Accreditation Board for Engineering and Technology

ENGINEERING CRITERIA 2000
PROGRAM SELF-STUDY REPORT

Computer Engineering

University of West Florida

June 2006
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Glossary

Academic Advising  The process of interaction between a student and an advisor assigned for the purpose of providing guidance on matters related to success in the curriculum. Although the student is ultimately responsible for knowledge of the requirements and success in achieving them, academic advising is mandatory in the UWF and ECE Department.

Alumni Surveys  A set of survey instruments annually distributed to alumni. The results are tabulated along with any narrative responses and provided to the ECE Curriculum Committee.

Assessment  The process of evaluation by which the department determines, through a variety of clearly defined means, whether it is satisfactorily accomplishing its mission and achieving its objectives.

Assessment Plan  A plan adopted to guide the assessment process. This plan specifies what data is collected, who is responsible, when it occurs, how it is used, how the results are reported, and how action is taken as a consequence of the results.

Director  The faculty member serving as the administrative officer responsible for all departmental processes and operations.

Constituents  A group of individuals with common expectations of an educational program.

Educational Objective  A statement describing how the program will fulfill its mission.

Employer Surveys  A survey sent to employers of our graduates to obtain an overall evaluation of the success of program graduates and to elicit constructively critical narrative responses.

EAC or Council  Engineering Advisory Council. A volunteer body of practicing engineers external from the university but with an interest in the development and success of the engineering programs.

Focus Group  An informal group of people convened to be representative of a larger population for the purpose of structured interaction leading to qualitative findings which would be difficult to objectively obtain.

Instrument  A device used to elicit information from the respondent in a structured way.

Mission Statement  The purpose of the department.

Program Objective  A statement describing what our graduates are expected to accomplish 4/5 years after graduation.

Program Outcomes  Descriptions of what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program.

SASS  Student Academic Support System. A computer program that shows how the student is progressing towards meeting degree requirements.

Stakeholder  A group of individuals with common expectations of an educational program.

Performance Criteria  The benchmark that the program sets for the outcome and against which the outcome’s performance is judged by the faculty within the department. These criteria are most often stated in terms of percentages, percentiles, averages, or other quantitative measures.
A. Background Information

1. Degree Offered

The Department of Electrical and Computer Engineering at the University of West Florida offers:

   Bachelor of Science in Computer Engineering*

The same degree program is offered in two campuses: Pensacola (PNS) and Fort Walton Beach (FWB). The distance between two campuses is approximately 50 miles.

* The University of Florida in Gainesville awards the degree, which is offered under a co-operative arrangement between the University of Florida (UF) and the University of West Florida (UWF). The diplomas are identical in all respects to those issued to UF students.

2. Program Modes

   Day
   Co-operative Work Experience
3. The ABET Interim Visit Report

FINAL STATEMENT

UNIVERSITY OF FLORIDA

Accreditation Board for Engineering and Technology
ENGINEERING ACCREDITATION COMMISSION

UNIVERSITY OF FLORIDA
Gainesville, Florida

FINAL STATEMENT
Visit Dates: February 9-10, 2003 – University of West Florida Campus
February 11-12, 2003

Introduction

The Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET) has conducted an interim visit to the electrical engineering and computer engineering programs (University of West Florida campus, Pensacola) and the coastal and oceanographic engineering program (Gainesville campus) at the University of Florida relative to shortcomings identified during the 2000-2001 general EAC review.

This statement represents the final summary of the EAC interim evaluation at the institutional and engineering program levels. The first part covers the overall institution and its engineering operation; the second covers the individual engineering programs. Its format allows the reader to discern both the original visit findings and subsequent progress made during the process.

A program’s accreditation action is based upon the findings summarized in this statement. Actions depend on the program’s range of compliance or non-compliance with the criteria. This range can be construed from the following terminology:

- **Deficiency**: A deficiency indicates that a criterion is not satisfied. Therefore, the program is not in compliance with the criteria and immediate action is required.

- **Weakness**: A weakness indicates that a criterion is satisfied but lacks the strength of compliance that assures that the quality of the program will not be compromised prior to the next general review. Therefore, remedial action is required to strengthen compliance with the criteria.
Final Statement

- Concern: A concern indicates that a criterion is currently satisfied; however, the potential exists for this situation to change in the near future such that the criterion may not be satisfied. Therefore, positive action is required to ensure continued full compliance with the criteria.

- Observation: An observation is a comment or suggestion that does not relate directly to the accreditation action but is offered to assist the institution in its continuing efforts to improve its programs.

The University of Florida is a public, land-grant research university. It is the oldest and largest of the ten state universities in Florida. The College of Engineering at the University of Florida has eleven academic departments. All departments offer bachelor's, master's, and Ph.D. degree programs, except for the coastal and oceanographic engineering program and the biomedical engineering program which offer graduate degrees only. The interim visit on the Gainesville campus involved only the coastal and oceanographic engineering program.

The University of West Florida is a public comprehensive university located in Pensacola in the fast growing western tip of the Florida panhandle. It enrolled its first class in 1967 and today has over 9,000 students. It has branch campuses at Fort Walton Beach and Eglin Air Force Base, both a short drive east of Pensacola. The University of West Florida (UWF) and the University of Florida (UF) entered an agreement in 1993 to offer a joint electrical engineering program on the UWF campus. The program would offer a UF degree by following the UF curriculum as closely as possible, while using faculty members hired by UWF. The director of the UWF/UF program was the sole UF employee in the collaborative arrangement. In 1998, the Florida Board of Regents approved an addendum to the 1993 UWF/UF agreement and authorized the UWF/UF program to also offer a computer engineering degree. It was agreed that the UWF/UF programs were to be turned over to the UWF at an acceptable time in the future.

Institutional Strengths

1. The University of Florida is a large research institution with nationally recognized engineering program offerings. Selective admission guidelines provide a very competent student body.
2. The efforts of the University of Florida and the University of West Florida to collaborate in order to expand engineering offerings to the far western part of the state are to be commended. It is apparent that the demand for such offerings is present and growing in Pensacola. The programs provide opportunities for citizens in that part of the state to improve their educational credentials when geographic limitations preclude them from relocating.

Institutional Concerns

1. Criterion 7: Institutional Support and Financial Resources The previous general review noted a concern regarding financial resources in support of faculty salaries. It was noted that faculty salaries continued to be below national averages and professional norms.

Although it is recognized that several initiatives have been enacted to correct the salary problems, it appears that faculty salaries are still below national averages and professional norms, especially in comparison to the University of Florida's peer institutions. The EAC recommends that measures be taken to assure that financial resources be directed to maintaining the quality and continuity of faculty in the engineering program.

- This concern was not addressed during this interim visit and will be evaluated at the next general review.
Computer Engineering
Program
(University of West Florida Campus)

Introduction
The Electrical and Computer Engineering (ECE) Department at the University of West Florida (UWF) offers electrical engineering and computer engineering University of Florida (UF) degrees. The accreditation visit in 2000-2001 was the initial general review for both programs. Most of the faculty members teach in both programs with a great deal of commonality in the two curricula. Program concerns identified during the previous review were not addressed during this interim visit.

Program Strengths
1. The program faculty members are qualified, dedicated, and enthusiastic. Cooperation and communication among the faculty members are quite evident.

2. The students are enthusiastic and hard working. They report good access to the faculty members and satisfaction with their advisors.

3. Changes made since the previous review indicate that the faculty members and program administration are willing to make needed program improvements.

4. The engineering faculty members have a good working relationship with their computer science colleagues, who are actively involved in assessment and process improvement.

Program Weaknesses
1. Criterion 2: Program Educational Objectives. The previous general review cited a weakness related to inadequate involvement of constituencies in the establishment and periodic review of educational objectives and the need for the implementation of a formal process for assessment and review, with a cycle interval shorter than six years. While program objectives were published and adequate, a functioning process to review and assess the validity of the objectives as they relate to the needs of the various constituencies needed
In materials prepared for this visit, the program described an updated review process that involves key constituencies and which is based on a two-year cycle. In the first execution of this review process during 2001-2002, survey data were gathered from employers, alumni, students, and the Engineering Advisory Council. The evidence indicates that a basic survey process and data analysis were completed since the 2000-01 general review, although no changes to the program objectives were warranted by the data analysis. In addition, little documentation was provided for the non-survey components of the objective review process, including minutes of meetings with representatives of the various constituencies. This has been noted as an area for future improvement. Because the review process is still in its early stages and the current pool of graduates on whom to measure achievement of objectives is small, the program has not yet been able to fully demonstrate the achievement of its objectives based on the performance of graduates. The faculty appears to be committed to the sustainable implementation of the program improvement processes; however, these processes will need to be enhanced as the faculty and the program director gain additional experience with the methods of measuring achievement of objectives for program improvement. The results of these efforts are positive but warrant further review.

- The previously noted weakness is now cited as a concern.

2. Criterion 3: Program Outcomes and Assessment: The previous general review cited a weakness related to lack of evidence of compilation and use of outcome assessment results to evaluate the effectiveness of corrective actions. The final EAC statement also identified a need for documentation demonstrating student achievement of program outcomes. The process for assessing outcomes also needed strengthening. While assessment instruments were in use, there was no evidence of the compilation and use of results to assess the
effectiveness of corrective action. Without a more comprehensive process, the lack of
effectiveness of a poorly conceived corrective action might never be determined. It was
recognized that the unique requirements of the Joint Program agreements constrained the
freedom to make curricular changes as a result of outcome assessment. However, some
tailoring might still be possible. Also, Joint Program recommendations to the University of
Florida, the controller of the curriculum, could be made only if a viable process were in
place and functioning. The EAC recommended that a more formal process be formulated
and implemented.

In documentation prepared for the current review, the program has identified a fairly large
number of assessment tools, but only a subset of these tools appear to be focused on
evaluation of student and graduate outcome achievement. Further, evidence of the use of
these tools and the systematic application of their results to improve the program in some
cases remain incomplete. Some of the program's assessment techniques make use of surveys
and student self-evaluation; while these methods can provide useful information, the program
must be careful to validate them as effective measures for outcome assessment.

The program has strengthened its processes for demonstrating student achievement of
program outcomes by documenting links between the program outcomes and specific
courses. Faculty members assess student performance, summarizing the results in a report
for each course offering. Documentation provided by the program indicates that this process
has been initiated, though the evidence for some program outcomes is not as strong compared to
evidence for others. One drawback to the current approach is the difficulty of evaluating the
broad program outcomes in the limited context of a single course. The program is
encouraged to consider ways of further specifying this evaluation, perhaps by systematically
linking program outcomes to more specific course objectives.

The evidence indicates that the program has taken significant steps to improve the
assessment and demonstration of student outcomes. Discussions with the engineering and
computer science faculties revealed a good understanding of the remaining assessment issues
and a willingness to continue improving the process. The faculty is encouraged to use direct
assessment of student work and performance to strengthen the assessment of program outcomes.

- This shortcoming is now cited as a concern.

3. **Criterion 5: Faculty** The previous general review identified a weakness evidenced by high faculty workloads, large class sizes, and constrained elective offerings, as a result of an insufficient number of faculty members with the necessary competencies to cover all the curricular areas of the program. At least one additional ECE faculty member would be required to support the program at its current size; with any additional growth in enrollment, several more would be required.

Since the previous review, two new ECE faculty members were hired while one resigned, for a net increase of one faculty member for the two programs. The computer science faculty members who support the programs reported that, over the last two years, improvements have been made to alleviate a previously serious faculty shortage in that department. At present, class sizes appear reasonable, i.e., fewer than 35 students, even for those courses that were quite large, i.e., 74 to 98 students, at the time of the previous review. Effective Fall 2002, the engineering programs have instituted a plan to offer at least two technical elective courses each semester.

Discussions with engineering faculty members indicated that current workloads would make it very difficult to adapt to the loss of a faculty member due to resignation or sabbatical, or to permit release time for externally funded research or other scholarly activities. Some faculty members feel that increasing expectations for promotion and tenure may be difficult to meet unless they have more time for scholarship and service. Some faculty members also expressed concerns that research and scholarship expectations are not clearly defined when both department and university standards are taken into account. It should be noted that engineering has no graduate programs from which the faculty can draw research assistants.

Some faculty members also expressed concern about increasing demands related to the Fort Walton Beach campus. While this expansion provides potential growth in undergraduate enrollment and graduate research opportunities, i.e., UF has a research center near there, an
increase in the size of the faculty would be required to handle both on-site and distance learning activities.

- While some good progress has been made in this area, the previously cited weakness remains unresolved.

- **Due Process Response:** The EAC acknowledges receipt of a report from the computer engineering program in which it summarized its efforts regarding these faculty issues. Since the campus visit in February, 2003, the UWF ECE Department has hired two additional faculty members while one faculty member resigned. Of the new faculty members, one will be a tenure track assistant professor at the Pensacola campus, while the other will be a non-tenure track lecturer and serve as coordinator of the extended campus activities at Fort Walton Beach and Eglin Air Force Base. Both have excellent credentials for these positions. In addition, the program director circulated copies of the department bylaws to all faculty members for their review. These bylaws contain the criteria that the College of Arts and Sciences will use in its evaluation of the ECE faculty for promotion and tenure. The ECE faculty reviewed the department bylaws and voted to approve them.

- The computer engineering program has made good progress in addressing the faculty issues that have been cited. This shortcoming is now cited as a concern.
4. **Actions to Correct Previous Deficiencies, Concerns or Weakness**

No deficiency or weakness was cited in the previous visit in February 2003. However, the program has taken the following corrective actions:

(i) The ECE department developed a periodic review process for program educational objectives involving constituencies, effective Spring 2001 for measuring and demonstrating the achievement of program objectives.

(ii) The department developed a periodic review process for program outcome assessment, effective Spring 2001 for direct assessment of student work and performance to strengthen the assessment of program outcomes.

(iii) The Department hired one new and one replacement faculty members in electrical and computer engineering, staring Fall 2002 (Dr. Dale Harrell, Assistant Professor; Dr. Mohamed Khabou, Assistant Professor). The Department hired two more faculty members in electrical and computer engineering, starting Fall 2003 (Dr. Xuemin Millard, Assistant Professor; Dr. Tom Gilbar, Lecturer and FEEDS Coordinator). The Department hired one new faculty member in electrical and computer engineering, staring Fall 2005 (Dr. Andreas Fuchs, Assistant Professor). One faculty position which was vacated due to the resignation of Dr. Millard at the end of 2005 spring term was also filled, effective fall 2005 (Dr. Bassam Shaer, Assistant Professor). Thus, one new faculty was hired in Fall 2005. The record of faculty positions and their replacements is shown in Table 1-1. Dr. Mathews was on leave on absence during the 2005-2005 year and his position was filled by Dr. Avant as Visiting Professor. It will be filled by Dr. Ezzat Bakhoun, effective August 8, 2006 (see his vitae in Appendix I, Part C – Faculty Resumes). Dr. Bataineh passed away on April 15, 2006 due to lung cancer. The Department plans to fill Dr. Bataineh’s position temporarily by Dr. Avant as Visiting Professor and to initiate a search in Fall 2006 to fill the position permanently, effective Fall 2007.

<table>
<thead>
<tr>
<th>#</th>
<th>Faculty Position #</th>
<th>Faculty</th>
<th>2000-01</th>
<th>2001-02</th>
<th>2002-03</th>
<th>2003-04</th>
<th>2004-05</th>
<th>2005-06</th>
<th>2006-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>11175</td>
<td>Manseur</td>
<td>Manseur</td>
<td>Manseur</td>
<td>Manseur</td>
<td>Manseur</td>
<td>Manseur</td>
<td>Manseur</td>
<td>Manseur</td>
</tr>
<tr>
<td>2.</td>
<td>11184</td>
<td>Mathews</td>
<td>Mathews</td>
<td>Mathews</td>
<td>Mathews</td>
<td>Mathews</td>
<td>Avant (V)</td>
<td>Bakhoun</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>UF</td>
<td>Rashid</td>
<td>Rashid</td>
<td>Rashid</td>
<td>Rashid</td>
<td>Rashid</td>
<td>Rashid</td>
<td>Rashid</td>
<td>Rashid</td>
</tr>
<tr>
<td>4.</td>
<td>11176</td>
<td>Gorman</td>
<td>Gorman</td>
<td>Gorman</td>
<td>Gorman</td>
<td>Gorman</td>
<td>Gorman</td>
<td>Gorman</td>
<td>Gorman</td>
</tr>
<tr>
<td>5.</td>
<td>11174</td>
<td>Bataineh</td>
<td>Bataineh</td>
<td>Bataineh</td>
<td>Bataineh</td>
<td>Bataineh</td>
<td>Bataineh</td>
<td>Avant (V)</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>11706</td>
<td>Yasin (V)</td>
<td>Lau (V)</td>
<td>Khabou</td>
<td>Khabou</td>
<td>Khabou</td>
<td>Khabou</td>
<td>Khabou</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>11186</td>
<td>Harrell</td>
<td>Harrell</td>
<td>Harrell</td>
<td>Harrell</td>
<td>Harrell</td>
<td>Harrell</td>
<td>Harrell</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>10267</td>
<td>Gilbar</td>
<td>Gilbar</td>
<td>Gilbar</td>
<td>Gilbar</td>
<td>Gilbar</td>
<td>Gilbar</td>
<td>Gilbar</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>11470</td>
<td>Millard</td>
<td>Millard</td>
<td>Shaer</td>
<td>Shaer</td>
<td>Shaer</td>
<td>Shaer</td>
<td>Shaer</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>11033</td>
<td>Fuchs</td>
<td>Fuchs</td>
<td>Fuchs</td>
<td>Fuchs</td>
<td>Fuchs</td>
<td>Fuchs</td>
<td>Fuchs</td>
<td></td>
</tr>
</tbody>
</table>

(iv) The University of West Florida is committed to hiring all new faculty members at a salary, which will be competitive with that of peer institutions. The salary amounts for each discipline will be 10% above and below the mean published by the College and University Personnel Association (CUPA) in May 2004. The 9-month salary for a ‘new’ Assistant Professor of Electrical and Computer Engineering will depend on qualifications and experience and will fall within the range from $65,000 to $74,000
Effective Fall 2003, the Department is offering lecture courses at FWB campus through two high-tech synchronous-mode distance delivery classrooms. All lecture classes are taught through these classrooms from Pensacola to FWB or vice-versa. All labs are taught by faculty in both campuses. Students can also complete electrical and computer engineering degrees from FWB campus. Three (3) full-time faculty members are currently assigned to FWB campus.

UWF is committed to offering quality undergraduate engineering education to serve the needs of the Northwest Florida region. UWF will continue to provide support for additional space and additional laboratory stations as they are needed to accommodate the growing enrollment. It is anticipated that the Department will move to a new Science and Engineering building in 2007-2008 and share facilities with other departments (Engineering, Computer Science, Physics, Mathematics and Statistics) of the newly formed ‘School of Science and Engineering’.

5. **Background of UWF Engineering**

The Board of Regents requested the assistance of the Department of Electrical and Computer Engineering at UF to help form an Electrical Engineering Department at the University of West Florida at Pensacola. The agreement was signed by both universities on April 29, 1994 and May 9, 1994. The Director of the UF/UWF Joint Program, Dr. Ronald C. Houts, was hired in August 1993. He was employed as a UF faculty but assigned to UWF at Pensacola. Dr. Houts worked closely with the UF-ECE administration to replicate the UF BSEE program at UWF. Staring from only two (2) visiting faculty members in January 1994, the program had five (5) faculty members in fall 1996. The University of West Florida employs all faculty members. However, the University of Florida employs the Director.

The Joint Program was initially housed within the College of Science and Technology. A Procedural Agreement for the operation of the UF/UWF Joint Program was developed. Effective fall 1998, the Joint Program in Electrical Engineering was named as the Department of Electrical and Computer Engineering. Effective Fall 1999, the University of West Florida merged the College of Science and Technology (CoST) with the College of Arts and Social Sciences into a new College of Arts and Sciences (CAS). The Department is currently housed within the College of Arts and Sciences (CAS).

The ECE Department offers the following two UF degree programs:
- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Computer Engineering

The details are included in Appendix II, Institutional Profile.

6. **Changes to UWF Engineering**

Dr. Houts resigned his position as Director on January 3, 1997. Dr. Muhammad H. Rashid was hired as the Director on August 8, 1997. The original procedural agreement was amended in December 1997 to clarify additional operating procedures.

In July 1998, the Florida Board of Regents approved an addendum to the UF/UWF agreement, which was recommended by both UF and UWF in February 1998, and established the Bachelor of Science in Computer Engineering degree.

The recommendations of the Presidents of both UF and UWF and the Florida Board of Regents’ final approval are required for the turnover of the administration of the UF degree programs to UWF. The Presidents of UF and UWF will need to agree mutually on the turn over of the administration of the degrees to UWF. It is anticipated that UF will turn over the administration of the UF degree programs to
UWF in January 1, 2009. At that time, the degree programs will stand alone, and UWF will seek for ABET accreditation for its engineering programs.

The final transfer of the electrical and computer engineering programs from UF to UWF will be completed by December 31, 2008. Students graduating from the degree programs after December 2008 will be awarded a UWF degree. All students graduating prior to December 31, 2008 will receive a degree from UF. Students who were admitted to UWF before August 8, 2004, and are not able to complete the degree requirements by December 31, 2008, will have the option of transferring to UF for the completion of the degree from UF.

7. Transition Plan from UF to UWF

UWF initiated the process of transferring degrees from UF to UWF and is working on a transition plan. It is anticipated that some students who started UWF in fall 2004 may not complete the degree requirements by December 2008 and may receive UWF degrees. Of those students who come to UWF in Fall 2005, a number of them may graduate from UWF. As a result, UWF decided to have its own curriculum, degree plans (page # 204), SASS Audit and graduation certification process in place by Fall 2005. Table 1-2 shows the transition plan.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Activity</th>
<th>Status</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2003</td>
<td>Memorandum of Understanding</td>
<td>Signed by UWF and UF officials</td>
<td>Completed in August 2003</td>
</tr>
<tr>
<td>Fall 2004</td>
<td>Determine the process of degree separation</td>
<td>Worked with Dr. Carl Beckman, Associate VP</td>
<td>Identified the steps Spring 2005</td>
</tr>
<tr>
<td>Fall 2004</td>
<td>Initiate new UWF course review</td>
<td>*CAS, Academic Council, Faculty Senate, Provost</td>
<td>Pending at Tallahassee SCNS*</td>
</tr>
<tr>
<td>Spring 2005</td>
<td>Initiate new degree programs</td>
<td>CAS, Academic Council, Faculty Senate, Provost, BOT*</td>
<td>Pending at Tallahassee BOG*</td>
</tr>
<tr>
<td>Fall 2005</td>
<td>Inform all engineering students and get a signed statement</td>
<td>Staring Spring 2005</td>
<td>Until Fall 2007</td>
</tr>
<tr>
<td>Fall 2005</td>
<td>UWF curriculum for degrees</td>
<td>Given to students</td>
<td>Differ from UF</td>
</tr>
<tr>
<td>Spring 2006</td>
<td>SASS Audit for UWF degrees</td>
<td>The curricular requirements in place</td>
<td>For UWF degree seeking students</td>
</tr>
<tr>
<td>Fall 2007</td>
<td>Curriculum for UWF degrees in catalog</td>
<td>Spring 2007 for catalog change</td>
<td>For 2007-2008 catalog</td>
</tr>
<tr>
<td>Fall 2007</td>
<td>Notification to all engineering students</td>
<td>Complete notification</td>
<td>Complete notification</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>Initiate Graduation Certification for UWF graduates</td>
<td>Develop process</td>
<td>SASS Audit</td>
</tr>
<tr>
<td>Spring 2009</td>
<td>Graduation Certification for UWF graduates</td>
<td>Complete first certification</td>
<td>SASS Audit</td>
</tr>
</tbody>
</table>

*CAS – College of Arts and Sciences, BOT- Board of Trustees, BOG – Board of Governors, SCNS – State Course Numbering System

8. Coordination by UWF Engineering

At the beginning of each semester, the Department sends a tentative list of students graduating in the current semester and a list of students graduating in the following semester to UF-ECE Department and
UWF, Records and Registration.

UWF, Records and Registration sends grade information to UF, Records and Registration.

The Engineering sends student records to UF-ECE Department to include any updated records for students graduating in the current semester and new records for students graduating in the following term, and the UWF student becomes a UF student. Student records are also updated to reflect junior or senior status and honors.

The Department coordinates with UWF Records and Registration, UF Records and Registration, and ECE Department at UF.

Effective January 2009, after the transfer of the degree programs from UF to UWF is completed; the Department will coordinate with UWF Records and Registration.

The details of the graduation certification procedures for the ECE Department are included in Appendix II, Institutional Profile.

9. **Review Process to Ensure UF's Program Quality**

Since the students receive degrees from UF and the diplomas are identical in all respects to those issued to UF students, the Department and the UF-ECE Department work closely on academic and administrative issues to ensure the program quality. Some examples are as follows.

- The Director Rashid is a faculty member of the UF-ECE Department and reports to the Chair of UF-ECE Department.
- Dr. Rashid visits UF regularly for meetings on issues, relating to curriculum and administrative issues.
- The admission requirements for the Department are identical to those for UF.
- The Department follows the UF's curriculum, academic requirements and academic policies.
- The faculty member teaching a course at the Department visits UF if needed and communicates with the UF faculty teaching the same course and tries to follow the same syllabi.
- When the labs for the Department were first developed, the UF-ECE Department prepared the equipment list in order to replicate the UF labs.
- The faculty hiring for the Department was done with the approval of the UF-ECE Department. In addition to faculty interviews at the UWF campus, the complete applications of the final list of candidates (vitae, reference letters and academic transcripts) were sent to the UF-ECE Department for (verbal) approval. On recent hiring, only the application package of the new faculty members (vitae, reference letters and academic transcripts) were sent to the UF-ECE Department.
- As the separation is coming closer, the department is working almost independently of UF involvements, while maintaining the program quality and satisfying the UF graduation requirements.
10. **ABET Team**

In order to assist the Director, an ABET Team has been assembled. Its role is to provide internal guidance for the program’s development and management. The Team membership is as follows:

**Director:**  
Dr. Muhammad H. Rashid, (850) 474-2976, mrashid@uwf.edu

**Academic Advisor:**  
Ms. Sherry Whitlock, (850) 474-3410, swhitloc@uwf.edu

**Chair of ECE Curriculum Committee:**  
Dr. Dale Harrell, (850) 474-2963, dharrell@uwf.edu

**ABET and Assessment Coordinator:**  
Dr. Mohamed Khabou, (850) 857-6031, mkhabou@uwf.edu

**FWB Coordinator**  
Dr. Tom Gilbar, (850) 863-0716, tgilbar@uwf.edu

**Instructor and Technical Manager:**  
Mr. Bill Weber, (850) 474-3407, bweber@uwf.edu

**Senior Secretary:**  
Ms. Diana Feltner, (850) 474-2963, dfeltner@uwf.edu

**Co-op Director:**  
Ms. Carol Pattterson, (850) 474-2255, cpatters@uwf.edu

**Chair of Computer Science:**  
Dr. Leo ter Haar, (850) 474-2581, lterhaar@uwf.edu

**Chair of Mathematics and Statistics:**  
Dr. Kuiyuan Li, (850) 474-2287, kli@uwf.edu

11. **Curriculum Committee**

For effective functioning of the engineering unit through active participations of all faculty members, the unit has developed a Functional Chart as shown in Figure 1-1 (see page # 15) to achieve its mission and goals of national reputation for its undergraduate programs. The faculty members of the curriculum committee are:

Drs. Dale Harrell (Chair), M. Khabou, Tom Gilbar, Bassam Shaer, Jefre LaPorte (CS Rep), and Rohan Hemasinha (Math and Statistics Representative).
Figure 1-1: Functional Chart (for 2005-2006)

Director
Dr. Muhammad H. Rashid

Engineering Advisory Council

Associate Chair
(Vacant)

FWB Coordinator
Dr. Gilbar

Academic Advising
FWB: Dr. Tom Gilbar
PNS: Ms. Sherry Whitlock, Mr. Bill

Gulf Power Program
Dr. Dale Harrell

High School Engineering Program
Mr. Rigby*, Drs. Harrell & Fuchs

Department Technical Services
Mr. Bill Weber and Mr. David Algeo

ABET & SACS Accreditation
Drs. Bataineh, Harrell

Daily Operations of Labs,
Classrooms (PNS & FWB), and DLL
Delivery System
Dr. Bataineh, Mr. Weber, Mr. Algeo

Lab Assistants, Graders, Tutors, and
Facilitators

Teaching Assignment
& Class Scheduling

* Indicates the Committee
Lead Person

ECE Curriculum Committee
Drs. Harrell*, Khabou, Gilbar, Shaer, Bagui, & Laforte

Student Scholarships and Awards
Drs. Harrell*, Gorman, Manseur, Gilbar

Department Bylaws
Drs. Khabou*, Gorman, & Fuchs

Library (PNS & FWB)
Drs. Manseur* and Shaer

Commencement, Open Houses, and Orientations
Dr. Harrell & Mr. Weber

Outreach
All Faculty, Coordinated by Mr. Weber

School of Science and Engineering (SSE)
Dr. Bataineh, Mr. Weber

Robotics Lab and Student Academic Competitions
Dr. Manseur*, Dr. Fuchs, Mr. Rigby

UPIC and Vision 2015
Drs. Rashid*, Bataineh and Harrell

Committees

Office Student Assistant
Ms. Melanie Parker

Mentor Coordinator

Department Senior Secretary
Ms. Diana Feltner

Computer Engineering Coordination
Drs. Mohamed Khabou*, Bassam Shaer, and Geff Laforte

Department Mentoring Program (Recruitment & Retention)
Dr. Bataineh, Mr. Weber, Ms. Whitlock

FEEDS Program
Dr. Tom Gilbar

2005-2006 ORGANIZATIONAL CHART FOR THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COMPUTER ENGINEERING

Degree: Bachelor of Science in Computer Engineering

Department: Electrical and Computer Engineering
Building 70, Room 116
(850) 474-2663
http://uwf.edu/ece
ece@uwf.edu

College: Arts and Sciences

Semester Hours Required for Degree: 126

Faculty: M. Law (UF Chairperson), M. Rashid (Director), R. Avant, M. Bataineh, A. Fuchs, T. Gilbar, S. Gorman, D. Harrell, M. Khabou, R. Manseur, K.T. Rigby, B. Shaer, W. Weber

The mission of the Department of Electrical and Computer Engineering (ECE) is to offer baccalaureate degree programs in electrical and computer engineering which serve the needs of the West Florida region, the State, and the nation.

The goal of the baccalaureate degree program is to prepare students to embark upon a professional career in computer engineering or to begin graduate study.

Graduates will be known for the accomplishments in the early stage of their careers and they should:
A. Develop computer engineering solutions either individually or through interdisciplinary teams within a global and societal context.
B. Professionally and ethically engage in technical or business activity through engineering ability, communication skills, and knowledge.
C. Continue professional growth through post-graduate education, continuing education, or professional activity.
D. Contribute to the Northwest Florida regional economic development.

The UWF/UF Joint Program in Electrical and Computer Engineering is a cooperative arrangement between the University of West Florida (UWF) and the University of Florida (UF). Courses are taught on the UWF Pensacola and Ft. Walton Beach campuses. The degree is awarded by UF and is identical to the one offered students on the Gainesville campus and is accredited by ABET (Accreditation Board for Engineering and Technology).

The transfer of the electrical and computer engineering programs from UF to UWF will be completed by December 31, 2008. Students graduating from this program after December 2008 will be awarded a UWF degree. All students graduating prior to December 31, 2008 will receive a degree from UF. Students who were admitted to UWF before August 8, 2004, and are not able to complete the degree requirements by December 31, 2008, will have the option of transferring to Gainesville for the completion of the degree from UF.

The objective of the program leading to the degree of Bachelor of Science in Computer Engineering is to provide students with a strong theoretical and practical background in computer hardware and software, along with the engineering analysis, design, and implementation skills necessary to work between the two. A computer engineer is
someone with the ability to design a complete computer system - from its circuits to its operating system to the algorithms that run on it. Although it is valid to look at software and hardware separately, a computer engineer must take a more holistic approach. If an electronic device is to be called a computer, it must produce mathematically meaningful results. Similarly, any useful theory of computing must be physically realizable. The synthesis of theory and algorithms, which must take place before any useful computing can be achieved, is the job of the computer engineer. To produce such engineers is the mission of this program.

Computer engineering deals with the body of knowledge that forms the theoretical and practical basis for the storage, retrieval, processing, analysis, recognition, and display of information. This area also includes the design and implementation of computer systems and peripheral devices for information handling and engineering applications. The computer engineering curriculum provides a balance of hardware, software, and computer theory and applications with a basic background in electrical engineering. Seventeen hours of electives are included to permit a student to delve deeply into selected subject matters.

Computer engineers find career opportunities in a wide variety of companies or organizations involving the design, development, building, testing, and operation of computer systems. Computer engineers deal with both hardware and software (programming) problems. In designing a computer system, computer engineers must decide how much of the computer logic to put into hardware and how much to put into software. The work of the computer engineers and computer scientists is closely related. Computer engineers tend to be more involved with the computer hardware, whereas computer scientists tend to be more involved with the computer software and less emphasis on hardware.

**PROGRAM REQUIREMENTS**

The number of applicants who can be accepted is limited by the available classroom and laboratory space, laboratory facilities, and faculty. It is the department's policy to admit the best qualified applicants as determined by high academic achievement within the enrollment limitations discussed above. Admission is directly tied to student's performance in physics and calculus courses, because subsequent work is intimately related to those disciplines.

The currently accepted minimum requirements for admission to the program include completion of all eight common prerequisite courses with a grade of "C" or better in each, with an overall GPA of 2.5 (4.0 scale) in Physics courses, an overall GPA of 2.5 (4.0 scale) in Math courses, and an overall GPA of 2.5 (4.0 scale) in Chemistry I or Biology. Only the first two attempts (including withdrawals, drops, audits, etc.) will be considered in determining whether the minimum grade of "C" has been achieved and in calculating the overall GPA in common prerequisite areas. A student must be accepted into the program before the last 35th is completed. During the semester prior to the graduation term, the student's record is officially transferred to Gainesville where it is reviewed to certify that the particular course selections satisfy all graduation requirements.

Effective fall 2006, students are required to have a laptop PC. Students should check with the department for minimum hardware configurations.

In addition to general University requirements, students seeking the B.S. in Computer Engineering must meet the requirements listed below. A minimum course grade of "C" or better is required in all electrical engineering core courses (EEL 3111, 3112, 3135, 3304, 3396, and 3701), and in all computer science courses and labs (COT, CEN, CIS, CDA or COP prefix) which serve as prerequisites to other EEL and CS courses and labs. A "C" or better is required in EEL 4914C, ENC 3240, and all Computer Science courses.

Students should consult with their academic advisor for courses which may satisfy both the General Studies requirements and common prerequisites.

The computer engineering curriculum is designed to yield fifteen outcomes. Each upper division course within the curriculum contributes to at least one of these outcomes. A student must demonstrate each outcome achievement in at least two courses to satisfy the graduation requirements.

All seniors must complete an exit interview with their advisor and submit a copy of their senior design report before graduating.

Course descriptions are listed alphabetically by prefix in the back of this Catalog.

**General Studies (30 sh)**

Assumes Advanced Placement credits in ENC 1101 and ENC 1102 by UF. Must include a course in literature, ECO 2013, EHU 1001, PHI 2803, and either a Fine Arts or Behavioral Science, PHI 2800 should not be taken.

**Common Prerequisites (30 sh)**

State mandated common prerequisites must be completed prior to admission to the program. Courses in brackets indicate substitutes from Florida public community/junior colleges and universities.

- CHM 2045L General Chemistry II/ Lab .......................... 4
  [CHS x440]  
- MAC 2311 Analytic Geometry & Calculus I .................. 4
  [MAC x311, x261]  
- MAC 2312 Analytic Geometry & Calculus II .................. 4
  [MAC 2312, x262]  
- MAC 2313 Analytic Geometry & Calculus III .................. 4
  [MAC 2313, x283]  
- MAP 2302 Differential Equations ............................... 3
- PHY 2048/L University Physics I/ Lab .......................... 4
- PHY 2049/L University Physics II/ Lab .......................... 4
Choose one:
- CHM 2048 General Chemistry II ................................. 3
  or Biological Science ........................................... 3

* Indicates common prerequisites which can be used to satisfy General Studies requirements.
Computer Requirement (3 sh)
CIS 3020 Introduction to CIS .........................3

Major (60 sh)
CEN 3031 Introduction to Software Engineering ....3
CDA 3101 Introduction to Computer Organization ...3
COP 3530 Data Structure and Algorithms ............3
COP 4600 Operating Systems .........................3
COT 3100 Applications of Discrete Structures ......3
EEL 3111 Circuits I ..................................3
lab 3112 Circuits II ..................................3
EEL 3135 Discrete-Time Signals & Systems ..........3
EEL 3303L Electric Circuits Laboratory .............1
EEL 3304 Electronic Circuits I .......................3
EEL 3306 Solid-State Electronic Devices ..........3
EEL 3701L Digital Logic & Computer Systems/Lab ...4
EEL 4304L Electronics Laboratory ...................1
EEL 4712L Digital Design/Lab .......................4
EEL 4713L Digital Computer Architecture/Lab ......4
EEL 4744L Microprocessor Applications/Lab ........4
EEL 4914C Electrical Engineering Design ..........3
EGN 4034 Professional Ethics ......................1
EEL electives .......................................8

Maximum of 3 sh in EEL 4949 and maximum of 4 sh in EEL
4905, and maximum of 7 sh in EEL 4905/4949(combination).
Consult the Department for the current list of approved EEL
Elective courses. EEL 4834 cannot be used as an EEL elective.

Major Related (17 sh)
EEL 4834 C++ Programming for
Electrical Engineering ...............................3
EGM 2500 Engineering Mechanics: Statics ..........2
ENC 3240 Technical Writing ..........................3
MAS 3105 Linear Algebra ................................3
STA 4521 Introduction to
Mathematical Statistics I ...........................3
Computer Science Elective ..........................3

Consult the department for the current list of approved
technical elective courses

Upper Division Electives (0 sh)
B. Accreditation Summary

1.0 CRITERION 1 – STUDENTS

UWF has a process in place to evaluate student performance, advice students regarding curricular and career matters, and monitor student’s progress to foster their success in achieving program outcomes, thereby enabling them as graduates to attain program objectives. UWF has and enforces policies for the acceptance of transfer students and for the validation of courses taken for credit elsewhere.

The Office of the Registrar maintains the official academic records of all students and course registrations for currently enrolled students. Official student information is retained in the Office of the Registrar. Currently enrolled students may access their grades the day after grades are due (see Academic Calendar) via ARGUS. ARGUS is the University’s single entry point of fast and easy access to web-based services. Students may register, withdraw, drop and add classes, view the account balance, view grades, and more through ARGUS. Each student is granted access to ARGUS upon enrolling at UWF. Students are responsible for information and actions taken through ARGUS.

1.1 Evaluation

The University Student Academic Support System (SASS) audit shows the curricular requirements of the degree program. It keeps student’s academic record and shows how the student is progressing towards meeting the requirements for the degree. In addition, UWF sends a Student Academic Support System (SASS) audit to each student. Students can access his/her record of the SASS audit through remote computer access. The academic advisor can also access the student's record for advising and monitoring the student's academic progress. The department maintains an individual academic folder of each student, which contains his or her academic progress and UF GPA sheet, correspondence, and forms that he or she has processed.

The UF grading system is different from that of UWF as shown in Table 1-3 (Page # 20). As a result, a student can have different GPAs for UF and UWF. However, a student must satisfy the UF GPA requirements for graduation. Ms. Sherry Whitlock also keeps an updated degree plan with a UF GPA calculation in the student’s file (see Appendix IV – Student Advisement, Page # 2) and an ftp-site where the other advisors can also have an access to the student records.

The University Registrar posts grades on student’s transcript at the end of each semester. The College of Arts and Sciences at UWF receives a printout of those students whose grade point averages have fallen below 2.0. The College then places these students on College Probation, and an academic probation letter is written to each student. If the student wants to remain in the Department, a probation contract is also sent by the Department with the terms of the academic probation.
The intent of academic probation is to serve notice formally that a student may not be making satisfactory progress. It gives the students further opportunity to demonstrate their ability to meet academic expectations. Students whose cumulative grade point average (GPA) for University of West Florida course work is below the minimum listed below will be placed on academic probation by the student’s college.

<table>
<thead>
<tr>
<th>Total UWF GPA hours</th>
<th>UWF cumulative GPA for academic probation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>less than 1.60</td>
</tr>
<tr>
<td>16-30</td>
<td>less than 1.80</td>
</tr>
<tr>
<td>more than 30</td>
<td>less than 2.00</td>
</tr>
</tbody>
</table>

**Table 1-3: Comparison of UF and UWF Grading System**

<table>
<thead>
<tr>
<th>Description</th>
<th>UWF Grade</th>
<th>UWF Grade Points</th>
<th>UF Grade</th>
<th>UF Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding</td>
<td>A</td>
<td>4.0</td>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>Outstanding</td>
<td>A-</td>
<td>3.7</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Above average</td>
<td>B+</td>
<td>3.3</td>
<td>B+</td>
<td>3.5</td>
</tr>
<tr>
<td>Above average</td>
<td>B</td>
<td>3.0</td>
<td>B</td>
<td>3.0</td>
</tr>
<tr>
<td>Above average</td>
<td>B-</td>
<td>2.7</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Average</td>
<td>C+</td>
<td>2.3</td>
<td>C+</td>
<td>2.5</td>
</tr>
<tr>
<td>Average</td>
<td>C</td>
<td>2.0</td>
<td>C</td>
<td>2.0</td>
</tr>
<tr>
<td>Average</td>
<td>C-</td>
<td>1.7</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Below average</td>
<td>D+</td>
<td>1.3</td>
<td>D+</td>
<td>1.5</td>
</tr>
<tr>
<td>Below average</td>
<td>D</td>
<td>1.0</td>
<td>D</td>
<td>1.0</td>
</tr>
<tr>
<td>Failure</td>
<td>F</td>
<td>0.0</td>
<td>F</td>
<td>0.0</td>
</tr>
</tbody>
</table>

A computer engineering student, whose cumulative, upper-division or EEL grade point average falls below a 2.0/4.0 and does not meet departmental degree requirements, will be placed on academic probation. The student is required to prepare a probation contract with an ECE academic adviser. Students normally are given two terms in which to remove their deficit points. Students, who do not satisfy the conditions of the first term on probation, may be dismissed from the department.

**Note:** When a student file is transferred from UWF to UF, a ‘C-’ grade is converted to a grade of ‘C’. As a result, the UF transcript may show a higher GPA than the UWF GPA.

1.2 Advising

The University of West Florida is committed to quality academic advising to assist all students in attaining their educational goals. The University Advising Center advises all lower division students upon their first semester of enrollment. All students are encouraged to seek academic advising on a regular basis. The Dean of each college and Chairperson of each department ultimately are responsible for ensuring that academic advice is available and accessible to all students within the college or department. The Department provides two types of advising for its students: faculty advising (performed by a faculty advisor), and academic advising (performed by an academic advisor).
1.2.1 Academic Advisors

The purpose of the academic advisor is to provide academic advising, counseling, mentoring, and curriculum planning, and also to ensure that all degree requirements are met. Academic advising is under the supervision of the Director, who may assign advising related duties to non tenure-earning departmental faculty or staff.

Ms. Sherry Whitlock, a full-time staff member and Mr. William (Bill) Weber, an Instructor in the ECE department serve as the academic advisors in PNS and FWB; Tom Gilbar advises in FWB (see Table 1-4, Page # 21). They are always available for students’ “walk-ins” or appointments and Ms. Sherry Whitlock, has extended hours for appointments during registration week.

In addition to the faculty and academic advisors, the department has published a student-counseling guide, which is located on the departmental web. The links to the information packets for senior design, high/highest honors, and internships are also located on this web page¹. All freshmen normally go through the Freshman Origination. Mr. Bill Weber is responsible for orientation of engineering students. Before registering on-line for the first time, all students must see an advisor at the ECE department and/or the UWF advising Center. Students receive a copy of their degree plan or acknowledgement of the SASS Audit for their degree requirements.

### Table 1-4: Assignments of Academic Advisors

<table>
<thead>
<tr>
<th>Advisors</th>
<th>Admission</th>
<th>Academic Advising</th>
<th>Graduation Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PNS</td>
<td>FWB</td>
<td>PNS</td>
</tr>
<tr>
<td>Sherry Whitlock</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bill Weber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tom Gilbar</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the advisement period, the student meets with the academic advisor to discuss the student's progress in the program and what courses the student should take for the next semester. Students who have Co-op assignments may send e-mail of the courses they want to take in the following term to the Academic Advisor. The academic advisor reviews it and advises the students of any changes that they should make in their schedules.

One month prior to the University's advanced registration period, announcements are posted in the department and on the web to remind students to contact the academic advisor and to inform them of the earliest date that they may begin making their advisement appointments. The Department’s permission is required for certain 4000-level EEL courses. The academic advisor, Director or ECE faculty must approve the registration for these courses.

Advisement is further discussed in Subsection 3.3 – Assessment Methods to Measure Program Outcomes (see Page # 100).

1.2.2 Faculty Advisors

The purpose of the faculty advisor is to answer general questions concerning the profession of electrical/computer engineering or in engineering in general, to serve as a mentor, and to assist

¹ Refer to [http://uwf.edu/ece](http://uwf.edu/ece)
students in selecting specific technical elective courses that will meet the student's professional goals and interests. All teaching faculty members serve as faculty advisors. For the sake of convenience, each student is assigned to a faculty advisor as shown in Table 1-5 (Page # 22), effective Fall 2005. Students are however free to see other faculty advisors for any questions. Each student should know the name of his/her advisor from the SASS Audit and group e-mail notification.

<table>
<thead>
<tr>
<th>Table 1-5 Assignment of Faculty Advisors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pensacola Campus</strong></td>
</tr>
<tr>
<td>Faculty: Dr. Ezzat Bakhoum</td>
</tr>
<tr>
<td>Rank: Assistant Professor</td>
</tr>
<tr>
<td>Students: A-C</td>
</tr>
<tr>
<td>Faculty: Dr. Andreas Fuchs</td>
</tr>
<tr>
<td>Rank: Assistant Professor</td>
</tr>
<tr>
<td>Students: A-H</td>
</tr>
<tr>
<td>Faculty: Dr. Dale H. Harrell</td>
</tr>
<tr>
<td>Rank: Assistant Professor</td>
</tr>
<tr>
<td>Students: D-H</td>
</tr>
<tr>
<td>Faculty: Dr. Bassam Shaer</td>
</tr>
<tr>
<td>Rank: Assistant Professor</td>
</tr>
<tr>
<td>Students: I-P</td>
</tr>
<tr>
<td>Faculty: Dr. Steve Gorman</td>
</tr>
<tr>
<td>Rank: Associate Professor</td>
</tr>
<tr>
<td>Students: I-L</td>
</tr>
<tr>
<td>Faculty: Dr. Thomas Gilbar</td>
</tr>
<tr>
<td>Rank: Lecturer &amp; FEEDS coordinator</td>
</tr>
<tr>
<td>Students: O-Z</td>
</tr>
<tr>
<td>Faculty: Dr. Mohamed A. Khabou</td>
</tr>
<tr>
<td>Rank: Assistant Professor</td>
</tr>
<tr>
<td>Students: M-P</td>
</tr>
<tr>
<td>Faculty: Dr. Rachid Manseur</td>
</tr>
<tr>
<td>Rank: Associate Professor</td>
</tr>
<tr>
<td>Students: Q-T</td>
</tr>
<tr>
<td>Faculty: Dr. Roger Avant</td>
</tr>
<tr>
<td>Rank: Visiting Professor</td>
</tr>
<tr>
<td>Students: U-Z</td>
</tr>
</tbody>
</table>

1.3 Monitoring

The monitoring begins with the first personal contact with an advisor who starts monitoring the student’s progress until the student completes all requirements for the degree and graduation. The monitoring includes the following activities:

1. All engineering students are assigned to a faculty mentor by the department.
2. All lower level students are also assigned to a voluntary student mentor by the department, effective Fall 2005.
3. All upper level students must contact their Academic Advisor to discuss curriculum and have their CAS (College of Arts and Sciences) holds lifted and sign a department information sheet on rules and regulations as shown in Table 1-6 (Page # 24). When needed, the information can be acknowledged through email, or signed in person, or electronically.
4. Every student, who has passed MAC 2313 and PHY 2049C with a grade of “C” (2.0/4.) or better, has a student folder located in the department (red folder for UWF and manila folder for UF).
5. For UF Students, when the 8 technicals needed for admission are met with the 2.5 GPA requirement an admission letter is sent out to the student by the Director.
6. For UWF Students, when the 7 technicals needed for admission are met with the 2.3/4.0 GPA requirement an admission letter is sent out to the student by the Director.
7. For UF students, grades are updated on a GPA sheet based on UF’s GPA scale (see Appendix IX – Degree Progress) For UWF, SASS audits (see Appendix IV, Page # 4) and outcome certification sheet are also checked by their departmental Advisor for graduation requirements, especially in meeting the UWF general education requirements.
8. All students must see their Academic Advisor four semesters before graduation and thereafter to discuss meeting all their graduation requirements (see graduation list in Table 1-7, Page # 29).

9. All students must see their Academic Advisor four semesters before graduation and thereafter to discuss meeting all their outcome requirements (see outcome certification sheet in Table 1-8, Page # 30).

10. Four semesters before graduation, students have to meet the departmental probation guidelines (see item #3 in Table 1-6, Page # 24).

11. All UF and UWF upper level students must meet with their Academic Advisor to discuss probation issues and have holds lifted (for UWF students, letters are sent out by UAC - University Advising Center).

12. All upper level students, who are not returning, are contacted.

13. All students must fill out an exit interview (see Appendix VIII, Page # Section G) before graduating for providing any feedback on advising and other issues.

The complete set of “rules” for overall GPA, GPAs in selected courses, requirements for a ‘C ‘grade in prerequisite and other select courses, require constant monitoring of student progress and record. The academic advisors work with the faculty, Registrar’s office and the students to monitor all of these requirements and take appropriate actions to correct any problems. The on-line computerized registration system should check for the completion of pre-prerequisites and the registration of co-requisite courses for those students who have completed the pre-requisite courses at UWF.

For transfer students, the departmental advisors check the registration of those students. The faculty reminds the students about the pre-requisites of their courses. Due to the C-rule, it is in the best interest of the student to make sure that they have the appropriate pre-requisites; otherwise they can not use the course for their degree even if they earn a passing grade.

The Department will continue with the ‘C-rule’ to maintain the program quality after the separation from UF. A minimum course grade of "C" (2.0/4.0) or better is required in all electrical engineering courses and labs (EEL prefix), and in all computer science courses and labs (COT, CEN, CIS, CDA or COP prefix) prerequisites to other EEL and CS courses and labs. A minimum grade of "C" (2.0/4.0) is also required on EEL 4914C, STA 4321, ENC 3240, all computer science courses, and any course transferred into the junior-senior years from another institution, effective Spring 2009.
Welcome

We want to make sure that you are aware of some important rules and requirements of our department to make your program run smoother. Please carefully read the following:

1. The transfer of the electrical and computer engineering programs from UF to UWF will be completed by December 31, 2008. Students graduating after December 2008 will be awarded a UWF degree. All students graduating prior to December 31, 2008 will receive a degree from UF. Students who were admitted to UWF before August 8, 2004, and are not able to complete the degree requirements by December 31, 2008, will have the option of transferring to Gainesville for the completion of the degree from UF. See UWF catalog at [http://uwf.edu/catalog/](http://uwf.edu/catalog/) and our ece website at [http://uwf.edu/ece/transition.pdf](http://uwf.edu/ece/transition.pdf)

   **If you do not complete your degree by December 31, 2008, you will receive a degree from the University of West Florida.**

   I plan to graduate from: _____UF  in Spring _____ Summer _____ Fall _____ Year _____

   I plan to graduate from: _____UWF  in Spring _____ Summer _____ Fall _____ Year _____

2. Our department has a list of outcomes that are vital to meeting our objectives for your education. Although most of our courses meet many outcomes, each course is designated to meet a few specific ones. If you meet the outcome of a course, your professor will supply proof that will be placed in a portfolio folder in the department. **In order to graduate, you must meet all the outcomes of your degree program, and we must have proof from at least 2 courses per outcome that you have met those outcomes on file.** You may meet with your advisor as often as you like to get an update on your progress. We will also supply a list of the outcomes to you today that includes a list of the courses that fulfill each outcome. Check the ece website for the courses linking to the outcomes at [http://www.uwf.edu/ece/about/](http://www.uwf.edu/ece/about/)

3. Electrical engineering students must have a grade point average (GPA) of 2.0/4.0 or higher in all electrical engineering courses. Computer engineering students must have a grade point average of 2.0 or higher in both electrical and computer engineering courses. If your cumulative, upper-division GPA falls below the UF-GPA requirement of 2.0/4.0 you will be placed on academic probation and required to prepare a probation contract with an ECE academic adviser before you can register for any courses.

   Your will have two terms in which to remove your deficit points. If we feel that you are not making sufficient progress to meet this requirement, you will be dismissed from the program.
4. In order to take EEL 4304L - Electronics I Lab, you must complete all lower division course requirements, including foreign language, core courses, statics, technical writing, etc.

5. You must complete all prerequisites with a minimum of a C (2.0/4.0) before moving on to the next course. If you take a course without successfully completing the proper prerequisites, you will not be able to use this course toward your degree even if you might have earned a grade of C (2.0/4.0) or higher on this course and also not allowed to move on to the next course until those prerequisites are completed. Also, a course that is listed as a corequisite of another course must be taken at the same time or before that course. In addition to a C in all prerequisite courses, you must receive a minimum grade of C in the following courses: EEL 3111, EEL 3112, EEL 3135, EEL 3304, EEL 3701, EEL 3396, EEL 3472, EEL 4914, ENC 3420 and all CS courses (for computer engineers). For more details, see the UWF catalog and our advising guide at: http://www.uwf.edu/ece/advising/

6. Students are required to complete the last 30 credits toward the baccalaureate degree in residence at UWF after they are fully admitted to the UF/UWF Joint Program.

7. You must see your advisor at least 4 semesters before graduating in order to apply for graduation and check your outcome achievement status. Seeing your advisor 4 semesters before graduation will avoid the possibility of missing a course and any outcome achievements for graduation.

8. All students are required to abide by the Academic Honesty Guidelines, which have been accepted by the University of Florida. The referenced website is http://www.aa.ufl.edu/aa/Rules/4017.htm

All students are required to abide by the Academic Honesty Guidelines, which have been accepted by The University of West Florida. The referenced website is http://www.uwf.edu/uwfmain/stuhandbk/

We expect our students to be honest in all of their academic work. You agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action, up to and including expulsion from the department.

By signing below, I am acknowledging that I have read and understood all of the requirements listed above.

If there is the possibility that I may graduate before 2009, I have chosen the UF degree. If I graduate after 2008, it is my understanding that it is my responsibility to ensure that I am under the UWF degree award.

_________________________________  _____________________
Student’s Signature        Date

Note: UWF students, who completed a pre-requisite course before Spring 2009, can use a grade ‘C-‘ (1.7/4.0) to meet the C-rule for pre-requisites. Effective Spring 2009, they must receive a grade to ‘C’ (2.0/4.0) or better.
1.4 Policy for Acceptance of Transfer Students

Although, students receive a degree from UF, they must satisfy the general education requirements of the University of West Florida. The policy for UWF general education depends on if the students are transferring from an out-of-state or an in-state institution.

1.4.1 Transfer Students from Florida Community College

A transfer student from a community college can transfer a maximum of 60 semester credits to UWF. If the number of credits earned is greater than 60 semester hours, the best 60 credits will be selected. These are not necessarily the first 60 credits earned. After the acceptance of 60 transfer credits, a student cannot subsequently take courses at a community college and receive credit for them. The Department generally accepts only 48 credits from a community college toward an engineering degree.

An Associate of Arts (A.A.) degree and the completion of eight common prerequisites are required for admission into an engineering degree program. The A.A. degree is also important for satisfying the general education requirement of the University of West Florida. The general education requirement for UF is different from UWF. However, as a part of the co-operative agreement, students must satisfy the UWF general education requirements even through they receive a degree from UF. A student having an AA degree from a community college in Florida will be considered to have satisfied this requirement if at least 15 credits have been earned in the social science and humanities areas.

1.4.2 Transfer from Other Universities

Students transferring from other four-year institutions must have completed the eight common prerequisites with a GPA of 2.5/4.0 or higher. Although all credits earned will be accepted by the University of West Florida, some may not be accepted towards satisfying engineering degree requirements. Additionally, students must satisfy the general educational requirement of the University of West Florida, not the general educational requirement the University of Florida.

1.4.3 Transfer to UF and Upper-Division (UD) Grade-Point Average

After the student is officially transferred to UF and classified as a UF student, UF will apply its grading scales and calculate the student’s GPA. UF’s GPA is different from that of UWF’s GPA resulting in a higher GPA. The College of Engineering at UF evaluates a UWF student's performance based on his or her upper-division EEL GPA provided the student was not a previous UF student. This average is calculated from courses taken at the University of West Florida starting the semester after a student has earned a total of 60 credits. UF Grade points are assigned as shown in Table 1-3 (Page # 20). Grades for transfer courses are not calculated with UF’s or UWF’s GPA.

A student's upper division (UD) GPA can be determined by totaling the grade points earned in the semesters attended at UWF after completing 60 hours, and then dividing these grade points by the total semester hours for this time period. The GPA calculation of course work is an average of all repeats. Thus, the original grade plus any repeat grades are all factored into the GPA. A student with less than a 2.0 UD GPA has a UD grade-point deficit. This deficit is the number of additional grade points needed for a 2.0 UD average. For example, a student with 90 grade points for 50 hours attempted has a 1.8 GPA and a deficit of 10 grade points.
1.5 Process for Validation of Transfer Credits

1.5.1 Lower Division Courses

UWF Admissions Office, according to UWF transfer credit policy, evaluates transfer credits for lower-division courses. Transfer credits are normally allowed for courses completed at or through other regionally accredited institutions of higher learning. No credits, however, are allowed for technical, vocational, or pre-college courses, or those courses completed with grades below "D-".

A "P" grade in a transferred pass/fail course may be used to satisfy general education and Gordon Rule requirements if the student provides that the "P" was equal to a grade of "C" (2.0/4.0) or higher, or if pass/fail was the only grading system available for the transferred course.

Credits earned from Florida public institutions will be evaluated on the basis of the Common Course Numbering System. Those courses, which are considered equivalent, will be accepted for transfer credit at the level that institution originally awarding the credit classified the course. Courses are considered equivalent when the prefix and the last three numerical digits of the course number are the same. Courses not considered equivalent might be accepted for transfer credit at the discretion of the Director.

All grades earned at other regionally accredited institutions are exactly entered as earned on a student's record at the time of transfer. Such grades are averaged separately from grades earned at UWF and are not considered in the UWF GPA. Transfer courses appear on the UWF transcript.

College work completed with satisfactory grades by a student at a regionally accredited institution of higher learning, prior to graduation from high school, will be considered under the same guidelines as other transfer work.

1.5.2 Upper Division Courses

All electrical engineering (EEL) designated courses must be completed at UWF. The Department may accept a maximum of two courses (up to 8 credits) from another electrical or computer engineering program from another 4-year institute provided the course covers the same material as the course at UWF. The Department will not accept any electrical engineering course taken at non-ABET accredited programs.

The Department evaluates all upper division courses. Students desiring to transfer credits for an upper division course taken at another institution must provide documentation, which becomes part of the student’s academic folder that establishes the level of, and the coverage represented by, the course taken at the other institution. This documentation is normally presented to the faculty coordinator of the equivalent course at the department. The coordinator must be satisfied that the course is equivalent to the UWF course and that the student’s knowledge is adequate before transfer credits will be accepted. The Director of the department then reviews for final action on the coordinator’s recommendation and approves or disapproves the request for transfer credits. The form for transfer credit request is shown in Appendix II, Page # II-73. The approval of the course equivalency is sent to the Registrant Office to be entered into the Student Information Systems.
1.5.3 Course Substitution

If the course prefix and title do not match with a corresponding UWF course, the transfer is considered as a course substitution. The process whereby students may request substitutions in the published curriculum is identical to that for the course equivalency. The Director makes the final decision for the course equivalency or course substitution. Since only 2 EEL transfer courses are allowed, a course substitution is not common for upper level engineering courses. The course substitution is normally done for lower (2000) level courses for those students who are changing UWF majors or coming from the out-of-state institutions. For examples, EUH 1001– Western Perspectives I is substituted by an American history course AMH 2010 – United States to 1877, AMH 2020 - United States since 1877, or a course on Western Civilization History.

1.5.4 Lower Division Shortages

Upper division students must make up lower-division hour shortages as soon as possible. Any shortages in mathematics must be made up with upper division mathematics courses.

1.6 Process to Ensure That All Students Meet All Program Requirements

The Department maintains an individual academic folder of each student, which contains his or her academic progress and UF GPA sheet, correspondence, and forms which have been processed. In addition, UWF maintains a Student Academic Support System (SASS) audit for each student, which shows the student’s progress toward meeting the requirements for the degree. Students can access his/her record of the SASS audit through remote computer access. The academic advisor can also access the student's record for advising and monitoring the student's academic progress (see Appendix IV - Student Advisement, Page # 2)

The process begins when the student must see an advisor at least 4 semesters before graduating in order to apply for graduation and check his/her outcome achievement status and the course to be completed before graduation. Seeing an advisor 4 semesters before graduation will avoid the possibility of missing a course and any outcome achievements for graduation. The items for graduation certification check list is shown in Table 1-7 (Page # 29) Certification process is further discussed in Appendix II, Requirements for Graduation (see Page # 49).

The students must also satisfy the outcome achievement requirements which are demonstrated through the student portfolio. Table 1-8 (Page # 30) shows the status and check list of the Outcome achievements and Certification. Processes for Ensuring Student Achievement of Program Outcomes is further discussed in Subsection 3.3 (see Page # 100).

Course Outcomes for Transfer Students: Transfer students whose courses are accepted for credits will be deemed to have met the designed course outcomes of the UWF equivalent courses. During the transfer credit evaluations, the course outcomes will also be evaluated and identified.

Course Outcomes for Courses Completed before fall 2004: The courses which were completed by UWF students before the outcome requirements in Fall 2004 will be deemed to have met the designed course outcomes. There will be no need for course evaluations for meeting the outcome requirements by those course(s).
### Table 1-7: Graduation Certification Check List

**TENTATIVE GRADUATION LIST FOR THREE (3) SEMESTERS IN ADVANCE FOR ELECTRICAL ENGINEERING**

**PRE-GRADUATION CHECK LIST FOR ELECTRICAL ENGINEERING**
*(TO BE COMPLETED AT THE END OF EACH SEMESTER AFTER GRADES POST)*

<table>
<thead>
<tr>
<th>Advanced List of 2005 Fall 2005 Graduates</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Status</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>Antes, John</td>
<td>x</td>
</tr>
<tr>
<td>Barrow, Jonathan</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advanced List of Spring 2006 Graduates:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Status</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>Bates, Ryan</td>
<td>x</td>
</tr>
<tr>
<td>Carbino, Timothy</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advanced List of Summer 2006 Graduates</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Status</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>McDonald, James</td>
<td>x</td>
</tr>
<tr>
<td>Moye, Chad</td>
<td>x</td>
</tr>
</tbody>
</table>

Reviewed by Advisor: _________________ Date: ___________ Director: _________________ Date: ___________
Table 1-8 Outcome Assessment and Certification

<table>
<thead>
<tr>
<th>Pre-grad certification:</th>
<th>I certify that this student has met, or will meet, requirements for the degree indicated above subject to the following conditions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honors Project:</td>
<td>√</td>
</tr>
<tr>
<td>Advisor Signature:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Program Director's Signature:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graduation Certification:</th>
<th>I certify that this student has met the requirements for the degree indicated:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisor Signature:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Program Director's Signature:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEEEDED</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>i</td>
<td>O</td>
<td>O</td>
<td>☑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEEEDED</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>i</td>
<td>O</td>
<td>O</td>
<td>☑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pre-evaluation of Outcomes: Advisor and Student Signature: [Signature] Date: 9-14-05

Final Evaluation of Outcomes: Advisor and Student Signature: [Signature] Date: [Signature]

I certify that I understand that I need to meet all 15 of the department outcomes in at least X courses in order to graduate. The outcomes that I have met are indicated at:

(03 calculus)

Student Print Name: Tony Rodriguez
Student Sign Name: Alexander Molody
Date: 09-14-05

Outcome 8: Teamwork - Sr. Design
1.7 Student Admission to UWF Engineering

Application requirements for admission to the engineering program are:

- Completion of some 45 semester-hours of lower division courses those are applicable toward an Associate of Arts (AA) degree from a Florida Community College.
- Completion of a minimum of 45 semester hours (sh) with an overall GPA of 2.5/4.0 or 60 sh with a 2.0/4.0 GPA.
- Completion of eight (8) pre-engineering technical courses with a 2.5/4.0 minimum GPA by the term they are admitted. Laboratories are required for the first chemistry and both physics courses, but the grades are not considered in the technical GPA. These eight courses required for admission are listed in Table 1-9 (Page # 31).

<table>
<thead>
<tr>
<th>#</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>MAC 2312</td>
<td>Analytic Geometry and Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>MAC 2313</td>
<td>Analytic Geometry and Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>MAP 2302</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>PHY 2048/L</td>
<td>University Physics I</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>PHY 2049/L</td>
<td>University Physics II</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>CHM 2045/L</td>
<td>General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>CHM 2046 or BIO</td>
<td>General Chemistry II or Biological Science</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

Students with a GPA of less than 2.5/4.0 in eight technical courses may be admitted conditionally as shown Table 1-10 (Page # 31). Pre-EE and pre-CEN engineering students are eligible to take EEL classes prior to being admitted to the EE/CEN program provided they have the pre-requisites.

<table>
<thead>
<tr>
<th>GPA in 8 technical courses</th>
<th>Student status</th>
<th>Additional EEL courses</th>
<th>Admissibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 or better</td>
<td>Associate of Arts (AA) transfer UWF native students (classified as pre-electrical or pre-computer engineering)</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Between 2.4 and 2.5.</td>
<td>UWF native students only (classified as pre-electrical or pre-computer engineering)</td>
<td>Track record of 12 or more credit hours of EEL courses with a GPA of 2.0/4.0 or better in EEL courses</td>
<td>Yes</td>
</tr>
</tbody>
</table>
In addition to the eight technical requirements, the following State mandated common prerequisites must be completed prior to admission to the program:

+ ENC 1101     English Composition I                              3
+ ENC 1102     English Composition II                            3
+ XXXXXXX      Humanities Courses                                6
+ XXXXXXX      Social Science Courses                           6
+ XXXXXXX      Humanities or Social Sciences                3

+ Indicates common prerequisites which can be used to satisfy General Studies requirements.

Common prereqs from:

Special rules concerning the number of hours in the lower division are applicable to this program and may be found at
http://www.facts.org/PreCoreq_SW/PreCoreq2004/i_enginfo1.html

Note: UWF native students can also earn credits toward an AA degree after completion of the AA degree requirements² (see UWF catalog for an A.A. degree)

Students are admitted under the condition that they agree to abide by the Academic Honesty Guidelines and signed the following statement:

The University of Florida Rules - 6C14 Student Affairs

All students are required to abide by the Academic Honesty Guidelines, which have been accepted by the University of Florida. The referenced website is
http://www.aa.ufl.edu/aa/Rules/4017.htm

I, the undersigned, understand that the UF/UWF Joint Program expects its students to be honest in all of their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action, up to and including expulsion from the UF/UWF Joint Program.

_______________________       ______________
Signature          Date

________________________
Student Name

² http://uwf.edu/catalog/
1.8 Sources of Students Seeking Admission

Students who apply to the Department usually come from four sources: (1) as a UWF native student classified as pre-engineering, pre-electrical and/or computer engineering; (2) as a transfer student from another Florida university, (3) from a Florida Community College; or (4) as a transfer student from another out-of-state university. As long as they have met the admission requirements, they are eligible for admission into the Department. The sources of the admitted students are shown in Table 1-11 (Page # 33).

Table 1-11: Sources of Sources of Enrolled Students to the Department

<table>
<thead>
<tr>
<th>Sources</th>
<th>Summer 2004</th>
<th>Fall 2004</th>
<th>Spring 2005</th>
<th>Summer 2005</th>
<th>Fall 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>UWF native students</td>
<td>66</td>
<td>142</td>
<td>140</td>
<td>71</td>
<td>151</td>
</tr>
<tr>
<td>State Universities</td>
<td>8</td>
<td>11</td>
<td>9</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Other Florida universities</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Florida Community Colleges</td>
<td>76</td>
<td>101</td>
<td>98</td>
<td>71</td>
<td>92</td>
</tr>
<tr>
<td>Out-of-state universities or colleges</td>
<td>17</td>
<td>25</td>
<td>26</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td>Katrina Evacuees (LA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>282</td>
<td>277</td>
<td>171</td>
<td>289</td>
</tr>
</tbody>
</table>

The student enrollment record since the beginning of the Department is shown in Table 1-12 (see Page # 34) and Figure 1-2 (Page # 35). As of the beginning of the Spring 2005 semester, there are 129 (junior and senior) and 208 pre-engineering students in the Department.

1.9 Student Admission after the Transfer of Degrees from UF to UWF

UWF wants to maintain the same admission requirements after the separation (see Section 1.7 - Student Admission to UWF Engineering) and has requested the Florida Board of Governor (BOG) to continue designating UWF engineering programs as limited access programs. The number of applicants who can be accepted is limited by the available classroom and laboratory space, laboratory facilities, and faculty. It is the department’s policy to admit the best qualified applicants as demonstrated by high academic achievement within the enrollment limitations discussed above. Admission is directly tied to student’s performance in physics and calculus courses, because subsequent work is intimately related to these disciplines.

In addition to general University requirements, students seeking the B.S. in Computer Engineering must meet the requirements listed below. A minimum course grade of “C” (2.0/4.0) or better is required in all electrical engineering courses and labs (EEL prefix), in all basic science courses (MAC, MAP, PHYS, CHM) and in all computer science courses and labs (COT, CEN, CIS, CDA or COP prefix) which are prerequisites to other EEL and CS courses and labs.

A minimum grade of “C” (2.0/4.0) is required on EEL 4914C, ENC 3240, STA 4321, all computer science courses, and any course transferred into the junior-senior years from another institution.

All graduating seniors must complete an exit interview with their adviser and submit a copy of their senior design report before graduating.
Table 1-12: Enrollment Progress Report for Electrical and Computer Engineering
(Includes all ECE majors classified as pre-engineering)

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Jrs</th>
<th>Srs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 1996</strong></td>
<td>33</td>
<td>26</td>
<td>37</td>
<td>96</td>
</tr>
<tr>
<td><strong>Fall 1996</strong></td>
<td>39</td>
<td>26</td>
<td>46</td>
<td>111</td>
</tr>
<tr>
<td><strong>Spring 1997</strong></td>
<td>39</td>
<td>21</td>
<td>55</td>
<td>115</td>
</tr>
<tr>
<td><strong>Fall 1997</strong></td>
<td>48</td>
<td>20</td>
<td>62</td>
<td>130</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Jrs</th>
<th>Srs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 1998</strong></td>
<td>41</td>
<td>20</td>
<td>55</td>
<td>116</td>
</tr>
<tr>
<td><strong>Fall 1998</strong></td>
<td>37</td>
<td>44</td>
<td>32</td>
<td>113</td>
</tr>
<tr>
<td><strong>Spring 1999</strong></td>
<td>32</td>
<td>30</td>
<td>38</td>
<td>100</td>
</tr>
<tr>
<td><strong>Fall 1999</strong></td>
<td>59</td>
<td>30</td>
<td>39</td>
<td>128</td>
</tr>
</tbody>
</table>

*Started in Fall 1998*

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Jrs</th>
<th>Srs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 2000</strong></td>
<td>67</td>
<td>35</td>
<td>34</td>
<td>136</td>
</tr>
<tr>
<td><strong>Fall 2000</strong></td>
<td>74</td>
<td>33</td>
<td>26</td>
<td>133</td>
</tr>
<tr>
<td><strong>Spring 2001</strong></td>
<td>64</td>
<td>32</td>
<td>26</td>
<td>122</td>
</tr>
<tr>
<td><strong>Fall 2001</strong></td>
<td>80</td>
<td>28</td>
<td>31</td>
<td>139</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Jrs</th>
<th>Srs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 2002</strong></td>
<td>87</td>
<td>33</td>
<td>34</td>
<td>154</td>
</tr>
<tr>
<td><strong>Fall 2002</strong></td>
<td>95</td>
<td>27</td>
<td>34</td>
<td>156</td>
</tr>
<tr>
<td><strong>Spring 2003</strong></td>
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<td>23</td>
<td>33</td>
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<tr>
<td><strong>Fall 2003</strong></td>
<td>100</td>
<td>26</td>
<td>37</td>
<td>163</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Jrs</th>
<th>Srs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 2004</strong></td>
<td>79</td>
<td>33</td>
<td>34</td>
<td>146</td>
</tr>
<tr>
<td><strong>Fall 2004</strong></td>
<td>88</td>
<td>36</td>
<td>40</td>
<td>164</td>
</tr>
<tr>
<td><strong>Spring 2005</strong></td>
<td>113</td>
<td>33</td>
<td>40</td>
<td>186</td>
</tr>
<tr>
<td><strong>Fall 2005</strong></td>
<td>89</td>
<td>34</td>
<td>47</td>
<td>170</td>
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</table>

<table>
<thead>
<tr>
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<th>Pre</th>
<th>Jrs</th>
<th>Srs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 2006</strong></td>
<td>104</td>
<td>29</td>
<td>48</td>
<td>181</td>
</tr>
<tr>
<td><strong>Fall 2006</strong></td>
<td>176</td>
<td>62</td>
<td>70</td>
<td>308</td>
</tr>
<tr>
<td><strong>Spring 2007</strong></td>
<td>208</td>
<td>58</td>
<td>71</td>
<td>337</td>
</tr>
<tr>
<td><strong>Fall 2007</strong></td>
<td>173</td>
<td>51</td>
<td>82</td>
<td>306</td>
</tr>
</tbody>
</table>

Figure 1-2: Student Enrollment Growth
1.10 Program Requirements

Upon graduating with a BSEE and/or a BSCEN degree, a student must have at least a 2.0 UF cumulative upper-division GPA, and at least a 2.0 average in all electrical engineering courses. Further, a BSCEN student must also have a grade of C or better in all Computer Science (CS) courses and at least a 2.0/4.0 average in all other courses required for computer engineering.

A minimum grade of “C” (2.0/4.0) is also required on EEL 4914C, ENC 3240, STA 4321, all computer science courses, and any course transferred into the junior-senior years from another institution.

A student must file an application to graduate for the degree with the ECE department at UWF in the semester prior to the graduating semester. If the student changes his graduation date, he/she must then fill another application with the ECE Department at UWF. Failure to file for a degree will prevent a student from graduating even if he or she has satisfied all other graduation requirements.

All graduating seniors must complete an exit interview with their adviser and submit a copy of their senior design report before graduating.

Effective fall 2005, students are strongly recommended to have a laptop tablet PC. Effective fall 2006, students are required to have a laptop tablet PC. Students are advised to contact the department to check the minimum hardware configurations.\(^3\)

C- Rule: If a required electrical engineering or a computer engineering course is a prerequisite to another required electrical engineering or a computer engineering course, a student must earn at least a grade of ‘C’ (2.0/4.0) in the prerequisite course before taking the next course.

\(^3\) [http://uwf.edu/ece/tabletpc](http://uwf.edu/ece/tabletpc)
30-Hour Rule: A student must take the last 30 hours in residence at the University of Florida/Department before receiving the BSEE or BSCEN degree, and have an electrical engineering (EE) or computer engineering (CEN) status when taking these hours.

Special Rules

1. A grade of “C” or better must be earned in ENC 3240 or ENC 2210 (Technical Writing), and in any course transferred into the upper division.
2. To take an electrical engineering or computer engineering elective, a student must have earned a grade of C or better in each prerequisite course.
3. A laboratory course cannot be repeated for degree credit.
4. EEL 4914C must be taken preferably no later than the next-to-last semester before graduation, and not more than one semester before this. The grade earned must be a C or better. (We do, however, make exception to this rule and students are allowed to take EEL 4914 in the final semester so that students are well prepared for their senior design).
5. Students must make up lower-division hour shortages. Any shortage in mathematics must be made up with upper-division mathematics courses.
6. A student can not take a course and it’s prerequisite at the same time, even with the instructor's approval, and even if the student has previously taken the prerequisite course and did not earn a C.
7. Required courses or technical electives (except EEL 4949) cannot be taken for an S-U (satisfactory/unsatisfactory) grade.

1.11 Academic Policies

After a student is accepted to Engineering, the student will be classified as a UWF student until the student is officially transferred to UF beginning of the graduation semester. The student will, however, be taking courses at UWF and will follow the UWF academic policies.

Undergraduate students are required to maintain the University of West Florida cumulative GPA’s of at least 2.0/4.0 to remain in good academic standing. If a student's overall GPA drops below 2.0, UWF will place this student on academic probation. If, however, the grade-point deficit is 1.5 or less, the student will be suspended. See the UWF undergraduate catalog for details.

1.12 UWF Catalog Year

The student will follow the catalog that is effective in the semester (fall, spring, summer) in which he or she was accepted to the University of West Florida. Then, the department will consider the student’s GPA for acceptance in the Department provided the student is continuously enrolled (at least one course a year). If the student is a special student (non-degree seeking) or does not take courses for three consecutive semesters, his catalog year will not be effective until the student applies (or reapplies). Courses taken as a special student will not apply to his or her degree unless the student fills out a petition from Records and Registration.

The student may change his or her catalog year to a more current one (but not to a previous one) or may appeal to admissions for a pre-engineering status to be considered as electrical engineering (EE) or computer engineering (CEN).
1.13 Summer Attendance

Every student must earn a total of at least 9 credits during one or more summer terms to fulfill the State University System's requirement for summer attendance unless he or she had earned at least 60 credits before entering a State University. Since a community college is not a State University, students with an AA degree from a community college do not have to be concerned about this requirement. The summer attendance requirement will be waived for students who complete at least two summer semesters of engineering-related co-op or internship.

1.14 Graduation Time

It usually takes a full-time student four years and one or two summers to complete the undergraduate curriculum. For those students who are attending on a part-time basis, it usually takes between five to six years to complete the requirements for the B.S. degree. Table 1-13 (Page # 38) shows the number of graduates of the Department since its start in 1994.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BSEE</td>
<td>10</td>
<td>18</td>
<td>22</td>
<td>19</td>
<td>28</td>
<td>6</td>
<td>13</td>
<td>9</td>
<td>15</td>
<td>18</td>
<td>23</td>
<td>181</td>
</tr>
<tr>
<td>BSCEN</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Dual*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>18</td>
<td>7</td>
<td>11</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>18</td>
<td>22</td>
<td>19</td>
<td>29</td>
<td>9</td>
<td>21</td>
<td>18</td>
<td>34</td>
<td>27</td>
<td>44</td>
<td>251</td>
</tr>
</tbody>
</table>

* Dual receives two separate degrees: BSEE & BSCEN

1.15 Honors and Awards

The Department of Electrical and Computer Engineering at UF recognizes students who achieve high levels of academic accomplishments by classifying them as either honor students, high honors students, or highest honors students. The highest academic award granted by the Department is the Electrical E Award.

A student is classified as an Honor Student in the College of Engineering at UF when he or she has earned an average of 3.30 or higher as an upper-division (UD) student and has earned at least 16 hours of EEL in the UF/UWF program. An UD GPA of at least 3.30 is required at the time of graduation for graduation with honors (cum laude).

To graduate with High Honors (magna cum laude), a student must have at least a 3.50 UD GPA and be recommended by the faculty of the Department. An upper division grade point average of 3.80 or higher is required for the Highest Honors (magna cum laude). A student who is eligible for High or Highest Honors will receive a letter of invitation from the UF Dean of the College. An acceptance letter is required if a student wishes to pursue High or Highest Honors. In addition, a research project must be performed, a thesis on the project submitted, and an oral examination passed.

Students who qualify for magna or summa cum laude but do not write a thesis will receive cum laude. Approximately two semesters prior to graduation, students who are eligible for High or Highest Honors must contact the office of the Department at UWF to discuss a High-Honors or Highest-Honors plan, and to specify the supervisory committee.
To receive the prestigious Electrical E Award, a student must have a minimum of a 3.9 UD GPA (UF) as well as a 3.9 GPA (UF) minimum average in all (EEL) electrical engineering courses. A recipient will have his or her name inscribed on a plaque that is located in the Department showcase in Larsen Hall at UF and also in the ECE Department at UWF.

For Procedure to Graduate with Honors, contact the ECE Department at UWF. For more information contact, UF web-site at  http://www.ece.ufl.edu/undergraduates/honors.html

**UWF President’s Honor Roll:** All undergraduate students who earn a semester GPA of 3.90 or higher on a minimum of six semester hours of graded ("A-F") course work at UWF are recognized on the president's honor roll for that semester.

**UWF Dean’s Honor Roll:** All undergraduate students who earn a semester GPA of 3.50-3.89 on a minimum of six semester hours of graded ("A-F") course work at UWF in any semester are recognized on the dean's honor roll for that semester. To be eligible for the Dean's list, a student must carry 14 hours (12 in the Summer term) and earn a 3.50 or better average with no grade less than a C.

**Commencement:** Although the Graduates receive UF degrees, they can attend the UWF and/or UF commencement. During the UWF commencement, an UF representative introduces the graduates to the UWF President for conferring the engineering degrees.

### 1.16 Honorary and Professional Societies

The IEEE Student section (faculty advisor: Dr. Steve Gorman) is very active and meets every month during the academic years. They invite speakers and organize tours and visits to local companies. Their officers have also been more active in keeping the IEEE Lounge open for studying, and tutoring. The students at the Ft Walton Beach campus have recently established a new IEEE student section, faculty advisor: Dr. Tom Gilbar.

In 2004, the SWE section was established, faculty advisor Dr. Xuemin Millard who resigned in March 2005. Dr. Dale Harrell is currently the faculty advisor.

Effective Spring 2006, the department has established the Eta Kappa Nu (EKN) Honorary Society, faculty advisors: Drs. Dale Harrell for PNS and Tom Gilbar for FWB.

### 1.17 Changes to Students Advisement

The improvements/changes made to Students and Advisement since Fall 2000 is shown in Table 1-14 (see Page # 39).
<table>
<thead>
<tr>
<th>List Improvements</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>The female population in the engineering major decreased in FY 2002-03.</td>
<td>As a result, Ms. Whitlock approached Dr. Millard, who was hired fall 2003, to start a chapter of the Society of Women Engineers (SWE) for retention and recruitment purposes. We began to initiate a chapter of SWE at UWF and established a chapter within eight months, which now has members that know and help each other academically and personally, and attend recruitment events such as the Festival on the Green and Fall Frenzy.</td>
</tr>
<tr>
<td>At the ECE Picnic, which Ms. Sherry Whitlock initiated fall of 2003, students learned of scholarships and employment through attending representatives from ROTC and the Navy.</td>
<td>Two students received scholarships and future employment. In addition, this activity helped with the retention of the students.</td>
</tr>
<tr>
<td>Information on the majors within the School of Science and Engineering was provided at the UWF Fall Frenzy.</td>
<td>Students were involved in an atmosphere of camaraderie between disciplines, and faculty and students to include students from outside the school. In addition, information on the disciplines was provided which was a great opportunity for recruitment. Furthermore, the FWB campus participation started as an extension of the School of Science and Engineering but (PNS campus joined the UWF Fall Frenzy, because of a recent hurricane) developed into a Career Fair that strengthen the bond with OWCC’s CS, PHY, and Math departments. Area businesses and interested students attended the event adding to the recruitment efforts. The sharing of projects was very informative and enjoyable for the students as a result, they will share their projects again at UWF’s Festival On The Green (FOG).</td>
</tr>
<tr>
<td>Established FWB direct toll free number for prospective students.</td>
<td>By doing this, prospective students have an inviting and affordable access to the FWB advisors.</td>
</tr>
<tr>
<td>Coordinated with the FWB advisor to incorporate a UF student EXCEL GPA worksheet.</td>
<td>As a result, the EXCEL worksheet is more detailed than the current worksheet to display additional information.</td>
</tr>
<tr>
<td>Co-op employers, contributors, and prospective replacements were solicited to join the Engineering Advisory Council to strengthen the programs’ support.</td>
<td>As a result, six additional members joined. The new members and their company names were sent to University Division of Development’s Planned Giving for additional resources toward the One Million Dollar campaign and any future contributions. In addition, Peggy Darby, Annual Giving Coordinator at UWF, and myself coordinated ideas for their outgoing letters concerning the One Million Dollar campaign. This funding and support updates equipment that supports student learning.</td>
</tr>
<tr>
<td>ECE News is a group e-mail to students and is a constant communications link.</td>
<td>Students received a link to ASEE to help them understand what engineering involves. As a result, students have replied back informing me that they have a better picture of what an engineer is. Students have also received employment and course curriculum information to help them transition through the program.</td>
</tr>
<tr>
<td>Corresponded with the University Advising Center (UAC) for resources used in retention efforts</td>
<td>Students are informed of withdrawal deadlines through a letter from UAC as a result, a group e-mail is also now being sent to alert students of registration and withdrawal deadlines. Students respond to frequent contact and group e-mails in helping them with academic and personal problems. In addition, information was sent to the Director of UAC about the Introduction to Engineering course and as a result, eight advisors were able to understand the purpose and benefits in order to advise students thoroughly and efficiently.</td>
</tr>
<tr>
<td>Students were logged in to see the usage of tutoring services for retention purposes at the PNS and FWB campuses.</td>
<td>For more efficient use of the tutors, Ms. Whitlock suggested to move them to the labs where they could tutor and keep the labs open for student use after class hours.</td>
</tr>
<tr>
<td>A student volunteered to tutor lower level technicals, and Ms. Whitlock suggested this was a good idea.</td>
<td>An engineering major, tutoring pre-ECE majors helped students study in an engineering atmosphere allowing new students to become familiar with the ECE department and meet other students in their major.</td>
</tr>
<tr>
<td>Last March, Ms. Sherry Whitlock coordinated ECE’s</td>
<td>This open house resulted in meeting new student prospects and advising them of courses needed and information</td>
</tr>
</tbody>
</table>
open house to include advertisement and announcements of the activity to the public and provided advising materials for prospective students. about the GPA requirement for acceptance into the program. Other subjects included housing and student life.

<table>
<thead>
<tr>
<th>To help further retention and recruitment of the female population, Ms. Sherry Whitlock suggested having a female representative to attend more recruitment and retention activities.</th>
<th>As a result, Ms. Whitlock attended the Major Fair this past spring. In addition, female students are asked to join in activities for example; the President of IEEE, Laura Solari and the Secretary of SWE, Shelby Romine were asked to attend the committee of the School of Science and Engineering (SSE) second meeting. The student organizations (IEEE and SWE) are now members of the committee and are interacting with other student organizations outside of the committee meetings for example, SWE and IEEE interacted with the Physic student organization (SSE Fall Festival members) who also attended the Fall Frenzy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms. Sherry Whitlock has included students in retention and recruitment functions (Fall Frenzy, Major Fairs, etc.) and their projects.</td>
<td>By including their projects, attention is captured from prospective and current students, which helps students’ gain an interest for engineering. For example, at a Student Success recruitment activity, Ms. Whitlock brought two students (one female and one male) who used a visual tool. This tool was a robotic man who put a basket ball into a basket. In addition, another robot was also brought that traveled along a track. The result was that the whole room came over to see what was going on. Afterward the Director of Student Success commented that bringing students with projects was a very good recruitment tool.</td>
</tr>
<tr>
<td>Non-returning students are contacted.</td>
<td>As a result, more than half came in to see me and register.</td>
</tr>
<tr>
<td>Letters where sent to new students and transferring students from other departments and outside institutes to see an ECE advisor as soon as possible. Students who changed their major or transferred to another school where sent a survey to find out if they took a job, transferred to another university, or other reasons.</td>
<td>The results were that they transferred to another department or had other reasons.</td>
</tr>
<tr>
<td>Information on the Electrical Engineering minor was sent to the following departments in an effort to share information with other departments and students: Computer Science, Physics, EET, Chemistry, Bio, Math, Marketing and Economy, and Business.</td>
<td>This effort was done for recruitment purposes and some departments called informing me they did not know of our minor and that they would bring the EE minor to the attention of students who were interested in a minor.</td>
</tr>
<tr>
<td>Scholarships are coordinated with financial aid to set up a process to award scholarships to students who are in need.</td>
<td>The FWB students will be able to receive financial aid scholarships by Fall 2005. Other scholarship resources are coordinated to bring them to students’ attention and provide an information center within ECE.</td>
</tr>
<tr>
<td>Ms. Sherry Whitlock attended a SWE luncheon and initiated an invitation to invite HDR, Tracy Boutwell, Civil Engineer to join EAC.</td>
<td>As a result from interacting with her, Ms. Whitlock learned that they have two college scholarships that they have not decided where to direct them. Ms. Whitlock has sent information informing HDR on how to set up scholarships in the engineering foundation account. In addition, HDR has joined our Engineering Advisory Council.</td>
</tr>
<tr>
<td>An EAC member expressed his concern that he wanted to be more involved with students and the department.</td>
<td>As a result, UWF’s Planned Giving was notified to include that member in all of the UWF’s Planned Giving meetings and to invite the EAC members to regular faculty meetings to learn more about the department and how they can help students.</td>
</tr>
</tbody>
</table>
2.0 CRITERION 2 – PROGRAM EDUCATIONAL OBJECTIVES

The computer engineering program has in place:
(a) published educational objectives that are consistent with the UWF’s mission and describe the career and professional accomplishments that the program is preparing graduates to achieve.
(b) a process based on the needs of the program's various constituencies in which the objectives are determined and periodically evaluated,
(c) an educational program, including a curriculum that prepares students to attain program outcomes and that fosters accomplishments of graduates that are consistent with these objectives,
(d) a process of ongoing evaluation of the extent to which these objectives are attained, the result of which are used to develop and improve the program outcomes so that graduates are better prepared to attain the objectives.

2.1 Published Educational Objectives

The program has developed educational objectives which are consistent with the mission of the University of West Florida and the ABET criteria 2.0 for program educational objectives. A Bylaws Committee representing the ECE faculty worked from Fall 2003 to Fall 2004 to revise the Departmental Bylaws which are approved by the ECE faculty. The vision, mission and objectives were developed and reviewed in consultation with the full faculty and the department’s Engineering Advisory Council (Council). The mission, goals, and program objectives are listed in the University course catalog\(^1\) and Department website\(^2\).

2.2 Mission of the University of West Florida

To empower each individual we serve with knowledge and opportunity to contribute responsibly and creatively to a complex world

<table>
<thead>
<tr>
<th><strong>Our Vision</strong></th>
<th>To distinguish UWF as the premier creative, student-centered university focused on excellence.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Our Mission</strong></td>
<td>To empower each individual we serve with knowledge and opportunity to contribute responsibly and creatively to a complex world.</td>
</tr>
</tbody>
</table>
| **Our Values**         | Caring  
|                        | A safe and dynamic learning environment that encourages the development of individual potential  
|                        | Integrity  
|                        | Doing the right thing for the right reason  
|                        | Quality  
|                        | Dedication to uncompromising excellence  
|                        | Innovation  
|                        | Dedication to exploring and expanding the boundaries of knowledge  
|                        | Teamwork  
|                        | Working together to achieve shared goals |

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\(^1\) Refer to [http://uwf.edu/catalog/title.htm](http://uwf.edu/catalog/title.htm)

\(^2\) Refer to [http://uwf.edu/ece](http://uwf.edu/ece)
Stewardship
Managing and protecting our resources
Courage
Different by design

Our Goals and Imperatives

Promote a learning environment that encourages the development of individual potential in students, faculty, and staff

- Attract a high quality, diverse faculty and staff dedicated to putting students first
- Demand excellence in teaching, research, and service
- Create a new standard in education focused on learning outcomes
- Promote integrity through intellectual inquiry and open discourse

Attract and inspire a diverse and talented student body committed to uncompromising academic excellence

- Promote creativity by the exchange of ideas in the spirit of academic freedom and professional responsibility
- Promote diversity through a respect for and appreciation of differences

Provide solutions to educational, cultural, economic, and environmental concerns

- Align university services with community needs and interests through teamwork and collaboration
- Engage in scholarly research and creative activity to solve regional problems and enhance the quality of life
- Develop targeted areas in education and research that address critical national and international objectives

Manage growth responsibly through focus on continuous quality improvement of programs and processes

- Target markets of opportunity with effective communications programs
- Align financial resources with performance expectations
- Continuously develop and improve processes and methods in delivering the university's brand promise

2.2.1 Vision, Mission and Goals of Electrical and Computer Engineering Department

Vision: The vision of the Department of Electrical and Computer Engineering is to be recognized in the State of Florida and the nation for its outstanding undergraduate teaching and outreach programs, and for the quality, character, and integrity of its graduates and faculty.

Mission: The mission of the Electrical and Computer Engineering (ECE) Department at the University of West Florida is to offer baccalaureate degree programs in electrical and computer engineering, which serve the needs of the West Florida region, the State, and the nation. The mission statement can
be found in the 2006-2008 UWF Catalog\(^3\) as well as the Department web-site\(^4\).

**Goals:** The goal of the baccalaureate degree programs is to prepare students to embark upon a professional career in electrical or computer engineering, or to begin graduate study. The electrical and computer engineering programs shall be revised continuously to meet the criteria of the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). As long as the UF/UWF cooperative arrangement continues, the ABET accreditation of the degree programs will be sought through UF as stand-alone programs. When the administration of the electrical and computer engineering degrees is turned over to UWF in Spring 2009, the University of West Florida will seek ABET accreditation of its engineering programs.

The Department also takes an active role in interacting with practicing engineers who supply pertinent information to our program content so as to insure our students are prepared to enter the engineering profession. Such interaction with engineers and employers also facilitates program development that addresses the continuing education needs of our community.

2.2.2 **Program Educational Objectives**

According to the classification of Florida State Universities by their mission, UF's prime mission is education as well as research whereas UWF's prime mission is undergraduate education. The Department replicates the UF's degree while accomplishing the objectives within the mission and goals of UWF. The Department combines some unique features of UWF and its region with UF's well-established curriculum in computer engineering. The ECE faculty, the administration and the Engineering Advisory Council (EAC) have adopted the following program educational objectives\(^5\). These objectives are posted on the department web-site\(^6\). The Department welcomes feedback and comments from its constituencies (see Section A, Appendix V).

The objective of the program leading to the degree of Bachelor of Science in Computer Engineering is to provide students with a strong theoretical and practical background in computer hardware and software, along with the engineering analysis, design, and implementation skills necessary to work between the two. A computer engineer is someone with the ability to design a complete computer system -- from its circuits to its operating system to the algorithms that run on it. Although it is valid to look at software and hardware separately, a computer engineer must take a more holistic approach. If an electronic device is to be called a computer, it must produce mathematically meaningful results. Similarly, any useful theory of computing must be physically realizable. The synthesis of theory and algorithms, which must take place before any useful computing can be achieved, is the job of the computer engineer, and to produce such engineers is the mission of this program. The graduates of the program should have the following accomplishments:

1. Graduates would apply the knowledge of the fundamental theory and practice of computer science and computer engineering, as it applies to computer hardware and software.

2. Graduates would understand all the elements required to design a complete computer system (hardware and software).

\(^3\) Refer to [http://uwf.edu/catalog/title.htm](http://uwf.edu/catalog/title.htm)

\(^4\) Refer to [http://uwf.edu/ece](http://uwf.edu/ece)

\(^5\) Refer to [http://mww.uwf.edu/catalog/title.htm](http://mww.uwf.edu/catalog/title.htm)

\(^6\) Refer to [http://ww.uwf.edu/ece](http://ww.uwf.edu/ece)
3. Graduates would understand the interaction between hardware and software.

4. Graduates would demonstrate the ability for the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

5. Graduates would understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.

Effective Spring 2006, these program objectives are revised (see Section 2.9.3, Page # 79)

In addition to the above program educational objectives, the department incorporates the following features in order to enhance learning and to meet local and regional needs.

- Students will be instructed in skills to prepare them for employment with companies in the Northwestern Florida region, as well as with those that are nationwide or world-wide.
- Offering courses at the UWF Fort Walton Beach (FWB) campus, which are linked to student growth and local needs.
- Encouraging integration of engineering practice, including co-operative education and internships with classroom learning.
- Providing opportunities for student interaction with faculty and practicing engineers through professional and honor societies.
- Encouraging ECE Faculty to be active in research, consulting, and/or other professional activities in order to advance their own professional competence and to integrate new knowledge into the academic programs.

2.3 Needs of Constituencies

The ECE faculty has identified a number of stakeholders in the Department as listed in Section A, Appendix V - Engineering Advisory Council. The stakeholders are those constituents having the most to gain or lose in terms of how well the Department carries out its mission and goals. Major stakeholders are students, faculty, alumni and employers. There are, however, other stakeholders including graduate schools and government. It is important that the major stakeholders be brought into the assessment and improvement process through surveys and/or other mechanisms. Collectively, a series of individual surveys produced a body of evidence that will be useful in identifying the program’s strengths and limitations, thereby suggesting directions for improvements.

2.3.1 Consistency of Mission, Goals and Program objectives with the mission of the UWF

From the perspective of the engineering programs, the Department’s mission is most closely aligned with the aspect of the UWF mission that involves in supplying the manpower needs of the local region and in providing students with the skills and the knowledge so that the graduates can contribute responsibly to the State and national economies. In particular, success in the Department’s mission with respect to education will result in a nationally recognized undergraduate program, where students receive a solid foundation in the principles of electrical and/or computer engineering, industry-relevant training, and a desire and ability for life-long learning in the changing complex world of engineering. Given this preparation, students graduating from our undergraduate programs are well-prepared to compete for jobs in the engineering sector at both the local and national levels. Furthermore, by
providing this level of talent, we are helping to support the growth of the high-technology companies that are so vital to the Northwest Florida region, State and nation.

2.3.2 Local Influence on Mission, Goals and Program Objectives

Local companies and the community, including the Pensacola and Ft. Walton Beach Chambers of Commerce, recognize the importance and benefits of having quality-engineering programs at UWF. It is recognized by them that graduates of UWF Engineering are an attractive source of supply for their technical manpower needs, and that they enhance prospects for economic development in Northwest Florida. The Engineering Advisory Council serves to guide decision-making regarding academic programs. Companies in the Northwestern Florida region employ a number of the Department’s graduates, as shown in Tables 2-2 (see Page # 46) and 2-3 (see Page # 47).

As the number of students employed by these companies increases, the companies tend to become more active in providing feedback on the quality of student preparation, and hence on the mission and educational goals of the engineering programs. For example, the Engineering Advisory Council, which is composed of representatives of industry and business, meets normally once in each semester and discusses academic issues including program objectives and outcomes. The Engineering Advisory Council is pleased with the Department in terms of its program quality, students and graduates. The past meetings (as shown in Table 2-1) were more focused on identifying the future growth potential, fundraising, new programs and manpower needs of the Northwest Florida region. The minutes of the meetings are listed in Section E, Appendix V. The UWF administration values the importance and support of the Council in identifying the future growth and development of engineering education at UWF to serve the educational and manpower needs of the Northwest Florida region. Some Council members, Executive Vice-President/Provost Sandra Flake and Dean Jane Halonen also attend the ‘Senior Banquet’, which is organized by the IEEE Students Section and held every semester (usually in December or April) in a local restaurant.
Table 2-1: Council meeting during the period from January 2001 – May 2006

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Agenda</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/3/01</td>
<td>Lilios, 997 S. Palafox, Pensacola</td>
<td>Program update and new engineering programs</td>
<td>Preliminary and agenda for the next EAC meeting.</td>
</tr>
<tr>
<td>04/06/01</td>
<td>Pensacola</td>
<td>Program update, new engineering programs, program expansion, and fund raising for new and existing programs</td>
<td>More information on manpower needs and feasibility studies.</td>
</tr>
<tr>
<td>05/31/01</td>
<td>Pensacola</td>
<td>Program update, new engineering programs, program expansion, and fund raising for new and existing programs</td>
<td>Plan and justifications for fund raising.</td>
</tr>
<tr>
<td>12/13/01</td>
<td>Navarre</td>
<td>Outline of current program and plan for $1 million campaign</td>
<td>Action plan for the $1 million campaign</td>
</tr>
<tr>
<td>04/19/02</td>
<td>Pensacola</td>
<td>Feedback and accreditation, and fund raising</td>
<td>Report on program feedback</td>
</tr>
<tr>
<td>6/17/02</td>
<td>Institute for Human and Machine Cognition</td>
<td>EAC feedback and program accreditation $1 million campaign</td>
<td>Report on program feedback Strategy of the campaign</td>
</tr>
<tr>
<td>11/18/02</td>
<td>Pensacola and FWB DLL</td>
<td>1$ Million Campaign</td>
<td>Details of campaign materials</td>
</tr>
<tr>
<td>2/6/04</td>
<td>Pensacola &amp; FWB DLL</td>
<td>Program Status Briefing on $1 Million Campaign</td>
<td>Report on program feedback and campaign</td>
</tr>
<tr>
<td>2/4/05</td>
<td>Pensacola &amp; FWB DLL</td>
<td>Program Status, Feedback on Program Briefing on $1 Million Campaign</td>
<td>Report on program feedback and campaign</td>
</tr>
<tr>
<td>2/4/06</td>
<td>Pensacola &amp; FWB DLL</td>
<td>Program Status, Feedback on Program And status on $1 Million Campaign</td>
<td>Report on program feedback and campaign</td>
</tr>
</tbody>
</table>

The State targeted the Fort Walton Beach area, where more high-tech companies are relocating as a potential area for the growth of high-tech companies. UWF is making long-term plans to meet the educational needs and offers more courses at the Fort Walton Beach (FWB) campus. Effective Fall 2002, UWF is offering electrical and computer engineering courses at the FWB campus to meet the growing expectation from the local community for making available engineering programs at FWB.

Table 2-2: Largest Local Employment (as of Fall 2005)

<table>
<thead>
<tr>
<th>Employer</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eglin AFB (civil service)</td>
<td>13</td>
</tr>
<tr>
<td>USAF military (Eglin)</td>
<td>9</td>
</tr>
<tr>
<td>Manufacturing Technology Inc., FWB</td>
<td>7</td>
</tr>
<tr>
<td>Harris Aerospace Systems, Melbourne</td>
<td>3</td>
</tr>
<tr>
<td>Microsystems, FWB</td>
<td>3</td>
</tr>
<tr>
<td>Tracor, FWB</td>
<td>3</td>
</tr>
<tr>
<td>Company Name</td>
<td>Alumni</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>A+ Network Systems So. CO/Metrocall Pensacola, FL</td>
<td>1</td>
</tr>
<tr>
<td>Advanced Data Links/Rockwell Int’l. IA</td>
<td>1</td>
</tr>
<tr>
<td>Advanced Engr. &amp; Res. Assoc., Pensacola, FL</td>
<td>1</td>
</tr>
<tr>
<td>Aerospace Systems Division, Melbourne, FL</td>
<td>1</td>
</tr>
<tr>
<td>Alabama Power, AL</td>
<td>1</td>
</tr>
<tr>
<td>Applied Research</td>
<td>1</td>
</tr>
<tr>
<td>Armstrong Electric Co. Inc. Pensacola, FL</td>
<td>1</td>
</tr>
<tr>
<td>AST, Inc. Pace, FL</td>
<td>1</td>
</tr>
<tr>
<td>Axiohm, Inc., Ithica, NY</td>
<td>1</td>
</tr>
<tr>
<td>BellSouth, Pensacola, FL</td>
<td>2</td>
</tr>
<tr>
<td>Boeing Defense &amp; Space Group, WA</td>
<td>1</td>
</tr>
<tr>
<td>Civil Service, Eglin AFB, FL</td>
<td>13**</td>
</tr>
<tr>
<td>Coleman Research Corp. Crestview, FL</td>
<td>1</td>
</tr>
<tr>
<td>Control System Research, Crestview, FL</td>
<td>1</td>
</tr>
<tr>
<td>Dell</td>
<td>1</td>
</tr>
<tr>
<td>Direct2 Data Tech, Lake Mary, FL</td>
<td>1</td>
</tr>
<tr>
<td>Energy Operations, Inc. St. Francisville, LA</td>
<td>1</td>
</tr>
<tr>
<td>GE Industrial</td>
<td>1</td>
</tr>
<tr>
<td>Gulf Power, Pensacola, FL</td>
<td>1</td>
</tr>
<tr>
<td>Harris/Aerospace Systems Div. Melbourne, FL</td>
<td>2</td>
</tr>
<tr>
<td>HAS Consulting Group</td>
<td>1</td>
</tr>
<tr>
<td>Humber Consultants, Ft. Walton Beach, FL</td>
<td>1</td>
</tr>
<tr>
<td>IBM Corp., Rochester, NY</td>
<td>1</td>
</tr>
<tr>
<td>IDT Metric System</td>
<td>1</td>
</tr>
<tr>
<td>Klocke &amp; McLaughlin Consultants, Ft. Walton Beach, FL</td>
<td>1</td>
</tr>
<tr>
<td>Matrox Tech. Inc., Boca Raton, FL</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing Technology, Inc. Ft. Walton Beach, FL</td>
<td>7</td>
</tr>
<tr>
<td>Mettler-Toledo Inc., N.C.</td>
<td>1</td>
</tr>
</tbody>
</table>

* Note: 54 out of 86 graduates (on record) work for companies in the Northwest Florida region and 62 in Florida.
** 22 (=13+9) graduates are working at the Eglin AFB, FL.
2.4 Program Curriculum and Processes for Achievement of Program Educational Objectives

UWF has been benefiting from its partnership with UF’s established engineering programs. The UF-ECE Department is a leader in electrical and computer engineering education and research. The undergraduate curriculum is continuously revised to cope with the changing technology and benefits from the strong graduate programs and faculty research. Also, UWF has been making changes to its engineering curriculum in order to meet UF’s program and curricular requirements.

Since the Department replicates the UF’s degree, the electrical engineering curriculum is similar to the UF’s curriculum. However, UWF use the electives and course choices to adjust the curriculum to meet the local needs that can be met by the faculty expertise. The Department uses some courses, which are only offered at UWF, and there are some limitations on the number of technical electives available. Students cannot choose an area of specialization.

The UF program allows specializations in electrical engineering. Students with appropriate academic preparations can also take graduate level specialized courses leading to combined BS and MS degrees. However UWF students are required to take courses in all areas: power, electronics, electromagnetics, communications, control, and digital. The Department is looking into possibility of having the option of BS/MS programs to its students also. The Department has the flexibility to adjust the elective components of the UF curriculum and offer courses.

For Examples, the Department developed the following new UWF courses:
1. EEL 4635 - Digital Control (effective fall 2001)
2. EEL 4663 – Elements of Robotics to support the continued demand for students’ participation in Robotics competitions (effective, Fall 2002)
3. EEL 4515 – Digital Communications (effective, Spring 2002) to serve the commutation companies at FWB area
4. EGN 3203 - Applications of Engineering Software Tools (effective, Fall 2005) to serve the UWF student needs
5. EEL 4321 – Electrical Energy Systems to support Gulf Power co-op students (effective fall 2004)
6. EEL 4905 – Image Processing to support DSP aspects relating to military applications at FWB (effective Spring 2006).

2.4.1 Steps in Achieving Program Educational Objectives

The following steps and strategies are used by the faculty in order to achieve the program outcomes (see section 3.1 in Page # 90) which should lead to the accomplishments of the program objectives few years after graduation.
1. Through a curriculum consisting of certain courses.
2. Each course which is linked and contributes to the program outcomes, contributes to the program objectives.
3. Course content is designed to meet the program outcomes and objectives.
4. Faculty knows the program objectives and outcomes.
5. Faculty knows how his/her course is linked to the program outcomes and objectives and what contributions are made by his/her course.
6. Faculty evaluates the student achievements in a course through tests and/or presentations or other means.
7. Faculty ensures that students are tested on various contributing elements through tests, home works, assignments, presentation and/or reports.
8. Faculty collects samples of student work and reviews the course materials. Samples of student’s work will be made available for inspections.
9. Faculty writes a report on which outcomes and how they are met for each course. Effective fall 2003, the program outcome achievement report is completed by the faculty at the end of each semester.
10. The program uses a grade of ‘C’ (2.0/4.0) as the datum to specify the graduation requirements. A student’s performance in a class is measured by the class grade, although a student can receive a grade of ‘C’ (2.0/4.0) or better, but not achieving a program outcome. Similarly, a student can achieve a program outcome, but not meeting the degree requirement of ‘C’ or better. However, students are required to achieve a grade of at least ‘C’ in order to meet the overall course outcomes and objectives.
11. Students are required to have a grade of ‘C’ or better in all pre-requisite EEL courses. That is, if a particular EEL course is a pre-requisite to another EEL course, then students are assumed to have achieved 100% of the course objectives. However, if it is an EEL course such as a terminal course (i.e., EEL 3472), then students may not have achieved 100% of the course objectives in that course.
12. Overall, students must have an accumulative GPA of 2.0/4.0 or better in all EEL courses. Students in computer engineering must also have ‘C’ or better in all computer science courses. This requirement will ensure that all students graduating from the program will be expected to attain a certain minimum level of achievement toward meeting the overall program outcomes and be prepared in achieving the program objectives after graduation.

2.4.2 Relationship between Courses and Educational Objectives

Table 2-4 (see pages 50 & 51) shows the relationship between the courses required for the degree program and electrical engineering program educational objectives. Table 2.5 (see page # 52) shows how the program outcomes are related to the program objectives. Figure 2-1 (see Page # 53) shows the relation among the courses, program outcomes and program objectives. The faculty members derived the relationships in these tables. All lower division general pre-requisite courses which form the foundations contribute also to meeting our educational objectives. More specifically, these courses are: Calculus sequence, English, Technical Writing, Physics, Computer Science (programming), Social/Behavioral Science Elective, Literature Elective, Chemistry, Fine Arts Elective and the Humanities Elective.
### Table 2-4: Relationship between Courses and Program Educational Objectives

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Required</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL 3111</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3112</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3135</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3211</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3303L</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3304</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3396</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3472</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3473</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 3701C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4230</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4304L</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4306C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4310C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4440</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4514</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<tr>
<td>EEL 4514L</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4516</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4610</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>EEL 4657</td>
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<tr>
<td>EEL 4657L</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4712C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4713C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4744C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4751</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4905</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEL 4914C</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Educational Objectives:
1– Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software
2 – An ability to understand all the elements required to design a complete computer system (hardware and software).
3 – An ability to understand the interaction between hardware and software
4 – The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques
5 - An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.

Note: Effective Spring 2006, these program objectives are revised (see Section 2.9.3, Page # 80)
Table 2-4: Relationship between Courses and Program Educational Objectives

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Required</th>
<th>Computer Engineering Educational Program Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>EEL 4930</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EGN 4034</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EEL 4949</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CDA 3101</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CEN 3031</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CIS 3020</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>COP 3530</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>COP 4600</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>COP 3100</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>COP 4710</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>COP 4020</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>COT 4400</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>EGM 3512</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>MAC 2311</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>MAC 2312</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>MAC 2313</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>MAP 2302</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>MAP 4403</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>MAS 3105</td>
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<tr>
<td>STA 4321</td>
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<td>x</td>
</tr>
<tr>
<td>ENC 3240</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Educational Objectives:
1– Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software
2 – An ability to understand all the elements required to design a complete computer system (hardware and software).
3 – An ability to understand the interaction between hardware and software
4 – The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques
5 - An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.
## Table 2.5: Relationship between the program outcomes and program objectives

<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcomes</th>
<th>Program Educational Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core computer engineering topics</td>
<td>x x x</td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>x x x x</td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of computer engineering problems</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>x</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including computer engineering applications</td>
<td>x x x x</td>
</tr>
<tr>
<td>7</td>
<td>An ability to identify, formulate, and solve novel computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements</td>
<td>x x x x</td>
</tr>
<tr>
<td>8</td>
<td>An ability to function on multi-disciplinary teams, where possible</td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>An understanding of professional and ethical responsibility</td>
<td>x</td>
</tr>
<tr>
<td>10</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to understand the impact of computer engineering solutions in a global and societal context</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>A recognition of the need for, and an ability to engage in life-long learning</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Understanding of all the elements required to design a complete computer system (hardware and software)</td>
<td></td>
</tr>
</tbody>
</table>

### Educational Objectives:
1 – Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software
2 – An ability to understand all the elements required to design a complete computer system (hardware and software).
3 – An ability to understand the interaction between hardware and software
4 – The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques
5 - An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.

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Objectives
For
Bachelor of Science
Computer Engineering

1. Knowledge of Mathematics
2. Core Electrical & Computer Engineering
3. Modern Engineering Techniques, Skills &
4. Apply Knowledge of Math, Science & Engineering
5. Design & Conduct Scientific & Engineering
6. Knowledge of Probability &
7. Ability to Identify, Formulate, and Solve Engineering Problems
8. Ability to Function on Multi-disciplinary Teams
9. Professional & Ethical Responsibilities
10. Effective Communications
11. Knowledge of Contemporary Issues
12. Ability to Engage in Life-long Learning
13. Knowledge of Discrete Mathematics
14. Theory & Practice of Computer /
15. Complete design of computer system

![Figure 2-1: Relationships of Courses to Program Outcomes and Objectives](image-url)
2.5 Process of Determine and Periodically Evaluate Educational Objectives

The Department has developed and implemented the following on-going process for periodically reviewing and evaluating its educational objectives:

1. The Department sends Program Review Questionnaires to all graduating seniors, students (at least 10), Engineering Advisory Council members, alumni (at least 10), employers (at least 10), co-op employers (at least 10), and to the Graduate Program Directors at UF and the UF Research Engineering Education Florida (REEF) at Shalimar, Florida.
2. The ECE Curriculum Committee reviews all responses for electrical and computer engineering program objectives and makes written recommendation for any changes to the Director.
3. The Director, in consultation with the Engineering Advisory Council, makes his/her recommendation.
4. The Department adopts and disseminates the revised program objectives.
5. The normal review cycle is 2 years.

The Departmental review process has been in place since 1998. The general review process is shown in Fig. 2-2 (see page # 55). Table 2-6 (see page # 55) shows the responsibility and review cycles for the program’s mission, goals and objectives. Table 2-7 (see page # 55) shows the constituencies for sending Survey Questionnaires.
Table 2-6: Normal Review Cycles of Mission, Goals and Objectives

<table>
<thead>
<tr>
<th>Program</th>
<th>Responsibility</th>
<th>Cycle</th>
<th>Initial</th>
<th>2nd Review</th>
<th>3rd Review</th>
<th>4th Review</th>
<th>5th Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission and Goals</td>
<td>Director</td>
<td>2/3 years</td>
<td>Sept 1998</td>
<td>Fall 2001</td>
<td>Fall 2004</td>
<td>Fall 2006</td>
<td>Fall 2008</td>
</tr>
<tr>
<td>Program Objectives</td>
<td>Director</td>
<td>2/3 years</td>
<td>Sept 1998</td>
<td>Fall 2001</td>
<td>Fall 2004</td>
<td>Fall 2006</td>
<td>Fall 2008</td>
</tr>
<tr>
<td>Program Outcomes</td>
<td>Director</td>
<td>2/3 years</td>
<td>Sept 1998</td>
<td>Fall 2001</td>
<td>Fall 2004</td>
<td>Fall 2006</td>
<td>Fall 2008</td>
</tr>
</tbody>
</table>

Table 2-7: Normal Schedules for Review Questionnaires

<table>
<thead>
<tr>
<th>Constituencies</th>
<th>Graduating Seniors</th>
<th>Students</th>
<th>Alumni</th>
<th>Employers</th>
<th>Co-op Employers</th>
<th>EAC</th>
<th>Graduate Schools</th>
</tr>
</thead>
</table>
2.5.1 Involvement of Constituencies

The curriculum committee has the responsibility for recommending any changes upon input from:
- Alumni;
- Employers include Engineering Advisory Council
- Students
- Faculty members.

Any recommendations for curriculum and program objective changes coming out of the evaluation and review process go through the normal channels for approval. Basically, any changes to the curriculum and the program objectives are first determined by the curriculum committee (see Figure 2-3, Page # 56) with input from constituencies including Advisory Council and then it is brought up to the entire faculty. The actual internal process is shown in a flowchart diagram in Figure 2-4 (see Page # 57)

ECE Curriculum Committee

Director

Mohammad Khabou
(Comp E)

Dr. Tom Gilbar
(EE)

Dr. Dahe Harrell (Chair)
(EE)

Dr. Bassam Shaer
(EE)

Dr. Jefrey LaPore
(CS)

Dr. Rohan Hemasingha
(Math & Stat)

Purpose of Curriculum Committee:
- Advisory Committee to Director
- Takes Input reports from EAC, alumni and employers
- Reviews Exit Interviews reports
- Takes input from ECE faculty members
- Reviews and suggests curriculum changes

Figure 2-3 Structure of curriculum committee and input gathering process
2.5.2 Evaluation Tools for Program Objectives

The evaluation tools for program educational objectives are listed in Table 2-8 (Page # 58). The evaluations of the program objectives are performed by analysis of three main instruments:

1. Alumni surveys (see Appendix VI, Section A) performed every two/three years. This survey is done by mail and e-mails. Table 2-13 shows the questionnaires for feedback on the program objectives.
2. Employer and Engineering Advisory Council surveys (see Appendix VI, Sections B &C) are performed once in two/three years designed to see how well we meet our objectives. The survey is also done by mail and e-mails. Table 2-16 shows the employer questionnaires for feedback on the program objectives. The Advisory Council (EAC) survey is done by mail or during the regular Council meeting.
3. Co-op employer surveys (see Appendix VI, Section D) performed once in two/three years designed to see how well we are preparing our students towards meeting our objectives. The survey is also done by mail. Table 2-19 (page # 69) shows the questionnaires for co-op employer surveys.
### Table 2-8: Objective Evaluation Tools and Purposes

<table>
<thead>
<tr>
<th>#</th>
<th>Evaluation Tools</th>
<th>Method</th>
<th>Purpose of Evaluation Tools</th>
<th>Type</th>
<th>Bench mark for achieving</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Alumni surveys</td>
<td>x</td>
<td>How our curriculum satisfies needs of company</td>
<td>Surveys</td>
<td>80%</td>
</tr>
<tr>
<td>2.</td>
<td>Employer surveys</td>
<td>x</td>
<td>How our students perform in company shows strengths and concerns of our program and how well our students function as an engineer</td>
<td>Surveys</td>
<td>80%</td>
</tr>
<tr>
<td>3.</td>
<td>Co-op employer surveys</td>
<td>x</td>
<td>How our students perform in company; shows how well our students are being prepared to function as a team member.</td>
<td>Surveys</td>
<td>80%</td>
</tr>
<tr>
<td>4.</td>
<td>Feedback from the Engineering Advisory Council</td>
<td>x</td>
<td>Strengths and weaknesses of our program from a company point of view; to meet the needs of company</td>
<td>Surveys</td>
<td>80%</td>
</tr>
<tr>
<td>5.</td>
<td>Records of student placement and employment status after graduation.</td>
<td>x</td>
<td>Monitors the professional progress and recognition of our graduates.</td>
<td>List</td>
<td>None</td>
</tr>
<tr>
<td>6.</td>
<td>Feedback from companies</td>
<td>x</td>
<td>Shows strengths and concerns of our program and how well our students function in multi-disciplinary teams</td>
<td>Letters</td>
<td>2 to 5 supporting letters</td>
</tr>
<tr>
<td>7.</td>
<td>Hiring Companies</td>
<td>x</td>
<td>Measures the reputation and satisfaction with the quality of our programs</td>
<td>Company types</td>
<td>None</td>
</tr>
<tr>
<td>8.</td>
<td>External accreditation evaluations</td>
<td>x</td>
<td>Measures our strengths and concerns of our programs</td>
<td>External reviews</td>
<td>No deficiencies and weaknesses</td>
</tr>
</tbody>
</table>

#### 2.5.3 Administration of Evaluation Tools

Results from each survey are tabulated and forwarded to the Director, which are then submitted to the Chair of the curriculum committee for review and evaluation. The curriculum committee is responsible for updating the procedures for evaluation of the objectives. This committee is also responsible for interpreting the results and recommending to the ECE faculty any changes to the curriculum that are needed based on the review and evaluations. The results are shared with our advisory council.

#### 2.6 Similarities of Computer and Electrical Engineering Programs

UWF Engineering uses the same survey results such as exit interviews, alumni surveys and employer surveys for computer and electrical engineering graduates. Data for similar program in electrical engineering administered by the Engineering is presented in this Self-Study Report. 85% of the courses for the hardware-oriented computer engineering program are common to the electrical engineering program. The comparison of the computer engineering program with the electrical engineering program is shown in Table 2-9. The relationships between the computer engineering objectives and the survey questionnaires are shown in Tables 2-10(a) and 2-10(b) (see page # 59).
Table 2-9 Comparison between Electrical and Computer Engineering Programs

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering</td>
<td>18 (14.3%)</td>
<td>3</td>
<td>12 (9.5%)</td>
<td>7</td>
<td>21 (16.7%)</td>
<td>3</td>
<td>57 (45.2%)</td>
<td>8</td>
<td>126 (100%)</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>18 (14.3%)</td>
<td>3</td>
<td>12 (9.5%)</td>
<td>7</td>
<td>21 (16.7%)</td>
<td>18</td>
<td>44 (34.9%)</td>
<td>2</td>
<td>126 (100%)</td>
</tr>
<tr>
<td>Common to both programs</td>
<td>16 (12.7%)</td>
<td>3</td>
<td>12 (9.5%)</td>
<td>7</td>
<td>21 (16.7%)</td>
<td>3</td>
<td>44 (34.9%)</td>
<td>2</td>
<td>107 (84.9%)</td>
</tr>
</tbody>
</table>

Table 2-10(a): Comparison between computer engineering objectives and survey questionnaires

<table>
<thead>
<tr>
<th>#</th>
<th>Program Objectives</th>
<th>Survey Questionnaires</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>An ability to understand all the elements required to design a complete computer system (hardware and software).</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>An ability to understand the interaction between hardware and software.</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2-10(b): Comparison between survey questionnaires and computer engineering objectives

<table>
<thead>
<tr>
<th>#</th>
<th>Questionnaires</th>
<th>#</th>
<th>Program Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>5</td>
<td>An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.</td>
</tr>
<tr>
<td>2</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>1</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.</td>
</tr>
<tr>
<td>3</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>4</td>
<td>The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques</td>
</tr>
<tr>
<td>4</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>2</td>
<td>An ability to understand all the elements required to design a complete computer system (hardware and software).</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>3</td>
<td>An ability to understand the interaction between hardware and software</td>
</tr>
<tr>
<td>6</td>
<td>Understand contemporary engineering issues</td>
<td>5</td>
<td>An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.</td>
</tr>
<tr>
<td>7</td>
<td>Function on multi-disciplinary teams</td>
<td>2</td>
<td>An ability to understand the interaction between hardware and software</td>
</tr>
</tbody>
</table>

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2.7 Results and Analysis of Evaluation Surveys

The evaluation tools from 1 to 4 in Table 2-8 are used to gather data and the results for three cycles over the last 6 years are used for comparisons. The results of program objectives surveys, alumni surveys, employer surveys, and co-op employer Surveys are shown Tables 2-11 to 2-21 and Figures 2-5 to 2-15.

Comments made by external constituencies, which related to both the electrical and computer engineering programs included: students are well trained in digital systems; section on power systems might be added; and have students take the EIT exam prior to graduating. The changes that are made to address these comments are discussed in Section 2.9.5, Page # 82.

Student comments on the Mission Statement of the Department included: degree programs should serve the needs of the world; there should be mention of graduating “quality” engineers; the program provides the required outcomes and objectives; and fundamentals taught should be the same for each class, no matter who is teaching it. The changes that are made to address these comments are discussed in Section 2.9.5, Page # 82.

Regarding Program Educational Objectives, the comments obtained focused on the electrical engineering Program, but they have relevance to the computer-engineering program as well. Students indicated that: they should obtain the ability to plan and implement research through various media so as to better prepare them for graduate study and life-long learning; interest in a particular area of expertise within the broader area of EE should be facilitated; there should be more training on software used such Mathcad, P-Spice, and Matlab; programming courses should be taught in the Department so as to maximize their relevance to EE students; the level of advising from professors should be increased; Autocad should be available for credit as part of the program; and that EE courses should be available every semester. They also commented that UWF has the advantage of having a small Department with high a faculty/student ratio, which is supportive of the local military-industrial base. The changes that are made to address these comments are discussed in Section 2.9.5, Page # 82.

2.7.1 Program Objectives Surveys

2004 Fall Objectives Surveys: In Fall, 2004, questionnaires to obtain information on the validity and/or need for change in program educational objectives were sent to alumni, employers, co-op employers and members of the Engineering Advisory Council (see Appendix VI). The results of these surveys are summarized below in Table 2-11 and Figure 2-5. There are many students who are quite matured and have practical experience. They can provide good feedback on the program objectives. However, their responses are not included in the final results for the evaluation purpose.

Summary Results: Although the number of responses (10%) from our constituencies was low, the analysis of the survey indicates at least 80% or higher of our constituencies believe that no changes in the program objectives are needed.
Table 2-11 Summary of Program Educational Objectives Review (conducted in Fall 2004)

<table>
<thead>
<tr>
<th>Constituencies</th>
<th>No Sent</th>
<th>No of Responses</th>
<th>Mission and Goals</th>
<th>Electrical Engineering Program Objectives</th>
<th>Computer Engineering Program Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>No Change</td>
<td>Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Employers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Co-op Employers</td>
<td>11</td>
<td>16</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Council Members</td>
<td>28</td>
<td>33</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Alumni</td>
<td>126</td>
<td>165</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sub-Total*</td>
<td>165</td>
<td>17 (10%)</td>
<td>14 (82%)</td>
<td>1 (6%)</td>
<td>14 (82%)</td>
</tr>
<tr>
<td>Students</td>
<td>208</td>
<td>61</td>
<td>41 (87%)</td>
<td>2 (4%)</td>
<td>41 (87%)</td>
</tr>
</tbody>
</table>

* Student responses are not included in the final results

Figure 2-5: Results of Educational Objectives Review (conducted in Fall 2004)

2001 Fall Objectives Surveys: On August 29, 2001, questionnaires to obtain information on the validity and/or need for change in program educational objectives were sent to alumni, employers, co-op employers and members of the Engineering Advisory Council (see Appendix VI). These instruments were also distributed to students attending and IEEE student meeting on November 14, 2001, and to 39 students enrolled in EGN 4034: Engineering Ethics on November 20, 2001. The results of these surveys are summarized below in Table 2-12 and Figure 2-6.

Summary Results: Although the number of responses (18%) from our constituencies was low, the analysis of the survey indicates at least 60% or more of our constituencies believe that no changes in the program objectives are needed.
Table 2-12: Summary of Program Educational Objectives Review (conducted in Fall 2001)

<table>
<thead>
<tr>
<th>Constituencies</th>
<th>No Sent</th>
<th>No of Responses</th>
<th>Mission and Goals</th>
<th>Electrical Engineering Program Objectives</th>
<th>Computer Engineering Program Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>No Change</td>
<td>Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Employers</td>
<td>15</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Co-op Employers</td>
<td>12</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Council members</td>
<td>28</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Alumni</td>
<td>65</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Sub-Total*</td>
<td>120</td>
<td>21 (18%)</td>
<td>15 (71%)</td>
<td>3 (14%)</td>
<td>13 (62%)</td>
</tr>
<tr>
<td>Students</td>
<td>39</td>
<td>26</td>
<td>22</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

* Student responses are not included in the final results

Figure 2-6: Results of Educational Objectives Review (conducted in Fall 2001)

2.7.2 Alumni Surveys

2004 Fall Surveys: The summary of survey results, which was conducted in the 2004 Fall semester, is included in Section A, Appendix VI. One hundred and twenty six (126) survey forms were sent, and 11 (9%) were received. The questions and the responses are listed in Table 2-13 and displayed in Figure 2-7. The alumni survey questionnaires did not ask direct questions on the program objectives. Few questions were related to more than one objective.

Summary Results: Although the number of alumni responses (9%) was low, the analysis of the alumni survey indicates that 80% or more of our alumni believe that the program prepared them with those listed capabilities, except program objective # 1 on the impact of engineering solutions in a global societal context and # 6 on contemporary engineering issues.
Table 2-13: Summary of the alumni survey results (conducted in Fall 2004)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Capabilities</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>1(9%)</td>
<td>6(55%)</td>
<td>2(18%)</td>
<td>1(9%)</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>2(18%)</td>
<td>8(73%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>1(9%)</td>
<td>9(82%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
<tr>
<td>2, 3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>1(9%)</td>
<td>9(82%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>2(18%)</td>
<td>7(64%)</td>
<td>1(9%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>1(9%)</td>
<td>5(45%)</td>
<td>3(27%)</td>
<td>1(9%)</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>3(27%)</td>
<td>5(55%)</td>
<td>1(9%)</td>
<td>1(9%)</td>
<td>0</td>
<td>0</td>
<td>10(91%)</td>
</tr>
</tbody>
</table>

Figure 2-7: Results of Alumni Survey (conducted in Fall 2004)

2001 Fall Surveys: The summary of survey results which was conducted in the 2001 Fall semester is included in Section A, Appendix VI. Twenty-eight (28) survey forms were sent, and 3 (11%) were received. The questions and the responses are listed in Table 2-14 and displayed in Figure 2-8. The alumni survey questionnaires did not ask direct questions on the program objectives. Few questions were related to more than one objective.

Summary Results: Although the number of alumni responses (11%) was low, the analysis of the alumni survey indicates that 90% or more of our alumni believe that the program prepared them with those listed capabilities.
Table 2-14: Summary of the alumni survey results (conducted in Fall 2001)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>1 (33%)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>3 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>11 (69%)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>2, 3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>1 (33%)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>1 (33%)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>1 (33%)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
</tbody>
</table>

Figure 2-8: Results of Alumni Survey (conducted in Fall 2001)

1999 Spring Surveys: Alumni survey was conducted in the 1999 Spring semester. Fifty-four (54) survey forms were sent of which 16 (27%) were received. The questions and the responses are listed in Table 2-15 and displayed in Figure 2-9. The alumni survey questionnaires did not ask direct questions on the program objectives. Few questions were related to more than one objective.

Summary Results: The analysis of the alumni survey indicates that 80% or more of our alumni believe that the department prepared them with those listed capabilities.
Table 2-15: Summary of the alumni survey results (conducted in Spring 1999)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>8 (50%)</td>
<td>6 (37%)</td>
<td>2 (13%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>11 (69%)</td>
<td>5 (31%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>11 (69%)</td>
<td>5 (31%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>2, 3</td>
<td>Design systems, components or processes to meet my employer's needs</td>
<td>10 (63%)</td>
<td>5 (31%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (6%)</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>8 (50%)</td>
<td>8 (50%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>7 (44%)</td>
<td>8 (50%)</td>
<td>1 (6%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>10 (63%)</td>
<td>6 (37%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (100%)</td>
</tr>
</tbody>
</table>

Figure 2-9: Results of Alumni Surveys (conducted in Spring 1999)

2.7.3 Employer Survey Results

2004 Fall Surveys: The summary of the employer survey results, which was conducted in the Fall of 2004, is included in Section B, Appendix VI. Similar questionnaires were sent for the first time in summer fall 2001. Fifteen (25) survey forms were sent, and 2 (8%) were received. The questions and responses are listed in Table 2-16 and displayed in Figure 2-10. The employer survey questionnaires did not ask direct questions on the program objectives. Few questions were related to more than one objective.

Summary Results: Although the number of employer responses (8%) was low, the analysis of the employer survey indicates that 90% or more of our employers believe that the program prepared our graduates with those listed capabilities.
### Table 2-16: Summary of the employer survey results (conducted in the Fall 2004)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>0 (2 (100%))</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>2 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>2 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
<tr>
<td>2, 3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>2 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>1 (50%)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>2 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>1 (50%)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (100%)</td>
</tr>
</tbody>
</table>

**Figure 2-10: Results of Employer Survey (conducted in Fall 2004)**

**2001 Fall Surveys:** The summary of the employer survey results, which was conducted in the Fall of 2001, is included in Section B, Appendix VI. Similar questionnaires were sent for the first time in summer 1999. Fifteen (15) survey forms were sent, and 7 (47%) were received. The questions and responses are listed in Table 2-17 and displayed in Figure 2-11. The employer survey questionnaires did not ask direct questions on the program objectives. Few questions were related to more than one objective.

**Summary Results:** The analysis of the employer survey indicates that 80% or more of our employer believe that the department prepared our graduates with those listed capabilities, except the program objective # 7 on multi-disciplinary teams.
Table 2-17: Summary of the employer survey results (conducted in the Fall 2001)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>1 (17%)</td>
<td>4 (66%)</td>
<td>0</td>
<td>0</td>
<td>1 (17%)</td>
<td>1 (17%)</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>4 (66%)</td>
<td>1 (17%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>2 (33%)</td>
<td>3 (50%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>2, 3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>1 (17%)</td>
<td>4 (66%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (17%)</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>3 (50%)</td>
<td>2 (33%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (17%)</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>0</td>
<td>6 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>1 (17%)</td>
<td>2 (33%)</td>
<td>2 (33%)</td>
<td>0</td>
<td>0</td>
<td>1 (17%)</td>
<td>6 (100%)</td>
</tr>
</tbody>
</table>

1999 Spring Survey: The employer survey was conducted in the 1999 Spring semester. Fifty-four (54) survey forms were sent of which 7 (13%) were received. The questions and the responses are listed in Table 2-18 and displayed in Figure 2-12. The employer survey questionnaires did not ask direct questions on the program objectives. Few questions were related to more than one objective.

Summary Results: Although the number of employer responses (13%) was low, the analysis of the employer survey indicates that 80% or more of our employer believe that the program prepared our graduates with those listed capabilities, except the program objective # 1 on the impact of engineering solutions in the global social context.
Table 2-16: Summary of the employer survey results (conducted in the Spring 1999)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>29%</td>
<td>29%</td>
<td>29%</td>
<td>0</td>
<td>0</td>
<td>13%</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>43%</td>
<td>57%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>43%</td>
<td>57%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>2, 3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>57%</td>
<td>29%</td>
<td>14%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>47%</td>
<td>43%</td>
<td>14%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

Figure 2-12: Results of Employer Survey (conducted in Spring 1999)

2.7.4 Co-op Employer Survey Results

2004 Fall Surveys: The summary of the Co-op employer survey results, which was conducted in the Fall of 2004, is included in Section D, Appendix VII. Twelve (12) survey forms were sent of which 5 (42%) were returned. The questions and the responses are listed in Table 2-19 and displayed in Figure 2-13.

Summary Results: The analysis of the employer survey indicates that 80% or more of our co-op employers believe that the department is preparing our graduates with those listed capabilities, except the program objective # 2a on modern engineering techniques and #4 on multi-disciplinary teams.
Table 2-19 Summary of the Co-op employer survey results (conducted in the Fall 2004)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>1 (33%)</td>
<td>2 (66%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>1 (33%)</td>
<td>1 (33%)</td>
<td></td>
<td></td>
<td>1 (33%)</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>2, 3</td>
<td>Identify, and solve electrical or computer engineering problems</td>
<td>1 (33%)</td>
<td>2 (66%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Design and conduct engineering experiments</td>
<td>1 (33%)</td>
<td>1 (33%)</td>
<td></td>
<td></td>
<td>1 (33%)</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>2 (66%)</td>
<td>1 (33%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Communicate effectively in writing or orally</td>
<td>2 (66%)</td>
<td>1 (33%)</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>2 (66%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (33%)</td>
<td>3 (100%)</td>
</tr>
</tbody>
</table>

Figure 2-13: Results of Co-op Employer Survey (conducted in Fall 2004)

2001 Fall Surveys: The summary of the Co-op employer survey results, which was conducted in the Fall of 2001, is included in Section D, Appendix VII. Twelve (12) survey forms were sent of which 5 (42%) were returned. The questions and the responses are listed in Table 2-20 and displayed in Figure 2-14.

Summary Results: The analysis of the employer survey indicates that 80% or more of our co-op employers believe that the department is preparing our graduates with those listed capabilities.
Table 2-20 Summary of the Co-op employer survey results (conducted in the Fall 2001)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>1 (20%)</td>
<td>4 (80%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2, 3</td>
<td>Identify, and solve electrical or computer engineering problems</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Design and conduct engineering experiments</td>
<td>1 (20%)</td>
<td>6 (80%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>2 (40%)</td>
<td>3 (60%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Communicate effectively in writing or orally</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>3 (60%)</td>
<td>1 (20%)</td>
<td>1 (20%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 2-14: Results of Co-op Employer Survey (conducted in Fall 2001)

1999 Spring Survey: The summary of the Co-op employer survey results, which was conducted in the 1999 Spring semester, is included in Section D, Appendix VII... Eighteen (18) survey forms were sent of which 11 (61%) were received. The questions and the responses are listed in Table 2-21 and Figure 2-15.

Summary Results: The analysis of the employer survey indicates that 80% or more of our co-op employers believe that the department is preparing our graduates with those listed capabilities, except program objective # 7 on the issue of multi-disciplinary teams.
Table 2-21: Summary of the employer survey results (conducted in the Spring 1999)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>7</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>64%</td>
<td>36%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>6</td>
<td>45%</td>
<td>55%</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>6</td>
<td>45%</td>
<td>55%</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>2, 3</td>
<td>Identify, and solve electrical or computer engineering problems</td>
<td>6</td>
<td>5</td>
<td>55%</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Design and conduct engineering experiments</td>
<td>4</td>
<td>5</td>
<td>45%</td>
<td>9%</td>
<td></td>
<td>9%</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>7</td>
<td>3</td>
<td>64%</td>
<td>27%</td>
<td></td>
<td>9%</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Communicate effectively in writing or orally</td>
<td>4</td>
<td>5</td>
<td>36%</td>
<td>45%</td>
<td>18%</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>5</td>
<td>2</td>
<td>45%</td>
<td>18%</td>
<td>18%</td>
<td>18%</td>
<td>7</td>
</tr>
</tbody>
</table>

Figure 2-15: Results of Co-op Employer Survey (conducted in Spring 1999)

2.7.5 Hiring Companies

The graduates of the Department have been hired by companies such as Sprint, Boeing, Motorola, Texas Instruments, Proctor & Gamble, to name a few of the well known companies. The starting salary for recent graduates of the Department is in the $45,000 to $60,000 range. The alumni list provides the names of companies where they work. A sample of the companies who have recently hired our engineering graduates is shown in Table 2-22.

http://uwf.edu/ece/alumni/alumni.cfm
Mr. H. L. Dell, Senior Vice President of Schmidt, Dell, Cook & Associates is the Chair of EAC sub-committee on Curriculum and Program Outcome Assessment. His company hires a number of our graduates. Mr. Dell wrote on May 1, 2000, “I have found, through, experience, that the students completing the engineering program at UWF are quick learners and have a good engineering foundation.” Mr. Dell also wrote on May 20, 20020:
“This past spring, I reviewed the responses from the employers of the program’s graduates. It was obvious that the general opinion from the other employers was consistent with mine. The UWF Engineering Program is producing quality graduates and they are being well received by the industry. The few concerns about additional training in certain areas have already been addressed by the addition of new professors and courses.
The three engineers I have working with my firm from the UWF program are progressing well. One has passed his professional engineering exam and the other two will be sitting for the exam within the next year. I am confident that they too will pass.
The engineering program faces a tough challenge. How can you improve on such a stellar performance?” Mr. Dell’s letters are included in Section D, Appendix V.

Mr. Knut R. Bergan, President of Ian-Conrad Bergan, Inc wrote on May 4, 2006 (see Section E, Appendix V, “We hired one of your recent graduates (Mr. Joe Nguyen) back on February 2005 as an entry level electrical engineer. He was tasked to help develop some new products which required engineering knowledge above and beyond that which would be part of the electrical engineering curriculum. He skillfully accomplished his task and we quickly realized that Joe is an exceptional bright young man with incredible work ethics. He has been promoted and has been instrumental in supporting our engineering efforts as a result of our growth.

He has been involved in micro-controller embedded code development to actual on-board implementation of our new Guard Level DFG (Digital Float Gauge) for its maiden installation on-board a new tanker being built in Hiroshima Japan. ………………………..

Needless to say I believe his education both with respect to academic rigors and practical on-hand experience gave him a solid foundation to which one build a career.

We look forward to see more of your graduates as our company grows.”

Table 2-22: Sample List of Companies.

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARRIS/AEROSPACE SYSTEMS DIVISION, Melbourne, FL</td>
<td>MICROSYSTEMS, Fort Walton Beach, FL</td>
</tr>
<tr>
<td>MOTOROLA, Fort Worth, TX</td>
<td>ALABAMA POWER, AL</td>
</tr>
<tr>
<td>AXIOHM, INC., Ithaca, NY</td>
<td>BELLSouth, Pensacola, FL</td>
</tr>
<tr>
<td>BOEING DEFENSE AND SPACE GROUP, WA</td>
<td>NORTEL-NORTHERN TELECOM, TX</td>
</tr>
<tr>
<td>PROCTOR &amp; GAMBLE, OH &amp; K</td>
<td>GENERAL ELECTRIC, Hartford, CT</td>
</tr>
<tr>
<td>RAYTHEON SYSTEMS CO., St. Petersburg, FL</td>
<td>GERC (GRADUATE SCHOOL), Shalimar, FL</td>
</tr>
<tr>
<td>GULF POWER, Pensacola, FL</td>
<td>IBM CORP., Rochester, MN</td>
</tr>
<tr>
<td>TEXAS INSTRUMENTS, Dallas, TX</td>
<td>MANUFACTURING TECHNOLOGY, INC., Fort Walton Beach, FL</td>
</tr>
<tr>
<td>N.A.W. RESEARCH CTR., Patuxent River Naval Station, MD</td>
<td></td>
</tr>
</tbody>
</table>
2.8 Evaluation to Determine Achievement

**Benchmark:** If the lowest range falls below the benchmark of 70% in two consecutive surveys, the faculty will be mandated to review the program curriculum which leads to the program outcomes and objectives.

The results of three consecutive surveys are summarized in Figures 2-16 to 2-19. The analysis of the results over the period from 1999 -2004 indicates achievement of the program objectives. As expected, there are variations from surveys to surveys. These results show improvements over the time due to interval changes in the curriculum and its delivery. The alumni and employers agreed with the program objectives and the analysis of the results did not suggest any changes.

A low return of employer and alumni surveys remains a problem. We are trying to seek ways to improve surveys. One might question the significance of the results. We also depend on discussion, comments and feedback from our Engineering Council, the reputation of employers, and the demand of our graduates by employers and graduate schools (as shown in Table 2-2, Page # 46).

2.8.1 Evaluation of Program Objectives

The range of results on agreement with program goals and objectives (for two consecutive review cycles) is shown in Fig. 2-16. According to the survey results, our constituencies agree with the program goals and objectives within the following range:

- Mission and goals: 71% to 82%
- Objectives for electrical engineering: 62% to 82%
- Objectives for computer engineering: 71% to 88%

If the lowest range falls below the benchmark of 70% in two consecutive surveys, the faculty will mandated to review the program goals and objectives in consultation with the Engineering Council.

**Figure 2-16: Range of Agreement on Educational Objectives Reviews (conducted in 2001 &2004)**

![Bar chart showing range of agreement on educational objectives reviews for 2001 and 2004.](image-url)
2.8.2 Achievement from Alumni Surveys

The range of results on achievement on program objectives (for three consecutive cycles) is shown in Fig. 2-17. The alumni surveys support the achievement of program objectives. The widest variations are in objectives on the impact of engineering solutions in a global societal context and the contemporary engineering issues. According to the survey results, the achievement levels of our program objectives fall within the following range:

5 Understand the impact of engineering solutions in a global societal context: 64% to 100%
1 Apply knowledge of mathematics, science, and engineering skills: 91% to 100%
4 Apply the techniques, skills and modern engineering tools necessary for good engineering practice: 100%
2.3 Design systems, components or processes to meet my employer’s needs: 94% to 100%
5 Understand my professional and ethical responsibilities: 82% to 100%
5 Understand contemporary engineering issues: 54% to 94%
2 Function on multi-disciplinary teams: 82% to 100%

Figure 2-17: Range of Achievement of Educational Objectives by Alumni Surveys
(Conducted in 1999, 2001 & 2004)

2.8.3 Achievement from Employer Surveys

The range of results on achievement on program objectives (for three consecutive review cycles) is shown in Fig. 2-18. The employer surveys support the achievement of program objectives. The widest variations are in objectives 1 and 7. According to the survey results, the achievement level of our program objectives falls within the following range:

5 Understand the impact of engineering Solutions in a global societal context: 64% to 100%
1 Apply knowledge of mathematics, science, and engineering skills: 91% to 100%
4 Apply the techniques, skills and modern engineering tools necessary for good engineering practice: 100%
2.3 Design systems, components or processes to meet my employer’s needs: 94% to 100%
5 Understand my professional and ethical responsibilities: 82% to 100%
2.8.4 Achievement from Co-op Employer Surveys

The range of results on achievement on program objectives (for three consecutive review cycles) is shown in Fig. 2-19. The question on “Understand the impact of engineering solutions in a global societal context” is not surveyed by co-op employers. The widest variations are in objectives 4 and 7. According to the survey results, the achievement level of our program objectives falls within the following range:

1. Apply knowledge of mathematics, science, and engineering skills: 91% to 100%
2. Function on multi-disciplinary teams: 82% to 100%
3. Design systems, components or processes to meet my employer’s needs: 94% to 100%
4. Apply the techniques, skills and modern engineering tools necessary for good engineering practice: 100%
5. Understand my professional and ethical responsibilities: 82% to 100%
6. Understand contemporary engineering issues: 54% to 94%
7. Understand the impact of engineering solutions in a global societal context: N/A
2.9 Results Used to Improve Effectiveness of the Program

The Curriculum Committee reviewed the results of the 1999 surveys in 2000 and recommended in keeping same the educational objectives (see Page # 43). The vision of the Department and the program mission were, revised. No changes were made to the program objectives. This was the outcome of one particular year’s surveys, as an example of how the “process” operates. The Curriculum Committee reviewed all responses to the surveys in January 15, 2002 and February 2005. As a result of this review, it was found that no modifications to the program’s mission or educational objectives were needed at this time. Other change and improvements, however, were made from the results of the review process including the preparation for the ABET self-study report (see Examples of Improvements in Sections 3.7, 3.8 and 3.9). The program continues to make changes to attain a target goal of achieving 90% or better in all objectives.
2.9.1 Changes in Curricular Content

The program has devolved a review process of periodically evaluating the evaluation results and making appropriate changes in the curriculum and certain courses. The examples of new courses developed for curricular improvements are listed in Section 2.4 (see Page # 49). The evaluation process and program feedback (during the last three consecutive evaluation cycles) lead to the improvements in program objectives and the outer feedback loop for program objectives is shown in Figure 2-20. Although, those changes made improvements in the results, the following objectives indicate still the lower scores and wider variations.

# 5 Understand the impact of engineering Solutions in a global societal context
# 5 Understand contemporary engineering issues
# 2 Function on multi-disciplinary teams

The exposure to engineering ethics and factors in professional practice is accomplished through the required course *EGN 4034 – Professional Ethics*, and student's participation in professional societies such as the Institute of Electrical and Electronics Engineers (IEEE). Effective Fall 2000, replaced EEL 4931 – *Electrical Engineering Undergraduate Seminar* with *EGN 4034 – Engineering Professionalism and Ethics*. Table 1-23 illustrate few examples of changes made to further improvements in these objectives.

![Figure 2-20: Outer feedback loop for program objectives](image-url)
<table>
<thead>
<tr>
<th>#</th>
<th>Objectives</th>
<th>Course</th>
<th>Faculty</th>
<th>How and what changes you made?</th>
<th>Since (after) 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>The impact of engineering solutions in a global and societal context</td>
<td>EEL 4914C</td>
<td>Rashid</td>
<td>Required students to explain the impact of design projects on the global and social context.</td>
<td>Fall 2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL4914C</td>
<td>Bataineh</td>
<td>Require Design objectives to include summary of the major constraints that were considered during the design and implementation such as economical, environmental, social, political, ethical, health, safety, manufacturability, and sustainability.</td>
<td>Spring 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL4663</td>
<td>Mansur</td>
<td>Students investigate increasing role of industrial robots in industry</td>
<td>Summer 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4914C</td>
<td>Bataineh</td>
<td>Required students to explain and include in the report the impact of design projects on the global and social context.</td>
<td>Fall 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4834</td>
<td>Khabou</td>
<td>Emphasize current engineering problems in programming assignments</td>
<td>Fall 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGN 4XX1 &amp; 4XX2</td>
<td>New Courses</td>
<td>Will split senior Design EEL 4914C into two courses: EGN 4XX1 - Capstone Design I (1 credit) and EGN 4XX2- Capstone Design II (2 credits) to cover professional skills in program objectives.</td>
<td>Fall 2007</td>
</tr>
<tr>
<td>5</td>
<td>Contemporary engineering issues</td>
<td>EEL 4931</td>
<td>Mansur</td>
<td>Students worked in team to research and make a presentation on a contemporary ethical issue. It included lectures on the importance of professional registration. Replaced EEL 4931 by EGN 4034 in fall 2000.</td>
<td>Fall 1999 –Spring 2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL4713</td>
<td>Khabou</td>
<td>Emphasize contemporary computer architecture issues (e.g. effect of memory organization on overall performance of computers, pipelining, etc.)</td>
<td>Spring 2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGN 4034</td>
<td>Rashid</td>
<td>Students worked in a team to research and make a presentation on a contemporary ethical issue. It included lectures on the importance of professional registration</td>
<td>Fall 2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EUH 1001</td>
<td>Unknown</td>
<td>Commends ECO 2013 – Economics, PHI – Ethics, and EUH 1001 – Western Perspectives I for Gen Ed</td>
<td>Fall 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4213</td>
<td>Harrell</td>
<td>Students research viable/new methods of power generation and implementation and write about their findings.</td>
<td>Fall 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4834</td>
<td>Gilbar</td>
<td>Included an assignment on contemporary issues</td>
<td>Summer 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4242</td>
<td>Rashid</td>
<td>Students work on a team to complete a paper on a contemporary power electronics issue.</td>
<td>Summer 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4712L</td>
<td>Shaer</td>
<td>Students use Engineering CAD tools to simulate and complete lab assignments</td>
<td>Fall 2005</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>EEL 4242</td>
<td>Rashid</td>
<td>Students work on a team to complete a design assignment and labs</td>
<td>Summer 2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Rashid</td>
<td>Students work in a team, on design projects and oral presentations.</td>
<td>Fall 2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4213</td>
<td>Harrell</td>
<td>Students work in teams to accurately complete a from scratch power system design problem using Power World software.</td>
<td>Fall 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4514L</td>
<td>Gorman</td>
<td>Students work in teams to complete Lab assignments</td>
<td>Fall 2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGN 4034</td>
<td>Rashid</td>
<td>Students worked in a team to research and make a presentation on a contemporary issue and professional ethics.</td>
<td>Fall 2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4663</td>
<td>Mansur</td>
<td>Students work on teams to design and program a mobile robot task</td>
<td>Summer 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL4914C</td>
<td>Bataineh</td>
<td>Even though not required yet, team projects were/are strongly encouraged. All teams are also required to present oral presentations specifying the contribution of every team member’s role and responsibility to the final project result.</td>
<td>Fall 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Shaer</td>
<td>Students work on a team to complete and present a project to class.</td>
<td>Fall 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4304L</td>
<td>Shaer</td>
<td>Students work in teams to complete lab assignments</td>
<td>Fall 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3303L</td>
<td>Fuchs</td>
<td>Students rotate lab partners from week to week. By the end of the semester, each of the students should have worked with everyone in the class in completing one laboratory exercise, and, hence, they have learned to “function on a multi-disciplinary team”.</td>
<td>Fall 2005</td>
</tr>
</tbody>
</table>
### 2.9.2 Changes to the Review Process

The review process involves meetings with students, faculty and Council members as well as surveys. It is expected that with the greater constituency involvement, which is now underway, the next round of reviews may produce more changes. The objective review process has resulted in the following issues (as shown in Table 2-24) for which the actions to be taken for improvements.

#### Table 2-24: Issues and Actions for improving Review Process

<table>
<thead>
<tr>
<th>Issue</th>
<th>Actions to be Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low turn out of the alumni surveys through the postal mails</td>
<td>Conduct web-based alumni and employer surveys, effective fall 2005. After the alumni information is submitted, the alumni will receive an alumni survey form to complete and will be asked to give the employer survey form to his/her supervisor. The results of the surveys will be summarized and submitted to the department annually. The survey form can not be completed by the same alumni within a two year period and the form will be sent automatically to the alumni in every 2 years</td>
</tr>
<tr>
<td>Alumni change their jobs and often do not send their updated addresses</td>
<td>Develop web-based updating of the alumni information (effective fall 2005, see Table 2-23, Page # 80) <a href="http://uwf.edu/ece/alumni/">http://uwf.edu/ece/alumni/</a></td>
</tr>
<tr>
<td>Too many questionnaires</td>
<td>Reduce to the form to one page alumni and employer survey questionnaires, (see Appendix V, Parts C&amp; D).</td>
</tr>
<tr>
<td>No direct questionnaires to measures program objectives.</td>
<td>Add questionnaires on program objectives, effective fall 2005</td>
</tr>
<tr>
<td>Program objectives should fully match with the ABET’s terminology</td>
<td>Review the program objectives, effective Spring 2006.</td>
</tr>
</tbody>
</table>

### 2.9.3 Changes Made to Educational objectives

When we compared the program objectives with the ABET terminology for program objectives during our review process and the preparation of the ABET self-study report, we realized that our program objectives should be consistent with the ABET terminology. We started the following steps for the review process:

1. The ECE faculty was divided into three groups. Each group proposed a set of program objectives.
2. The ECE curriculum committee reviewed the three sets of program objectives and came up with a one set.
3. The following questionnaires were sent by a group e-mail to all members of the Engineering Council for their input.
   (a) What our graduates should be able to do in 3-5 years after graduation? What you would like to see their accomplishments?
   (b) What are your requirements for promotion in 3-5 years after graduation?
4. A working group consisting of the following members had reviewed the proposed sets from the curriculum committee and the suggestions from the Council members. This group came up with a working draft of the program objectives.
Mr. Lynn Dale – Chair of curriculum committee of the Engineering Advisory Council
Mr. Jeremy Wayat – Alumni and a member of the Engineering Advisory Council
Dr. Steve Gorman – faculty member, who has more than 10 years of industrial experience
Dr. Roger Avant - faculty member, who has more than 20 years of industrial experience
Dr. Dale Harrell - faculty member, who has more than 10 years of industrial experience.
Dr. Mohanand Bataineh -- faculty member, who has more than 5 years of industrial experience

5. The working draft of the program objectives was sent to all members of the Engineering Advisory Council for comments and feedback.
6. The proposed program objectives were presented to the ECE faculty for comments and approved on November 18, 2005.
7. The revised program objectives for electrical engineering, which are listed below, will be effective fall 2006 and will be published in the 2006 UWF catalog.
8. The questionnaires for alumni survey of the revised program objectives are shown in Table 2-25 (page # 81).

**Computer Engineering Objectives** *(Revised on November 18, 2006):*

Graduates will be known for their accomplishments in the early stage of their careers and they should:

1. Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context.

2. Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.

3. Continue professional growth through post-graduate education, continuing education, or professional activity.

4. Contribute to the Northwest Florida regional economic development.

* Approved by the ECE faculty on November 18, 2005
Table 2-25: ALUMNI SURVEY  
ELECTRICAL AND COMPUTER ENGINEERING  
UNIVERSITY OF WEST FLORIDA  

Degree received: Bachelor of Science in Electrical Engineering (BSEE)  
Term & year received __________________  
Bachelor of Science in Computer Engineering (BSCEN)  
Term & year received __________________  

1. Please rate your level of agreement with each of the following accomplishments of our educational objectives as a result of our engineering education at the University of West Florida by checking the appropriate column of your response by a mark, x:

<table>
<thead>
<tr>
<th>#</th>
<th>Accomplishments of our educational objectives</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a.</td>
<td>Develop electrical engineering solutions either individually or through interdisciplinary teams within a global and societal context.</td>
<td>![Rating]</td>
</tr>
<tr>
<td>1b</td>
<td>Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context</td>
<td>![Rating]</td>
</tr>
<tr>
<td>2</td>
<td>Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.</td>
<td>![Rating]</td>
</tr>
<tr>
<td>3</td>
<td>Continue professional growth through post-graduate education, continuing education, or professional activity.</td>
<td>![Rating]</td>
</tr>
<tr>
<td>4</td>
<td>Contribute to the Northwest Florida regional economic development.</td>
<td>![Rating]</td>
</tr>
</tbody>
</table>

2. Do you think that our educational objectives (as listed above) are sound, sufficient, achievable and appropriate to the practice of electrical and computer engineering? ___ YES   ____ NO, suggest changes. 
If NO, what changes and/or modifications would you suggest?  

3. Do you have any suggestions for improving our curriculum (courses, laboratories, computer facilities) so that we could better meet our objectives?  

4. What do you consider to be the greatest strengths and/or weakness of our undergraduate programs?  

5. How do you continue professional growth? Please check as appropriate  
   Professional society _____ Continuing Education _____ Passed EIT Exam _____ Passed PE Exam _____  
   Masters Degree ______ Ph.D. _______ Others ______ Please specify ________________________________  

6. If you are employed or self-employed, the name and address of your company  
   Company Name ___________________________________________________________________________  
   Address ______________________________________________________________________________  
   ______________________________________________________________________________  

   To help us keep our alumni records accurate, please answer the following questions  

7. Your name ____________________________________________________________  

8. Your e-mail ____________________________________________________________
2.9.4 Changes Made to Meet Local Needs

The Council discussed the program objectives (see minutes in Section A, Appendix V). According to the Council, the program objectives serve the region well and no changes were recommended. But, there was consensus among the Council members on offering courses and continuing educational activities in power and other areas to serve the needs of the Northwest Florida region. The Department hired one faculty (Dr. Dale Harrell, effective fall 2002) for developing courses in power area.

February 2005, UWF has signed an educational partnership agreement with Gulf Power Company to offer training courses for personnel in its Power Delivery department. The courses to be included under this agreement are:

- Algebra and Trigonometry courses for non-engineers
- AC/DC circuits for non-engineers
- Three-phase for non-engineers
- EIT Review courses for engineers
- PE Review courses for engineers
- Power engineering courses for engineers

Gulf Power has also established a Gulf Power Engineering Endowment of $100,000 with a State matching of $50,000 for promoting power engineering education. Few students are already working directly with Gulf Power engineers for their senior design projects. For examples,

- Two students are working on implementing a Transmission Line Structure Information Network for Gulf Power. The students are involved with converting multiple data bases into one comprehensive data base that includes all structure information. Structure information encompasses such structure specific information as GPS position, quickest access route, structure hardware, power flow, etc. This information can be accessed through any Southern Company computer. The project also includes ArcView-9 attributes, internet access reliability, and an easily understandable user manual for the engineer(s) that ultimately take over the project.
- The Gulf Power endowment provided partial travel supports to the following undergraduate students to present papers at the 2005 North American Power Symposium, Iowa State University, Ames, Iowa from Sunday, October 23 - Tuesday, October 25, 2005.


2.9.5 Changes Due to Survey Comments

The following are the examples of actions taken by the Department to address some of the comments:

- Comments made by external constituencies on requiring students to take the EIT exam prior to graduating were discussed by the faculty. Although, the faculty acknowledges the benefits of taking EIT exam by students, the faculty decided to continue covering the professional registration process in EGN 4034 and encouraging students in taking the EIT Exam.
- Student comments that the fundamentals taught should be the same for each class, no matter who is teaching it. The department started an ‘archive folder’ of all EEL course syllabi, effective Fall
2004 so that the Department has a record of who taught what topics in each course and there is a consistency in the course coverage, ftp.ece.uwf.edu

- For more training on software used such Mathcad, P-Spice, and Matlab; programming courses should be taught in the Department so as to maximize their relevance to EE students. The Department developed a new course EGN 3033 – Engineering Software Tools, effective Spring 2006.

- The level of advising from professors should be increased. Effective fall 2005, each student is assigned to a Faculty advisor (see Section 1.2.2, page # 21).

2.10 Implementation of the Revised Program Objectives

The revised program objectives for computer engineering, which will be effective fall 2006 and will be published in the 2006 catalog, were placed in effect to receive feedback from alumni and employers. The questionnaires for alumni surveys are shown in Table 2-25.

2.10.1 Results of 2006 Alumni Surveys

The summary of alumni survey results, which was conducted in the 2006 Spring semester, is included in Section A, Appendix VI. Forty-four (44) survey forms were sent by e-mails, and 6 (14%) were received. The questions and the responses are listed in Table 2-26 and Figure 2-21.

The responses for continued professional growth are:

- Professional society __3 (50%)__ Continuing Education _4 (67%)__
- Passed EIT Exam __1 (17%)__ Passed PE Exam __1(17%)__
- Masters Degree __2 (33%)_____ Ph.D. ___1 (17%)_____ Others ___ Please specify __________

Summary Results: The analysis of the alumni survey indicates that 80% or more of our alumni believe that the department prepared them with those listed accomplishments.
Table 2-26: Summary of the alumni survey results (conducted in Spring 2005)

<table>
<thead>
<tr>
<th>#</th>
<th>Accomplishments of our educational objectives</th>
<th>Rating</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Develop computer engineering solutions either individually or through interdisciplinary teams within a global and societal context.</td>
<td>2 (50%)</td>
<td>2 (50%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>2.</td>
<td>Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.</td>
<td>5 (83%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>3.</td>
<td>Continue professional growth through post-graduate education, continuing education, or professional activity.</td>
<td>5 (83%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>4.</td>
<td>Contribute to the Northwest Florida regional economic development.</td>
<td>2 (33%)</td>
<td>3 (50%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
</tbody>
</table>

Figure 2-21: Results of Alumni Survey (conducted in Spring 2006)

2.10.2 Results of 2006 Engineering Council Advisory Surveys

The summary of the Engineering Council survey results, which was conducted in the Spring of 2006, is included in Sections B & C, Appendix VI on Assessments. Fifteen (33) survey forms were sent, and 4 (12%) were received. The questions and responses are listed in Table 2-25 and Figure 2-22.

Summary Results: Out of the four (4) Council responses, 2 of them are employers. The analysis of the employer survey indicates that 100% employers believe that the program prepared our graduates with those listed capabilities.
Table 2-27: Summary of the Engineering Council survey results (conducted in the Spring 2006)

<table>
<thead>
<tr>
<th>#</th>
<th>Accomplishments of our educational objectives</th>
<th>Rating</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context.</td>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.</td>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>Continue professional growth through post-graduate education, continuing education, or professional activity.</td>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>2 (50%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>Contribute to the Northwest Florida regional economic development.</td>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 2-22: Results of Engineering Council Survey (conducted in Spring 2006)

2.11 Summary of Criteria 2.0

The computer engineering program has in place the following:

(a) published educational objectives that are consistent with the mission of the institution and the ABET criteria.
(b) a process based on the needs of the program's various constituencies in which the objectives are determined and periodically evaluated
(c) a curriculum that prepares students to attain program outcomes and accomplishments of graduates.
(d) a process of ongoing evaluation and the result are used to develop and improve the program outcomes so that graduates are better prepared to attain the objectives.

The results of different evaluation tools (as shown in Fig. 2-23) indicate that the program objectives are achieved beyond the benchmark of 80% or better. The variations between the highest and lowest values are...
achievements are wide in objectives # 1 (38%), 4 (35%), 6(47%) and 7(35%). The Department plans to monitor the results and takes appropriate actions to reduce the variations and make improvements on others.

Table 2-23 (Page # 78) shows examples of changes made for improving few program objectives. Table 2-28 (Page # 87) shows examples of program objective evaluations and Actions Taken. Table 2-29 shows the level of implementation and demonstration of program educational objectives

Figure 2-23: Lowest and Highest Degrees of Objective Achievements for Electrical Engineering (for three review cycles)

2.12 Materials Available for Review under Criteria 2.0

The department has established an assessment process, which is used for continuous improvement of the undergraduate programs and the department’s educational operations. The process involves listing the program education objectives and program outcomes that have been identified. It is intended to be a working notebook. The documentation includes following reports:

Survey Results and Raw Data of Alumni Surveys
Survey Results and Raw Data of Employer Surveys
Results Surveys and Raw Data of Co-op Employer Survey
Minutes of Advisory Council Meetings
<table>
<thead>
<tr>
<th>Electrical Engineering Educational Objective</th>
<th>Intended Outcome</th>
<th>Outcome Indicators and Criteria for Success</th>
<th>Evaluation Results</th>
<th>Action Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software</td>
<td>Graduates will be able to effectively apply their skills in engineering practice.</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>UWF General Education has an ongoing review of the general education and diversity requirements.</td>
<td>In 1998, the UWF General Education Council changed the General Education Requirements to General Studies Requirements with a broad educational foundation in six different areas. Effective Fall 2002, the department recommends ECO 2013 – Economics, PHI – Ethics, and EUH 1001 – Western Perspectives I for Gen Ed. It has improved, but needs further improvement.</td>
</tr>
<tr>
<td>An ability to understand all the elements required to design a complete computer system (hardware and software).</td>
<td>Graduates will be able to effectively apply their skills in engineering practice.</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>94% of employers indicated that they were pleased with the quality of electrical engineer the department was producing.</td>
<td>The department is emphasizing integrating more problems into the courses to strengthen in this objective.</td>
</tr>
<tr>
<td>An ability to understand the interaction between hardware and software</td>
<td>Graduates will be able to effectively apply their skills in engineering practice</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>The students requested for choice of more technical electives.</td>
<td>Effective fall 1998, the department publishes an offering list of technical electives. Each faculty can schedule at least one technical course in each year.</td>
</tr>
<tr>
<td>The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques</td>
<td>Graduates will be able to effectively apply their skills in engineering practice.</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>More space needed to cope with the program growth.</td>
<td>Effective Summer 1999, the department is sharing lab space with technology programs. Purchased more lab equipment in 1998, 1999 and 2000, 2002, 2003, 2005.</td>
</tr>
<tr>
<td>An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.</td>
<td>Graduates will be able to effectively apply their skills in engineering practice.</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>Graduating senior self evaluation indicated lower scores in lifelong leaning experience and contemporary issues.</td>
<td>Effective fall 1998, the department requires the course EEL 4931 – EE Seminar, which replaced by EGN 4034 in Fall 2000.</td>
</tr>
<tr>
<td>Graduates will be able to effectively apply their skills in engineering practice.</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>Emphasis on communication skills was indicated by alumni, exit interviews and employers.</td>
<td></td>
<td>The ECE faculty requires notebook-type lab reports, formal design reports in some course, and oral presentation for senior course which improved communication skills.</td>
</tr>
<tr>
<td>Graduates will be able to effectively apply their skills in engineering practice.</td>
<td>Positive reaction to the curriculum from constituents</td>
<td>Employers and Engineering Council indicated that this makes a big difference in the quality of the student</td>
<td>The ECE faculty encourages students to work in a team in senior design and other courses which improved this, but needs further improvement.</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Educational Objectives</td>
<td>Constituents</td>
<td>Processes</td>
<td>Evaluation of Objectives</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Evaluation tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
</tr>
<tr>
<td>2</td>
<td>An ability to understand all the elements required to design a complete computer system (hardware and software).</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
</tr>
<tr>
<td>3</td>
<td>An ability to understand the interaction between hardware and software</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
</tr>
<tr>
<td>4</td>
<td>The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
</tr>
<tr>
<td>5</td>
<td>An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
</tr>
<tr>
<td></td>
<td>Students and faculty</td>
<td>manpower demand of the region.</td>
<td>problems are identified for improvement</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>--------------------------------</td>
<td>----------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>6</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement (for review three cycles) vary from 50% to 85% for different tools. At least 50% or better degree of achievement. But, it shows improvement due to the measures taken.</td>
</tr>
<tr>
<td>7</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement (for review three cycles) vary from 50% to 85% for different tools. At least 50% or better degree of achievement. But, it shows improvement due to the measures taken.</td>
</tr>
</tbody>
</table>
CRITERION 3 – PROGRAM OUTCOMES AND ASSESSMENT

The program has defined outcomes which describe what students are expected to know and be able to do by the time of graduation. There are established processes to produce these outcomes and an assessment process that demonstrates that these program outcomes are being measured and indicates the degree to which the outcomes are achieved. The results of this assessment process are applied to the further development of the program.

3.1 Program Outcomes

Program outcomes relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program. The outcomes are divided into two major sets: (1) program outcomes and (2) course outcomes. The first set corresponds to the curricular requirements which are consistent with the ABET Engineering Criteria and program criteria. All graduates of the computer engineering program are expected to achieve these program outcomes. The second set corresponds to the curricular requirements to produce the course outcomes and course objectives (see Appendix I, Part B, course syllabi). The department uses the second set to monitor and improve its operations and programs. The ECE faculty adopted the 13 outcomes listed in Table 3-1, which were revised in March 18, 2005 and are published in the web-site1. The relationship of the program outcomes to the ABET criteria is also shown in Table 3-1 (see Page #92). These outcomes correspond to the curricular requirements and graduate attributes specified in the ABET Engineering Criteria and the relevant program criteria.

Table 3-2 (see Page #93) shows the relationship between the educational objectives and the program outcomes. Relationships are noted as E = Excellent, S = Satisfactory, or N = Needs Improvement. Satisfactory completion of the electrical engineering degree requirements is the primary mechanism for achieving these outcomes. Table 3-3 (see Page #94) shows how the department uses the curriculum requirements to support its curriculum and operations.

The Department employs a number of strategies to aid it in meeting these outcomes, and to support monitoring and improve its operations and programs. They include:

- Providing advising that meets students’ needs for information regarding academic issues, career options, and graduate education.
- Working with the UWF office of Student Success Programs to provide appropriate support for under-represented population groups, including ethnic and racial minorities, women, and physically handicapped students.
- Providing research opportunities through Honor’s projects and offering technical electives within the technical specialties of the ECE faculty.
- Supporting and encouraging student participation in multi-disciplinary academic endeavors where possible.
- Taking steps to ensure that classroom and laboratory instructions are effective and encourage student learning.
- Improving its educational programs through professional development, activities, and the use of enhanced educational technologies.
- Courses will normally be taught by regular full-time faculty in a small-size environment.

1 http://uwf.edu/ece
(usually less than 30) to allow one-to-one integration between students and faculty.

- Students will be provided with hands-on experience through laboratory experiments and design projects.
- Learning environments will be linked so as to enhance interaction among engineering students.
- Providing learning opportunities through mentoring and tutorial sessions.
<table>
<thead>
<tr>
<th>#</th>
<th>Computer Engineering Program Outcomes*</th>
<th>ABET Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Recognize and apply concepts, principles and theories of mathematics through differential and integral</td>
<td>Engineering Criterion 3(a) and EE Program Criteria</td>
</tr>
<tr>
<td></td>
<td>calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Recognize and apply concepts, principles and theories of core electrical engineering topics: basic</td>
<td>EE Program Criteria</td>
</tr>
<tr>
<td></td>
<td>circuit analysis, signals and systems, electronics, digital logic, and computer programming.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Use modern engineering techniques, skills, and tools, including computer-based tools for analysis</td>
<td>Engineering Criterion 3(k)</td>
</tr>
<tr>
<td></td>
<td>and design of electrical engineering problems.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering</td>
<td>Engineering Criterion 3(a)</td>
</tr>
<tr>
<td></td>
<td>problems.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Design and conduct scientific and electrical engineering experiments, as well as to analyze and</td>
<td>Engineering Criterion 3(b)</td>
</tr>
<tr>
<td></td>
<td>interpret data.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Recognize and apply concepts, principles and theories in probability and statistics, including</td>
<td>EE Program Criteria</td>
</tr>
<tr>
<td></td>
<td>electrical engineering applications.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Identify, formulate, and electrical engineering problems, including the planning, specification,</td>
<td>Engineering Criterion 3(c,e) and EE Program Criteria</td>
</tr>
<tr>
<td></td>
<td>design, implementation, and operation of systems, components, and/or processes that meet performance,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cost, time, safety, and quality requirements.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Function effectively on multi-disciplinary teams**.</td>
<td>Engineering Criterion 3(d)</td>
</tr>
<tr>
<td></td>
<td>* It requires ability with different skills defined by the task and include communication skills,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>technical skills, technical expertise and conflict resolution skills.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Describe the ethical and professional responsibilities of the electrical engineer. Make and defend</td>
<td>Engineering Criterion 3(f)</td>
</tr>
<tr>
<td></td>
<td>ethical judgments in keeping with professional standards.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Communicate effectively in writing and convey technical material through oral presentation of</td>
<td>Engineering Criterion 3(g)</td>
</tr>
<tr>
<td></td>
<td>electrical engineering topic and interaction with an audience.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Describe the interrelatedness of contemporary issues in a global and society context with electrical</td>
<td>Engineering Criterion 3(h,i)</td>
</tr>
<tr>
<td></td>
<td>engineering solutions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* It requires one paper on how engineering can impact some recent event.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Justify the need for engaging in life-long learning in electrical engineering.</td>
<td>Engineering Criterion 3(i)</td>
</tr>
<tr>
<td></td>
<td>* It requires ability to use library, critique journals articles, synthesize materials from different</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sources, and figure out where to go for new information.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Recognize and apply concepts, principles and theories of discrete mathematics.</td>
<td>Program Criteria</td>
</tr>
<tr>
<td>14.</td>
<td>Recognize and apply concepts, fundamental theory and practice of science and engineering, as it</td>
<td>Program Criteria Identical to Outcome 2</td>
</tr>
<tr>
<td></td>
<td>applies to hardware and software, and identify the interaction between hardware and software.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Describe and apply all the elements required to design a complete system (hardware and software)</td>
<td>Engineering Criterion 3(c,e) and Program Identical to Outcome 7</td>
</tr>
</tbody>
</table>

* Initially Approved on September 26, 1997
Revised and Approved on September 21, 1998
Revised and Approved on March 18, 2005

** A team is defined as a group where members are focused on achieving a common goal. UWF offers only two engineering programs: electrical and computer engineering. A successful team consists of a group of students (usually 2-3) with different skill sets, where students share equal responsibility and contribute through different aspects of electrical and/or computer engineering (e.g., power, electronics, digital logic, control, communications, electromagnetics, programming, microprocessors, software simulation and uses, computer science topics, etc.) in order to complete a given project or task. It includes communication skills, technical expertise, and conflict resolution.
Table 3-2: Relationship between Educational Objectives and Outcomes

<table>
<thead>
<tr>
<th>#</th>
<th>Educational Objectives</th>
<th>Computer Engineering Program Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.</td>
<td>E E E E E</td>
</tr>
<tr>
<td>2</td>
<td>An ability to understand all the elements required to design a complete computer system (hardware and software).</td>
<td>E E E E E S</td>
</tr>
<tr>
<td>3</td>
<td>An ability to understand the interaction between hardware and software.</td>
<td>E E</td>
</tr>
<tr>
<td>4</td>
<td>The analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.</td>
<td>E E E E E E E E E</td>
</tr>
<tr>
<td>5</td>
<td>An ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.</td>
<td>S S E S N</td>
</tr>
</tbody>
</table>

E = Excellent  S = Satisfactory  N = Needs Improvement

Program Outcomes:
1 - Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables
2 - Knowledge of core electrical and computer engineering topics
3 - An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
4 - An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems
5 - An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data
6 - Knowledge of probability and statistics, including electrical engineering applications
7 - An ability to identify, formulate, and solve novel electrical engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements
8 - An ability to function on multi-disciplinary teams, where possible
9 - An understanding of professional and ethical responsibility
10 - An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience
11 - The broad education and knowledge of contemporary issues necessary to understand the impact of electrical engineering solutions in a global and societal context
12 - A recognition of the need for, and an ability to engage in life-long learning
13 - Knowledge of discrete mathematics
14 - Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software
15 - Understanding of all the elements required to design a complete computer system (hardware and software).

Note: The revised program Outcomes are listed in Table 3.1, effective Fall 2005.
Table 3-3: Curriculum Requirements Used to Achieve Program Outcomes

<table>
<thead>
<tr>
<th>Resources and Strategies</th>
<th>Applicable for all</th>
<th>Computer Engineering Program Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curriculum Requirements</strong></td>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</td>
</tr>
<tr>
<td>• Math and Basic Science</td>
<td>x</td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Computing and</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Required Core Courses</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Electives</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Major Design Experience</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Technical Breadth</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Ethics</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>• Humanities and Social</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Research Opportunities/</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Student Academic</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Competition*</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Co-op*</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Seminars and Lectures</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
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<tr>
<td>with Speakers from</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Engineering Advisory</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Council and Student/Faculty</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Committee</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Student Chapters of</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Professional Societies*</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Major Education</td>
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<tr>
<td>Academic Advising Office</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Faculty Advising</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Student Orientation and</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Faculty and Staff</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Professional</td>
<td></td>
<td>x x x x x x x x x x x x x x x x x x</td>
</tr>
</tbody>
</table>

* The listed items do not apply to all computer engineering students.

Program Outcomes:
1. Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables
2. Knowledge of core computer engineering topics
3. Ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
4. Ability to apply knowledge of mathematics, science, and engineering to the analysis of computer engineering problems
5. Ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data
6. Knowledge of probability and statistics, including computer engineering applications
7. Ability to identify, formulate, and solve novel computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements
8. Ability to function on multi-disciplinary teams, where possible
9. Understanding of professional and ethical responsibility
10. Ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience
11. The broad education and knowledge of contemporary issues necessary to understand the impact of computer engineering solutions in a global and societal context
12. A recognition of the need for, and an ability to engage in life-long learning
13. Knowledge of discrete mathematics
14. Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software
15. Understanding of all the elements required to design a complete computer system (hardware and software).

Note: The revised program Outcomes are listed in Table 3.1, effective Fall 2005.
3.2 Assessment Process to Measure Outcomes

The department uses multiple methods to assess the achievements of the program outcomes. The satisfaction of curricular requirements is the primary mechanism for ensuring that graduates achieve the program outcomes. The flowchart of the courses to the program outcome leading to the program objectives is shown in Figure 3-1. Each course within the curriculum is linked to at least one of the program outcomes. Table 3-4 (see Page #96) shows the relationship of each course to the program outcomes. Figure 3-2 (see Page #98) shows the relationship of the courses to the program outcomes leading to the program objectives. Students are informed of the linkage between the courses and the outcomes. Each faculty member also knows which of the program outcomes are met by his/her course. The direct and indirect assessment methods are used to measure and assess the achievement of each program outcome.

The block diagram of the process to measure and assess the program outcomes is shown in Figure 3-3 (Page # 99). The outcome assessment process that has been in place, since the Fall of 1998, is shown in Figure 3-4 (see Page # 99). The curriculum committee reviews the results of the assessment methods and makes written recommendations for changes to the Director who, with approval of the faculty, implements necessary changes, if possible, for program improvements.

**Figure 3.1 Flowchart of the courses to the program outcomes leading to the program objectives**
## Table 3-4: Relationship between Courses and Program Outcomes

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Reqr'd</th>
<th>Computer Engineering Program Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</td>
<td></td>
</tr>
<tr>
<td>EEL 3111</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3112</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3135</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3211</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3303L</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3304</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3396</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3472</td>
<td></td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3473</td>
<td></td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3701</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 3701L</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 4213</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 4230</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 4242</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
<td>EEL 4304L</td>
<td>x</td>
<td>x x</td>
</tr>
<tr>
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Program Outcomes:

1 - Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables
2 - Knowledge of core computer engineering topics
3 - An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
4 - An ability to apply knowledge of mathematics, science, and engineering to the analysis of computer engineering problems
5 - An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data
6 - Knowledge of probability and statistics, including computer engineering applications
7 - An ability to identify, formulate, and solve novel computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements
8 - An ability to function on multi-disciplinary teams, where possible
9 - An understanding of professional and ethical responsibility
10 - An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience
11 - The broad education and knowledge of contemporary issues necessary to understand the impact of computer engineering solutions in a global and societal context
12 - A recognition of the need for, and an ability to engage in life-long learning
13 - Knowledge of discrete mathematics
14 - Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software
15 - Understanding of all the elements required to design a complete computer system (hardware and software).
### Table 3-4: Relationship between Courses and Program Outcomes (continued)

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Program Outcomes:
1 - Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables
2 - Knowledge of core computer engineering topics
3 - An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
4 - An ability to apply knowledge of mathematics, science, and engineering to the analysis of computer engineering problems
5 - An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data
6 - Knowledge of probability and statistics, including computer engineering applications
7 - An ability to identify, formulate, and solve novel computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements
8 - An ability to function on multi-disciplinary teams, where possible
9 - An understanding of professional and ethical responsibility
10 - An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience
11 - The broad education and knowledge of contemporary issues necessary to understand the impact of computer engineering solutions in a global and societal context
12 - A recognition of the need for, and an ability to engage in life-long learning
13 - Knowledge of discrete mathematics
14 - Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software
15 - Understanding of all the elements required to design a complete computer system (hardware and software).

Note: The revised program Outcomes are listed in Table 3.1, effective Fall 2005.
Objectives
For
Bachelor of Science
Computer Engineering

1. Knowledge of Mathematics
2. Core Electrical & Computer Engineering
3. Modern Engineering Techniques, Skills &
4. Apply Knowledge of Math, Science & Engineering
5. Design & Conduct Scientific & Engineering
6. Knowledge of Probability &
7. Ability to Identify, Formulate, and Solve Engineering Problems
8. Ability to Function on Multi-disciplinary Teams
9. Professional & Ethical Responsibilities
10. Effective Communications
11. Knowledge of Contemporary Issues
12. Ability to Engage in Life-long Learning
13. Knowledge of Discrete Mathematics
14. Theory & Practice of Computer /
15. Complete design of computer system

Figure 3-2: Relationships of Courses to Program Outcomes and Objectives
Figure 3-3 Block diagram of the Assessment process for program outcomes

- **Program Courses**
- **Program Outcomes**
- **Program Objectives**
- **Changes for Program Improvements**
- **Measures & Assesses**

Figure 3-4: Interval Process for Assessing Program Outcomes

- **Department Curriculum Committee** (ECE Faculty, CS Faculty Rep., Math Faculty Rep., Student Rep.)
- **Department Faculty** (All Tenure and non-Tenure Track)
- **Engineering Advisory Council** (Local Businesses, Community Leaders and Alumni)
- **Alumni Surveys, Employers Surveys, and Students Evaluation**
- **Director**
### 3.3 Assessment Methods to Measure Outcomes

The program uses a number of assessment methods by which the achievements of the program outcomes are measured and assessed. Table 3-5 summarizes the direct and indirect methods and their purposes. The direct methods include the assessment tools such as written examinations, essays, papers, presentations, etc. The benchmark sets the outcome against which the outcome’s performance is judged by the faculty within the department. The achievement of an outcome is measured by a performance criterion which is stated in terms of a raw score of 3 out of 5 (or 6 out of 10) or percentage (60%) as follows:

- 5= excellent, exceeding expectation (100%)
- 4= very good, above expectation (80%)
- 3= good, met expectation (60%)
- 2= fair, below expectation (40%)
- 1= poor (20%)
<table>
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<tr>
<th>#</th>
<th>Assessment Methods</th>
<th>Method</th>
<th>Purpose of Assessment Methods</th>
<th>Type</th>
<th>Benchmark</th>
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<td>1.</td>
<td>Performance appraisals of student work samples</td>
<td>x</td>
<td>Monitors the quality of our classes</td>
<td>Faculty Assessment</td>
<td>60%</td>
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<td>2.</td>
<td>Faculty Assessment of student work</td>
<td>x</td>
<td>Monitors faculty estimate of achieving the learning outcomes. Each student must achieve the benchmark.</td>
<td>Faculty Assessment</td>
<td>60%</td>
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<td>3.</td>
<td>Portfolios of Student work</td>
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<td>Collection of student work: how and how many of the outcomes are met. Each student should meet all outcomes.</td>
<td>Faculty set criteria</td>
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<td>4.</td>
<td>Capstone Design project</td>
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<td>Measures how student knowledge from previous course work is applied in practice to find an engineering solution.</td>
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<td>5.</td>
<td>Review employer reports from student internship and co-op experience.</td>
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<td>How our students perform in industry; shows student's potential as an engineer.</td>
<td>Coop evaluation</td>
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<td>6.</td>
<td>Pre-Tests for Course Feedback and Outcome Assessment</td>
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<td>As an internal process for feedback and continuous improvements at the course and curriculum level.</td>
<td>Faculty Assessment</td>
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<td>7.</td>
<td>Student Academic Competitions</td>
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<td>Show skills for problem solving and team work</td>
<td>External evaluations</td>
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<td>8.</td>
<td>Exit Interviews and Outcome Assessments by graduating students</td>
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<td>How students view meeting the program outcomes</td>
<td>Graduating seniors Assessment</td>
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<td>9.</td>
<td>Student Outcome Assessment of a course</td>
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<td>Monitors student's progress in achieving the learning outcomes.</td>
<td>Student Assessment</td>
<td>60%</td>
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<td>10.</td>
<td>Student surveys</td>
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<td>To get student opinions and to ensure their awareness of the changes in program requirements</td>
<td>Student surveys</td>
<td>General feedback</td>
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<td>11.</td>
<td>Focused student group discussion</td>
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<td>To get student opinions, needs and feedback</td>
<td>Focused student group</td>
<td>General feedback</td>
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<td>12.</td>
<td>Request feedback from the Engineering Advisory Council.</td>
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<td>Strengths and weaknesses of our program from an industry point of view; to meet the needs of industry</td>
<td>Advisory Council.</td>
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<td>13.</td>
<td>Maintain records of passing the Fundamentals of Engineering Exam</td>
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<td>Quality of our program on a national level</td>
<td>Standardized test</td>
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<td>14.</td>
<td>Maintain records of student placement and employment status after graduation.</td>
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<td>Monitors the professional progress and recognition of our graduates.</td>
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<td>Maintain records on students involved in student organization, and level of activity in each organization.</td>
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<td>Monitors leadership skills and understanding of the need for professional development through lifelong learning.</td>
<td>Record of student professional activities</td>
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<td>16.</td>
<td>Feedback from companies</td>
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<td>Shows strengths and weaknesses of our program and how well our graduates are prepared</td>
<td>Company Feedback</td>
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<td>17.</td>
<td>External Accreditation evaluations</td>
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<td>Assesses our program strengths and weaknesses</td>
<td>consultants</td>
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3.3.1 Main Assessment Methods to Measure and for Analysis of Program Outcomes

The direct assessment of the program outcomes is performed by analysis of seven (7) main methods or instruments:

1. Faculty performance appraisal of three samples of student work by at least two faculty members. Table 3-6 (see Page # 104) shows the targeted courses to be sampled relative to program outcomes. The assessment tools include graded student work of written examinations, quizzes, home work, essays, papers, presentations, etc. This type of appraisal is normally conducted every 3 years.

2. Faculty Assessment of Student’s Outcome Achievement, which is the faculty estimate of achieving a program outcome. Table 3-7 (see Page # 105) also shows faculty course outcome achievement report which gives the course information in achieving an outcome through a course. The assessment tool includes one graded student work of a written examination, quiz, home work, essay, paper, presentation, etc. The faculty member sets the benchmark (usually 70%). This type of appraisal is done by the faculty for each course and a report is due at the end of each semester.

3. Student Portfolios for assessing the level and number of outcome achievements through different courses. Table 3-6 also shows the linkage of the outcomes to the program outcomes for the student portfolios. The student work for each student, which is apprised to have met the outcome and supplied by the faculty in item 2, is collected in a student folder known as student portfolio’.

4. Senior Design projects, which are based on the knowledge and skills acquired in earlier courses work within the curriculum, are assessed by two internal and/or external assessors.

5. Co-op Employer Evaluations as shown in Figure 3-9 (see Page # 134) for assessing student preparedness for their professional employment upon graduation.

6. Pre-Tests for Course Feedback and Outcome Assessments as an internal formal process for continuous improvements at the course and curriculum level.

7. Academic Competitions which are instructional events for students and their level of achievement attest to the quality of their education.

3.3.2 Supplementary Assessment Methods to Measure and for Analysis of Program Outcomes

The assessment of the program outcomes is supplemented by analysis of four (4) supplementary methods or instruments:

1. Outcome Achievements Surveys performed every semester to the graduating seniors. This survey is required for graduation and gives the self-assessments of student’s outcome achievements. A sample survey is shown in Table 3-21 (see Page # 145).

2. Exit Interview Surveys performed every semester to all graduating seniors. This survey is required for graduation and gives the self-evaluations of student’s preparedness toward meeting the program objectives and feedback on student’s academic and advising experience while at UWF. A sample survey is shown in Table 3-27 (see Page # 152).

3. Student Outcome Assessment performed every semester to all students. This survey gives self-evaluations of outcome achievements in each course. A sample survey is shown in Table 3.8 (see Page # 107).

4. Students Surveys and Student Group Meetings to receive feedback from students through student survey questionnaires and meetings.

5. Estimate of the outcome achievements through Festival on the Green (FOG)

6. External ABET Consultants

7. SACS Accreditation Review

8. Board of Regents (BoR) Review

9. UWF Internal Reviews
3.3.3  Manner In Which Faculty And Other Constituencies Are Involved

The department is responsible for delivering the curriculum and for achieving the program outcomes. The review process involves key stakeholders. It is summarized as follows:

1. The department receives input and feedback through assessment tools and summarizes the results. Meetings with students, faculty, Engineering Advisory Council members and employers are also included in the review process.
2. The ECE faculty reviews the results and identifies actions to be taken.
3. On a regular basis, the faculty members are directly involved in discussions of academic and non-academic issues relating to the operation of the department. Their recommendations are submitted to the Director for consideration.
4. The department has an open-door policy and seeks input and feedback from stakeholders. The Director and faculty consider their recommendations, and changes are implemented as appropriate.
5. The faculty, the Director, the department takes appropriate action based on the collective constituency input from students, graduating seniors, employers, alumni, engineering advisory council members, and co-op employers.

The ECE faculty reviews constituent input and provides feedback to the Director each year. The department then takes appropriate action to improve the effectiveness of the program outcomes and the curriculum. Each course coordinator reviews and adjusts the content of his/her course to ensure achievement of the program outcomes. The faculty takes ownership of the degree programs and is actively involved in the educational process. The general review process has resulted in numerous improvements such as the topics for the course EGN 4034 (see Section 3.7 - Examples of Improvements, Page # 179).
<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcome for Electrical &amp; Computer Engineering</th>
<th>Targeted Courses</th>
<th>How /Where Assessed*</th>
<th>% Student Scores</th>
<th>No. Students**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112, 3135, EGM4313, MAS310, EGM 2500, EGM 3400, EGM 4663, COP 4020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>EEL 3111, 3211, 3701, 3304, CIS 3020, COP 4020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>EEL 3304, 3303L, 4304L, 4712C, 4834, COP 3530</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical and computer engineering problems</td>
<td>EEL 3135, 3472, 4514</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>EEL 3303L, 3701L, 4744L, 4306L, 4514</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical and computer engineering applications</td>
<td>EEL 3396, STA 4321, 4514</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>An ability to identify, formulate, and solve novel electrical and computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements</td>
<td>EEL4914C, 4306L, COP 4600</td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>An ability to function on multi-disciplinary teams, where possible</td>
<td>EEL 4914C, 4657</td>
<td></td>
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<tr>
<td>9</td>
<td>An understanding of professional and ethical responsibility</td>
<td>EGN 4034, CEN 3031, COP 4020</td>
<td></td>
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<tr>
<td>10</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>EGN 4034, EEL4914, ENC 3240</td>
<td></td>
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<tr>
<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to understand the impact of electrical and computer engineering solutions in a global and societal context</td>
<td>EGN 4034, 4834</td>
<td></td>
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<tr>
<td>12</td>
<td>A recognition of the need for, and an ability to engage in life-long learning</td>
<td>EEL 4914C, EGN 4034, CEN 3031, COP 4020, EIN 4354</td>
<td></td>
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<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>EEL 3135, 3701C, COT 3100, COP 4020</td>
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<tr>
<td>14</td>
<td>Knowledge of the fundamental theory and practice of computer science and computer engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td>EEL 4744C, 4713C, CDA 3101, COP 4600, CDA 3101</td>
<td></td>
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<tr>
<td>15</td>
<td>Understanding of all the elements required to design a complete computer system (hardware and software)</td>
<td>EEL 4744C, 4713C, CDA 3101</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* e.g. Exam 1, Quizzes, Project 3, Lab Experiment 5, Homework 3, etc. ** (Be Specific To Which Number(s)) Minimum % student scores for a satisfactory demonstration

A student having a grade/achievement of C (70%) or better in the class has achieved the desired course outcomes? _____YES _____NO

If NO, why not? Explain.________________________________________________________________________

Comments: Include which (if any) course learning outcomes require attention, and how that will be addressed.

Instructor’s Signature __________________________________________ Date _______________________________

ATTACH ALL SUPPORTING DOCUMENTS SUCH AS COURSE SYLLABI, TESTS, QUIZZES, PROJECTS, ETC.
STUDENT OUTCOME ACHIEVEMENT INFORMATION

1. Instructor: m. Bataineh

2. Course Number: EE4306L Semester: Spring 2005

3. Outcome Number: (1 to 15) 5

- Each required course in the curriculum must contribute to at least one outcome.
- Each technical course in the curriculum must contribute to at least one technical outcome (1 to 7) and one non-technical outcome (8 to 12).

4. Score for Outcome Achievement: 70%. Maximum Possible Score: 100%. Class Average: 82.7

5. Number of Students in the Class: 27

6. Number of Students Who Met the Outcome: 21 Percentage: 77.7%

7. Check One or More of the Evaluation Tools (Be Specific To Which Number(s))
   - Midterm Exam
   - Final Exam
   - Lab(s)   ✔ Homework
   - Quiz
   - Project(s)
   - Others Lab reports (specify)

8. Attachments
   (a) Names of Those (Engineering) students Who Met the Outcome
   (b) Copies (or originals) of student work for those who met the specific outcome in item # 3

[Signature]
Instructor's Signature

[Date]
4/29/05

11/13/2003
1. Instructor: MANSEUR

2. Course Number: EEL3112 Semester: SPRING 2005

3. Outcome Number: (1 to 15) 1

   - Each required course in the curriculum must contribute to at least one outcome.
   - Each technical course in the curriculum must contribute to at least one technical outcome (1 to 7) and one non-technical outcome (8 to 12).

4. Score for Outcome Achievement: 60 Maximum Possible Score: 100 Class Average: 62

5. Number of Students in the Class: 26

6. Number of Students Who Met the Outcome: 17 Percentage: 65% 

7. Check One or More of the Evaluation Tools (Be Specific To Which Number(s))
   - Midterm Exam
   - Final Exam X
   - Lab(s)
   - Homework
   - Quiz
   - Project(s)
   - Others (specify)

8. Attachments

   (a) Names of Those (Engineering) students Who Met the Outcome

   (b) Copies (or originals) of student work for those who met the specific outcome in item # 3

   [Signature]

   Instructor’s Signature

   5/03/2005

   Date
Table 3-8: Student Course Outcome Assessment

<table>
<thead>
<tr>
<th>ID NUMBER</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
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</tbody>
</table>

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Blacken entire circle

Correct  ✅  Incorrect  ✗

1. This course improved my knowledge of mathematics through differential and integral calculus, or advanced topics in differential equations, linear algebra, and/or complex variables.
2. This course improved my knowledge of core electrical and/or computer engineering topics.
3. This course improved my ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design.
4. This course improved my ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical and/or computer engineering problems.
5. This course improved my ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data.
6. This course improved my knowledge of probability and statistics, including electrical and/or computer engineering applications.
7. This course improved my ability to identify, formulate, and solve electrical and/or computer engineering problems.
8. This course improved my ability to function on multi-disciplinary teams.
9. This course improved my understanding of professional and ethical responsibility.
10. This course improved my ability to communicate effectively in writing and/or to convey technical material through oral presentation and interaction with an audience.
11. This course improved my knowledge of contemporary issues necessary to understand the impact of electrical and computer engineering solutions in a global and societal context.
12. This course improved my recognition of the need for, and my ability to engage in life-long learning.

Do not stop - CONTINUE on back of this sheet.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>This course improved my knowledge of discrete mathematics.</td>
</tr>
<tr>
<td>14.</td>
<td>This course improved my knowledge of the fundamental theory and practice of computer science and/or computer engineering.</td>
</tr>
<tr>
<td>15.</td>
<td>This course improved my understanding of the elements required to design a complete computer system (hardware and software).</td>
</tr>
<tr>
<td>16.</td>
<td>My pre-requisite electrical or computer engineering courses appropriately prepared me for this course.</td>
</tr>
<tr>
<td>17.</td>
<td>My pre-requisite laboratory and computer course appropriately prepared me for this course.</td>
</tr>
<tr>
<td>18.</td>
<td>My pre-requisite mathematics courses appropriately prepared me for this course.</td>
</tr>
<tr>
<td>19.</td>
<td>My pre-requisite physics courses appropriately prepared me for this course.</td>
</tr>
<tr>
<td>20.</td>
<td>I used differential equations and/or integral calculus in this course.</td>
</tr>
<tr>
<td>21.</td>
<td>I used linear algebra in this course.</td>
</tr>
<tr>
<td>22.</td>
<td>I used complex variables in this course.</td>
</tr>
</tbody>
</table>

**Thank you for your input.**
Table 3-9: Outcome Assessment Methods and Review Cycles

<table>
<thead>
<tr>
<th>UF/UWF Assessment Methods and Tools</th>
<th>Responsibility</th>
<th>Cycle</th>
<th>Reviewed by</th>
<th>Audit Date</th>
<th>Action Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Require and review student work samples and accomplishments.</td>
<td>Director</td>
<td>As needed</td>
<td>Director</td>
<td>Spring 2002, Fall 2005</td>
<td></td>
</tr>
<tr>
<td>2. Instructor Outcome assessment of a Course</td>
<td>Director</td>
<td>2 year</td>
<td>Faculty</td>
<td>Every semester</td>
<td></td>
</tr>
<tr>
<td>3. Exit interviews with graduating students</td>
<td>Director</td>
<td>Semester</td>
<td>Faculty</td>
<td>Every semester</td>
<td></td>
</tr>
<tr>
<td>4. Student Outcome Assessment of a Course</td>
<td>Director</td>
<td>Semester</td>
<td>Faculty</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>5. Review employer reports from student internship and co-op experience.</td>
<td>Co-op office</td>
<td>Yearly</td>
<td>Director</td>
<td>Every semester</td>
<td></td>
</tr>
<tr>
<td>6. Request feedback from the Engineering Advisory Council.</td>
<td>Director</td>
<td>Yearly</td>
<td>Faculty</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>7. Student Academic Competition</td>
<td>Faculty</td>
<td>Yearly</td>
<td>Faculty</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>8. Focused student group discussion</td>
<td>Director</td>
<td>Yearly</td>
<td>Director</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>9. Audit student records of classes taken, grades received, and progress toward program</td>
<td>Director</td>
<td>Semester</td>
<td>Director and Academic Advisor</td>
<td>Every semester</td>
<td></td>
</tr>
<tr>
<td>10. Maintain records on students involved in student organization, and level of activity in each organization.</td>
<td>Student Branch Faculty Advisor</td>
<td>Yearly</td>
<td>Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Maintain records of student placement and employment status after graduation.</td>
<td>Director</td>
<td>Yearly</td>
<td>Director</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>12. Maintain records of percent of students who take and pass the Fundamentals of Engineering Exam if available.</td>
<td>Director</td>
<td>2 year</td>
<td>Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Course/Teacher Evaluations/class visit</td>
<td>Director</td>
<td>As needed</td>
<td>Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Annual faculty performance reviews</td>
<td>Director</td>
<td>Yearly</td>
<td>Director</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>15. Institute and national awards to faculty and students</td>
<td>UWF</td>
<td>Yearly</td>
<td>Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Audit results from student teaching evaluations for courses taught in department.</td>
<td>Faculty</td>
<td>Yearly</td>
<td>Director</td>
<td>Yearly</td>
<td></td>
</tr>
<tr>
<td>17. Alumni surveys</td>
<td>Director</td>
<td>2 years</td>
<td>Faculty</td>
<td>Fall 1999, Fall 2001, Fall 2004</td>
<td></td>
</tr>
<tr>
<td>18. Employer surveys</td>
<td>Director</td>
<td>2 years</td>
<td>Faculty</td>
<td>Fall 1999, Fall 2001, Fall 2004</td>
<td></td>
</tr>
<tr>
<td>19. Co-op employer surveys</td>
<td>Director</td>
<td>2 years</td>
<td>Faculty</td>
<td>Fall 1999, Fall 2001, Fall 2004</td>
<td></td>
</tr>
<tr>
<td>20. Feedback from companies</td>
<td>Director</td>
<td>2 year</td>
<td>Faculty</td>
<td>Spring 2002, Fall 2004</td>
<td></td>
</tr>
<tr>
<td>21. ABET accreditation evaluations</td>
<td>Director</td>
<td>2 year</td>
<td>Faculty</td>
<td>Fall 2000, Spring 2003, Fall 2006</td>
<td></td>
</tr>
<tr>
<td>22. UWF Board of Trustees</td>
<td>Director</td>
<td>6 year</td>
<td>Faculty</td>
<td>Spring 2005</td>
<td></td>
</tr>
<tr>
<td>23. SACS accreditation evaluations</td>
<td>Director</td>
<td>10 year</td>
<td>Faculty</td>
<td>Spring 2005</td>
<td></td>
</tr>
</tbody>
</table>
3.4 Results and Analysis of Main Assessment Tools on Program Outcomes

The outcome # 10 on communication skills is achieved through the writing requirement (see Section 4.3.3) that students must complete English and humanities course work with 24,000 written words. The highest amount of disagreement was on these two outcomes: for outcome # 6 on knowledge of probability and statistics, and for the outcome # 11 on contemporary issues. Requiring the courses STA 4321 – Mathematical Statistics, effective fall 2001 and EGN 4034 – Professional Ethics, effective fall 2002 improved the results for the outcome # 6 and for the outcome # 11.

3.4.1 Faculty Assessment of Samples of Student work

The curriculum committees identified the courses to be sampled relative to program outcomes as shown in Table 3-6 (see Page # 104). The faculty reviewed the folders for these courses (2001-02, Fall 2005 and Spring 2005). The summaries of the faculty assessments of the program outcomes are shown in Tables 3-10 & 3-11, and Figure 3-5.

Summary Results: According to the assessments of the course folders over two cycles, all outcomes are satisfied. As a result of these reviews, few course improvements were made (see comments in Tables 3-10 & 3-11).

3.4.2 Faculty Assessment of Student’s Outcome Achievements

Each faculty assessor sets his/her benchmark by which a program outcome in a course is satisfied and gives student’s name and the actual student course work that has met the specific outcome (see Table 3-6). Tables 3-12 & 3-13 (Pages # 119 & 125), and Figures 3-6 & 3-7 (see Pages # 124 and 128) show the summary of faculty assessments of program outcome achievements in the targeted courses including the % of the program outcome achievements and the % of students meeting the course objectives. The course grades are not used to measure the program outcome achievements. Students are, however, required to have a grade of C (2.0/4.0) or better in all pre-requisite EEL courses. This ensures that all students graduating from the program will be expected to attain a certain minimum level of achievement toward meeting the overall program outcomes and be prepared in achieving the program objectives after graduation.

Summary Results: According to the faculty assessments of student’s performance in courses linked to the program outcomes, more than 90% of the students in a class meet the program outcome, except for outcome #2. The range of variations from a linked course to another linked course for the same outcome is not wide, expect for outcome #1. It needs improvement in narrowing the gap between the expected outcome in the linked course and in achievement of the benchmark of 90% or better.
<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcome</th>
<th>Course</th>
<th>Reviewed by Course Coordinator</th>
<th>Date of Review</th>
<th>Reviewer’s Comments and Feedback</th>
<th>Action by ECE Curriculum Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>EEL 3111</td>
<td>Harrell</td>
<td>9/20/02</td>
<td>After a review of the available material outcomes are satisfied.</td>
<td>Cover complex variables in a lecture at beginning of course. Ask math dept. to cover complex math in calculus I or II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3701C</td>
<td>Khabou</td>
<td>9/20/02</td>
<td>Outcomes are satisfied</td>
<td>Monitor computer programming skills over next few semesters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CIS 3020</td>
<td>Norman Wilde</td>
<td>10/9/02</td>
<td>The relevant topic is computer programming skill. Achievement is mainly evaluated by performance on the final programming assignments, which require writing a fairly large program. Student work shows success in constructing such a program and code is reasonably well structured and documented.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>EEL 3304</td>
<td>Rashid</td>
<td>9/19/02</td>
<td>Students used PSpice in homework, design verifications, and tests</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>EEL 3701C</td>
<td>Khabou</td>
<td>9/20/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COP 3530</td>
<td>John Coffey</td>
<td>10/10/02</td>
<td>In order for students to formulate successful solutions to the computer programs, they must have knowledge of math (clearly seen in the queuing simulation assignment) and software engineering principles. Six programming problems were assigned during the semester. Assessment: Data Structures adequately supports this outcome.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outcomes satisfied, especially by the lab component of this class. Students learn to build, test and debug combinational and sequential circuits and use the oscilloscope and other measurement equipment to gather and analyze circuit data.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outcomes are satisfied</td>
<td>Required programming assignments in all sections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The programming assignment involved using probability theory to compare theoretical predictions of run time efficiency with the behavior of the program on an actual machine.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cache memory design, which involves probability of &quot;hits&quot; and &quot;misses&quot; is well being covered.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>It provides the students with a theoretic and practical exploration of the interaction between hardware and software. Different design decisions are considered and evaluated through software simulation and experimentation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The enclosed term project lists the team members on the front cover. Term project conducted in teams of 5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students participate in discussions on ethics in engineering through case studies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Course</td>
<td>Instructor</td>
<td>Date</td>
<td>Outcome Description</td>
<td>Action</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>------------</td>
<td>------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>10</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>EGN 4034</td>
<td>Manseur</td>
<td>9/19/02</td>
<td>All students must prepare documents (PowerPoint and other) and give an oral presentation with a Q&amp;A session. This outcome is satisfied.</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4914</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEN 3031</td>
<td>Laura J. White</td>
<td>10/10/02</td>
<td>The enclosed project was submitted in writing and presented orally at the end of the term.</td>
<td>No action needed</td>
</tr>
<tr>
<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to understand the impact of electrical engineering solutions in a global and societal context</td>
<td>EGN 4034</td>
<td>Manseur</td>
<td>9/19/02</td>
<td>All students are exposed to a large variety of contemporary engineering related topics and issues through a series of seminars. This outcome is satisfied.</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4914</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td>12</td>
<td>A recognition of the need for, and an ability to engage in life-long learning</td>
<td>EGN 4034</td>
<td>Manseur</td>
<td>9/19/02</td>
<td>All students must prepare documents (PowerPoint and other) and give an oral presentation with a Q&amp;A session. This outcome is satisfied.</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4914</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>EEL 3135</td>
<td>Mathews</td>
<td>9/19/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3701C</td>
<td>Khabou</td>
<td>9/20/02</td>
<td>Outcomes are satisfied</td>
<td>No action needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COT 3100</td>
<td>LaForté</td>
<td>10/15/02</td>
<td>The final exam tested students on logic, recursion, induction, basic algorithms, and Boolean circuit design.</td>
<td>Instituted common final exams for all sections of course</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COP 3535</td>
<td>John Coffey</td>
<td>10/10/02</td>
<td>Data structures requires consistent application of Big O() analysis. This capability is explicitly tested on exams and is implicit in the design of algorithms to solve the programming problems. Programming assignments require the creation of lists and trees - structures that are taught in discrete math. Assessment: Data Structures requires students to employ selected concepts and principles from discrete math.</td>
<td>No action needed</td>
</tr>
<tr>
<td>14</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td>EEL 4712C</td>
<td>Khabou</td>
<td>10/23/02</td>
<td>Outcome satisfied. Students learn how to use the hardware descriptive language (VHDL) to design and describe complex digital circuits. Students are introduced to the design of control units, simple Ale’s, data path and other computer hardware. Students also learn to compare designs in terms of complexity and speed.</td>
<td>No action needed</td>
</tr>
<tr>
<td>Course</td>
<td>Instructor</td>
<td>Date</td>
<td>Description</td>
<td>Action</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>COP 4600</td>
<td>Dennis Edwards</td>
<td>10/11/02</td>
<td>It provides the students with a theoretic and practical exploration of the interaction between hardware and software. Different design decisions are considered and evaluated through software simulation and experimentation.</td>
<td>Added assignments that will demonstrate the type of experiments and evaluations performed by the students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>EEL 4713C</td>
<td>Khabou</td>
<td>10/23/02</td>
<td>Outcome satisfied. Students learn to compare different computer architectures and measure their performance. Influence of instruction set architecture on hardware design is also covered. Pipelining, hazards, memory performance, I/O devices and other aspects of computer hardware and software are also introduced.</td>
<td>No action needed</td>
<td></td>
</tr>
<tr>
<td>CDA 3101</td>
<td>Molly Reyenga</td>
<td>10/10/02</td>
<td>Programming problems, Pipeline design and control, cache memory design, input/output optimization gave a “complete” picture of designing a computer system from software to hardware.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Program Outcome</td>
<td>Course</td>
<td>Assessed by</td>
<td>Review Date</td>
<td>Type of work</td>
<td>Rating 1 to 5</td>
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<tr>
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<td>------------------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112</td>
<td>Fuchs &amp; Gilbar</td>
<td>6/1/06</td>
<td>Exam</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>Avant &amp; Gorman</td>
<td>6/1/06</td>
<td>Exam</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3.4</strong></td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>EEL 3111</td>
<td>Harrell &amp; Gilbar</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3701</td>
<td>Gilbar &amp; Shaer</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
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<td></td>
<td></td>
<td></td>
<td><strong>4.59</strong></td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>EEL 4304L</td>
<td>Shaer &amp; Fuchs</td>
<td>6/1/06</td>
<td>Labs</td>
<td>4.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3303L</td>
<td>Harrell &amp; Gilbar</td>
<td>6/1/06</td>
<td>Labs</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
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<td></td>
<td></td>
<td></td>
<td><strong>4.63</strong></td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>EEL 3135</td>
<td>Avant &amp; Gorman</td>
<td>6/1/06</td>
<td>Exams</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3112</td>
<td>Fuchs &amp; Gilbar</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3.75</strong></td>
</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>EEL 4304L</td>
<td>Shaer &amp; Fuchs</td>
<td>6/1/06</td>
<td>Labs</td>
<td>3.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4744L</td>
<td>Khabou &amp; Gilbar</td>
<td>6/1/06</td>
<td>Labs</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
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<td></td>
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<td><strong>4.38</strong></td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical engineering applications</td>
<td>EEL 3396</td>
<td>Gorman &amp; Avant</td>
<td>4/28/06</td>
<td>Exams</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STA 4321</td>
<td>Bagui &amp; Li</td>
<td>5/23/06</td>
<td>Exams</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>4.0</strong></td>
</tr>
<tr>
<td>7</td>
<td>An ability to identify, formulate, and solve novel electrical engineering problems, including the planning, specification, design, implementation</td>
<td>EEL 4914C</td>
<td>Gilbar</td>
<td>6/1/06</td>
<td>Senior Design</td>
<td>4.9</td>
</tr>
<tr>
<td>Course ID</td>
<td>Instructor(s)</td>
<td>Date</td>
<td>Appraisal</td>
<td>Average Appraisal Score</td>
<td>Outcome</td>
<td></td>
</tr>
<tr>
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<tr>
<td>EEL 3303L</td>
<td>Harrell &amp; Gilbar</td>
<td>6/1/06</td>
<td>5</td>
<td>4.75</td>
<td>Outcome is met</td>
<td></td>
</tr>
<tr>
<td>EEL 3304</td>
<td>Shaer &amp; Fuchs</td>
<td>6/1/06</td>
<td>5</td>
<td>4.75</td>
<td>Outcome is met</td>
<td></td>
</tr>
<tr>
<td>EEL 3303L</td>
<td>Harrell &amp; Gilbar</td>
<td>6/1/06</td>
<td>Labs</td>
<td>5</td>
<td>Outcome is met</td>
<td></td>
</tr>
<tr>
<td>EEL 3304</td>
<td>Shaer &amp; Fuchs</td>
<td>6/1/06</td>
<td>Project</td>
<td>5</td>
<td>Outcome is met</td>
<td></td>
</tr>
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</table>

**Average appraisal score**: 4.75 
Outcome is met

<table>
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<tr>
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<th>Date</th>
<th>Appraisal</th>
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<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGN 4034</td>
<td>Rashid &amp; Gorman</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>EEL 4914</td>
<td>Gilbar &amp; Harrell</td>
<td>6/1/06</td>
<td>Senior Design</td>
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</tbody>
</table>

**Average appraisal score**: 3.6 
Outcome is met

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<th>Date</th>
<th>Appraisal</th>
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<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGN 4034</td>
<td>Rashid &amp; Gorman</td>
<td>6/1/06</td>
<td>Presentation</td>
<td>4</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>EEL 3701L</td>
<td>Harrell &amp; Gilbar</td>
<td>6/1/06</td>
<td>Labs</td>
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</table>

**Average appraisal score**: 4.5 
Outcome is met

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<thead>
<tr>
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<th>Date</th>
<th>Appraisal</th>
<th>Average Appraisal Score</th>
<th>Outcome</th>
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</thead>
<tbody>
<tr>
<td>EGN 4034</td>
<td>Rashid &amp; Gorman</td>
<td>6/1/06</td>
<td>Project</td>
<td>4</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>EEL 3701L</td>
<td>Khabou &amp; Gilbar</td>
<td>6/1/06</td>
<td>Project</td>
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<td>Outcome is met</td>
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</table>

**Average appraisal score**: 4.5 
Outcome is met

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<th>Date</th>
<th>Appraisal</th>
<th>Average Appraisal Score</th>
<th>Outcome</th>
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<tr>
<td>EGN 4034</td>
<td>Rashid &amp; Gorman</td>
<td>6/1/06</td>
<td>Project</td>
<td>3.5</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>EEL 4834</td>
<td>Khabou &amp; Gilbar</td>
<td>6/1/06</td>
<td>Project</td>
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**Average appraisal score**: 3.75 
Outcome is met

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<th>Appraisal</th>
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<th>Outcome</th>
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</thead>
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<tr>
<td>EEL 3701L</td>
<td>Gilbar &amp; Shaer</td>
<td>6/1/06</td>
<td>Labs</td>
<td>4.5</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>EEL 3701</td>
<td>Gilbar &amp; Shaer</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4.5</td>
<td>Outcome is met</td>
</tr>
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**Average appraisal score**: 4.5 
Outcome is met

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<tr>
<th>Course ID</th>
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<th>Date</th>
<th>Appraisal</th>
<th>Average Appraisal Score</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL 4744</td>
<td>Khabou &amp; Gilbar</td>
<td>6/1/06</td>
<td>Exams</td>
<td>5</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>Course</td>
<td>Instructor</td>
<td>Date</td>
<td>Assessment</td>
<td>Score</td>
<td>Outcome</td>
</tr>
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<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>EEL 4712</td>
<td>Khabou &amp; Shaer</td>
<td>6/1/06</td>
<td>Exams</td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td>Average appraisal score</td>
<td></td>
<td></td>
<td></td>
<td><strong>4.34</strong></td>
<td>Outcome is met</td>
</tr>
<tr>
<td><strong>15.</strong> Understanding of all the elements required to design a complete computer system (hardware and software)</td>
<td>EEL 4713</td>
<td>Shaer &amp; Khabou</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4.5</td>
</tr>
<tr>
<td>EEL 4712</td>
<td>Khabou &amp; Shaer</td>
<td>6/1/06</td>
<td>Exams</td>
<td>4.5</td>
<td>Outcome is met</td>
</tr>
<tr>
<td>Average appraisal score</td>
<td></td>
<td></td>
<td></td>
<td><strong>4.5</strong></td>
<td>Outcome is met</td>
</tr>
</tbody>
</table>
3.4.3 Faculty Assessment of Student Portfolios

The course numbers by which the program outcomes are met by a student are recorded in the Student Outcome Achievements Audit as shown in Table 3-14(a) (see Page # 129) and the student work is placed in the Student’s Outcome Portfolio (maintained in the department). If a student has met all the outcome requirements of 2 outcomes by at least two courses, then the x1-spread sheet will show ‘YES’, otherwise, it will show ‘NO’ (as shown in Table 3-14(a)). If it shows ‘YES’ against student, then it means that the student has met all outcomes and the folder should contains student work of each outcome from at least two separate courses. An example of the certification of program outcome achievement is shown in Table 3-14(b) (see Page # 130).

Summary Results: Since each student work is assessed independently by a faculty member, the folder should contain two independent assessments for each outcome. The assessment of a sample student portfolio shows that the student has met all program outcomes.

3.4.4 Faculty Assessment of Senior Design Projects

The senior design projects, which require the applications of the knowledge and skills acquired in earlier courses work within the curriculum and encompass most of the program outcomes, are assessed by two internal and/or external assessors. Tables 3-15(a) (see page # 131) and 3-15(b) (see page # 132) show the summaries of the outcome achievements. Figures 3-8(a) and 3-8(b) also depict the results graphically. The low scores are in outcome #1 on applications of advanced math (because some projects do not apply too much advanced math), outcome # 6 on probability and statistics (because some projects do not use probability and statistics), outcome # 8 on multidisciplinary teams (some projects are as an individual project due to work conflict in working as a team), and outcome # 9 on contemporary, social and global issues.

Summary Results: According to the assessments of the senior design projects, 90% of the program outcomes are satisfied.
<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcome</th>
<th>Strategy/ Course</th>
<th>Faculty Assessor</th>
<th>Benchmarks</th>
<th>Assessment Methods</th>
<th>Assessment Results</th>
<th>% of graduates Achieved the program outcome</th>
<th>% Achieving the course objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112</td>
<td>Manseur</td>
<td>100% of the students will participate in exams. Students must achieve a C average (60%) in the course.</td>
<td>Test 1 (25%), Test 2 (25%), Final Exam (35%), Homework (15%)</td>
<td>17 out of 26 achieved this outcome</td>
<td>65%</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>Khabou</td>
<td>100% of the students will participate in exams. Students must achieve a C average (70%) in the course, and receive a minimum grade of 10 out of 15 on Question 2 of the final exam.</td>
<td>Announced Quizzes and project (10%), Pop up quizzes (5%), Homework (10%), Test 1 (20%), Test 2 (25%) Final Exam (30 %)</td>
<td>18 out of 19 students achieved this outcome</td>
<td>94.7</td>
<td>94.7</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>EEL 3111</td>
<td>Gilbar</td>
<td>100% of the students will participate in exams. The students must achieve a C average in the course, and must receive a minimum grade of 10 out of 15 on Question 2 of the final exam.</td>
<td>3 Exams, and question 4 of the final will be used as a representative question of core ECE topics.</td>
<td>72% received a minimum of a C in the course, and 81% of the students received a minimum of 5 out of 8 on question 4 of the final.</td>
<td>72%</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Harrell</td>
<td>100% of the students will participate in all five examinations. Students must achieve a 70% overall average on the exams. Students must have a 70% average on the thirteen homework assignments. All above include electronic circuit design and basic analysis techniques. Also circuits solving methodologies (node, mesh, KVL, KCL, etc). Mathcad is required on homework along with PSpice. Mathcad available for tests.</td>
<td>Tests 1 – 5, 12 % each, 60 % of overall grade. 20% for homework. 15% for two writing projects. And 5% for class participation.</td>
<td>18 of 24 achieved the outcome benchmark</td>
<td>75% (18/24)</td>
<td>75% (18/24)</td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>EEL 3303L</td>
<td>Weber</td>
<td>100% of the students will participate in all five examinations. Students must achieve a 70% overall average on the exams. Students must also have a 70% average on the thirteen homework assignments. All above include electronic circuit design and basic analysis techniques. Also circuits solving methodologies (node, mesh, KVL, KCL, etc). Mathcad is required on homework along with PSpice. Mathcad available for tests.</td>
<td>Tests 1 – 5, 12 % each, 60 % of overall grade. 20% for homework. 15% for two writing projects. And 5% for class participation.</td>
<td>18 of 24 achieved the outcome benchmark</td>
<td>75% (18/24)</td>
<td>75% (18/24)</td>
</tr>
</tbody>
</table>
| Course Code | Instructor | Description | Outcome
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL 4304L</td>
<td>Harrell</td>
<td>100% of the students will participate in nine laboratory experiments with associated pre-lab exercises (PSpice and circuit analysis). Students must achieve 70%. All students submit the pre-lab before starting the experiment. All students must complete the lab.</td>
<td>13 of 14 students achieved the outcomes</td>
</tr>
<tr>
<td>EEL 3135</td>
<td>Khabou</td>
<td>100% of the students will participate in exams. Students must achieve a C average (70%) in the course, and receive a minimum grade of 12 out of 18 on Question 1 of the final exam.</td>
<td>18 out of 19 students achieved this outcome</td>
</tr>
<tr>
<td>EEL 3472</td>
<td>Dingus</td>
<td>An Announced Quizzes and project (10%), Pop up quizzes (5%), Homework (10%), Test 1 (20%), and Test 2 (25%) Final Exam (30%)</td>
<td>78% achieved benchmark requirement</td>
</tr>
<tr>
<td>EEL 3303L</td>
<td>Weber</td>
<td>80% or better successfully design, build, and test nine digital logic circuit designs; 100% of students submit a formal lab report for each experiment</td>
<td>78% achieved benchmark requirement</td>
</tr>
<tr>
<td>EEL 4304L</td>
<td>Harrell</td>
<td>Achieve a 70% or better. All students will design, build and test 10 HC11-based labs. Students submit a formal lab report for each experiment</td>
<td>6 out of 7 students successfully completed all labs and got a C or better.</td>
</tr>
<tr>
<td>EEL 4744L</td>
<td>Khabou</td>
<td>80% or better successfully design, build, and test eight digital electronic circuit designs; 100% of students submit a formal lab report for each experiment</td>
<td>82% of students (23/28) successfully completed all experiments; 100% of students submitted lab reports for the experiments they finished</td>
</tr>
<tr>
<td>EEL 4306L</td>
<td>Bataineh</td>
<td>Prefab work including circuit designs, when applicable (33%), Neatly built and functional circuit (34%), Student understanding of the circuit operation as assessed by the lab instructor (33%)</td>
<td>82% of students (23/28) successfully completed all experiments; 100% of students submitted lab reports for the experiments they finished</td>
</tr>
<tr>
<td>EEL 4657L</td>
<td>Manseur</td>
<td>80% or better of students successfully design, build and test 8 different control systems experiments, measure and interpret data and take a final exam.</td>
<td>29 out of 33 students successfully completed all requirements.</td>
</tr>
<tr>
<td>EEL 3396</td>
<td></td>
<td>Knowledge of probability and statistics, including electrical and computer engineering applications</td>
<td>100%</td>
</tr>
<tr>
<td>EEL 4514</td>
<td></td>
<td>6 Knowledge of probability and statistics, including electrical and computer engineering applications</td>
<td>100%</td>
</tr>
<tr>
<td>STA 4321</td>
<td></td>
<td>7 An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>92%</td>
</tr>
<tr>
<td>Course</td>
<td>Instructor</td>
<td>Grade</td>
<td>Notes</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>EEL4914C</strong></td>
<td>Bataineh</td>
<td>80% or better of students successfully design, build and test a senior design project, 100% successfully participate in a final project presentation; 100% of students submit a formal final project report</td>
<td>Project proposal (5%), critical review (15%), mentor evaluation (30%), final construction (15%), maintaining a patent-style notebook (10%), final project report (15%), project presentation (10%)</td>
</tr>
<tr>
<td><strong>COP 4600</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>An ability to function on multidisciplinary teams</td>
<td><strong>EEL 4242C</strong></td>
<td>Bataineh</td>
</tr>
<tr>
<td><strong>EEL 4657L</strong></td>
<td>Manseur</td>
<td>80% or better of students successfully teamed up in groups of three to collaborate on 8 different control systems experiments.</td>
<td></td>
</tr>
<tr>
<td><strong>EEL 4914C</strong></td>
<td>Bataineh</td>
<td>80% or better of students successfully design, build and test a senior design project; 100% of students submit a formal final project report</td>
<td>Project proposal (5%), critical review (15%), mentor evaluation (30%), final construction (15%), maintaining a patent-style notebook (10%), final project report (15%), project presentation (10%)</td>
</tr>
<tr>
<td><strong>EGL 4034</strong></td>
<td>Rashid</td>
<td>A score 80% or better in the quizzes, 100% of the students will participate in the presentation.</td>
<td>Group projects and presentations (20%), Team work (10%), Quizzes (40%), Participation (10%), final exam (10%) Self-Assessment Report (10%).</td>
</tr>
<tr>
<td><strong>EGL 4034</strong></td>
<td>Rashid</td>
<td>A score 80% or better in the presentation. 100% of the students will participate in the presentation.</td>
<td>Group projects and presentations (20%), Team work (10%), Quizzes (40%), Participation (10%), final exam (10%) Self-Assessment Report (10%).</td>
</tr>
<tr>
<td><strong>EGL 4034</strong></td>
<td>Rashid</td>
<td>A score 80% or better in the presentation and report on contemporary issue, 100% of the students will participate in the presentation.</td>
<td>Group projects and presentations (20%), Team work (10%), Quizzes (40%), Participation (10%), final exam (10%) Self-Assessment Report (10%).</td>
</tr>
</tbody>
</table>

88% 88%

29 out of 33 students Successfully completed all requirements.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Instructor</th>
<th>Description</th>
<th>Objectives</th>
<th>Assessment</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL 4914C</td>
<td>Bataineh</td>
<td>A recognition of the need for, and an ability to engage in life-long learning</td>
<td>80% or better of students successfully design, build and test a senior design project, 100% or better successfully participate in a final project presentation; 100% of students submit a formal final project report.</td>
<td>Project proposal (5%), critical review (15%), mentor evaluation (30%), final construction (15%), maintaining a patent-style notebook (10%), final project report (15%), project presentation (10%).</td>
<td>100% of students achieved benchmark requirement</td>
</tr>
<tr>
<td>EGN 4034</td>
<td>Rashid</td>
<td>Knowledge of the need for, and an ability to engage in life-long learning</td>
<td>A score 70% or better in the Self-Assessment Report (10%), 100% of the students will participate in the presentation...</td>
<td>Group projects and presentations (20%), Team work (10%), Quizzes (40%), Participation (10%), final exam (10%) Self-Assessment Report (10%).</td>
<td>100% scored 80% or better in quizzes.,100% scored 90% or better in presentation, 100% scored 100% or better in contemporary uses, and 100% scored 80% or better in assessment report.</td>
</tr>
<tr>
<td>EEL 3135</td>
<td>Khabou</td>
<td>Knowledge of discrete mathematics</td>
<td>100% of the students will participate in exams. Students must achieve a C average (70%) in the course, and receive a minimum grade of 10 out of 17 on Question 5 of the final exam.</td>
<td>Announced quizzes and project (10 %), Popup quizzes (5%), Homework (10%), Test 1 (20%), Test 2 (25%) Final Exam (30 %)</td>
<td>100% scored 80% or better in quizzes.,100% scored 90% or better in presentation, 100% scored 100% or better in contemporary uses, and 100% scored 80% or better in assessment report.</td>
</tr>
<tr>
<td>EEL 4744</td>
<td>Khabou</td>
<td>Knowledge of the fundamental theory and practice of computer science and computer engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td>100% of the students will participate in exams. Students must achieve a C average (70%) in the course, and receive a minimum grade of 10 out of 15 on Question 1 of the final exam.</td>
<td>Pretest (5%) Exam 1 (25%) Exam 2 (25%) Final Exam (30%) Homework (15%)</td>
<td>100% scored 80% or better in quizzes.,100% scored 90% or better in presentation, 100% scored 100% or better in contemporary uses, and 100% scored 80% or better in assessment report.</td>
</tr>
<tr>
<td>EEL 4744L</td>
<td>Khabou</td>
<td>Knowledge of the fundamental theory and practice of computer science and computer engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td>Achieve a 70% or better. All students will design, build and test 10 HC11-based labs. Students submit a formal lab report for each experiment</td>
<td>Prelab work (30%), Design work (20%) Student understanding of the design as assessed by the lab instructor (10%) Lab report (40%)</td>
<td>100% scored 80% or better in quizzes.,100% scored 90% or better in presentation, 100% scored 100% or better in contemporary uses, and 100% scored 80% or better in assessment report.</td>
</tr>
<tr>
<td>EEL 4713</td>
<td>Khabou</td>
<td>Understanding of all the elements required to design a complete computer system (hardware and software</td>
<td>100% of the students will participate in exams. Students must achieve a C average (70%) in the course, and receive a minimum grade of 10 out of 15 on Question 3 of the final exam.</td>
<td>Exam 1 (25%) Exam 2 (25%) Final Exam (35%) Homework (15%)</td>
<td>100% scored 80% or better in quizzes.,100% scored 90% or better in presentation, 100% scored 100% or better in contemporary uses, and 100% scored 80% or better in assessment report.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Instructor</td>
<td>Description</td>
<td>Assessment</td>
<td>Outcome</td>
<td>Grade</td>
</tr>
<tr>
<td>-------------</td>
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<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>EEL 4744L</td>
<td>Khabou</td>
<td>Achieve a 70% or better. All students will design, build and test 10 HC11-based labs. Students submit a formal lab report for each experiment</td>
<td>Prelab work (30%), Design work (20%), Student understanding of the design as assessed by the lab instructor (10%), Lab report (40%)</td>
<td>6 out of 7 students successfully completed all labs and got a C or better.</td>
<td>85.7</td>
</tr>
<tr>
<td>EEL 4713</td>
<td>Khabou</td>
<td>100% of the students will participate in exams. Students must achieve a C average (70%) in the course, and receive a minimum grade of 8 out of 12 on Question 9 of the final exam.</td>
<td>Exam 1 (25%), Exam 2 (25%), Final Exam (35%), Homework (15%)</td>
<td>13 out of 13 students achieved this outcome</td>
<td>100</td>
</tr>
<tr>
<td>EEL 4713L</td>
<td>Khabou</td>
<td>Achieve a 70% or better. All students will design, build and test 9 computer architecture-related labs (e.g. CPU control circuit, sequential multiplier, etc) Students submit a formal lab report for each experiment</td>
<td>Prelab work (30%), Design work (20%), Student understanding of the design as assessed by the lab instructor (10%), Lab report (40%)</td>
<td>12 out of 12 students successfully completed all labs and got a C or better.</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure 3-6: Faculty Assessments of Student’s Outcome Achievements (Spring 2005)
<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcome</th>
<th>Strategy/ Course</th>
<th>Semester</th>
<th>Faculty Instructor</th>
<th>Benchmarks</th>
<th>Assessment Methods</th>
<th>Assessment Results</th>
<th>% of graduates Achieved the program outcome</th>
<th>% Achieving the course objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112</td>
<td>Fall 04</td>
<td>Mansur</td>
<td>60/100</td>
<td>Final Exam</td>
<td>10/12</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3112</td>
<td>Spr. 05</td>
<td>Mansur</td>
<td>60/100</td>
<td>Final Exam</td>
<td>17/26</td>
<td>65%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>Fall 04</td>
<td>Millard</td>
<td>60/100</td>
<td>Final Exam</td>
<td>14/20</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>Spr. 05</td>
<td>Khabou</td>
<td>10/15</td>
<td>Final Exam</td>
<td>18/19</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4657</td>
<td>Spr. 05</td>
<td>Mansur</td>
<td>60/100</td>
<td>Final Exam</td>
<td>41/49</td>
<td>84%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4834</td>
<td>Spr. 05</td>
<td>Cast</td>
<td>93/100</td>
<td>C++ Programs</td>
<td>33/35</td>
<td>94%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGM 3401</td>
<td>Spr. 05</td>
<td>Zayas</td>
<td>70/100</td>
<td>Final/Labs/HW</td>
<td>12/13</td>
<td>92%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGM 4313</td>
<td>Fall 04</td>
<td>Mathews</td>
<td>60/100</td>
<td>Midterm/Final</td>
<td>28/36</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAS 3105</td>
<td>Fall 04</td>
<td>Z. Mansur</td>
<td>70/100</td>
<td>Midterm/Final</td>
<td>6/12</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAS 3105</td>
<td>Fall 04</td>
<td>X</td>
<td>70/100</td>
<td>Midterm/Final</td>
<td>20/22</td>
<td>91%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAS 3105</td>
<td>Spr. 05</td>
<td>Xu</td>
<td>78/100</td>
<td>Final/Midterm/HW</td>
<td>22/22</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>EEL 3111</td>
<td>Fall 04</td>
<td>Harrell</td>
<td>8.41/12</td>
<td>Exams/Labs</td>
<td>17/27</td>
<td>65%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3111</td>
<td>Spr. 05</td>
<td>Gilbar</td>
<td>5/8</td>
<td>Final Exam</td>
<td>16/22</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3396</td>
<td>Fall 04</td>
<td>Bataineh</td>
<td>65/100</td>
<td>Final Exam</td>
<td>41/41</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3701</td>
<td>Fall 04</td>
<td>Gilbar</td>
<td>14/20</td>
<td>Final Exam</td>
<td>22/25</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3701</td>
<td>Spr. 05</td>
<td>Mathews</td>
<td>70/100</td>
<td>Final Exam</td>
<td>11/14</td>
<td>79%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Fall 04</td>
<td>Bataineh</td>
<td>70/100</td>
<td>Final Exam</td>
<td>23/25</td>
<td>92%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Spr. 05</td>
<td>Harrell</td>
<td>70/125</td>
<td>Midterm/Lab/Final</td>
<td>16/21</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CIS 3020</td>
<td>Fall 04</td>
<td>White</td>
<td>64/100</td>
<td>Final Exam</td>
<td>4/5</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CIS 3020</td>
<td>Spr. 05</td>
<td>White</td>
<td>20/30</td>
<td>Final Exam</td>
<td>7/10</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>EEL 3303L</td>
<td>Fall 04</td>
<td>Millard</td>
<td>70/100</td>
<td>Labs</td>
<td>10/10</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3303L</td>
<td>Spr. 05</td>
<td>Weber</td>
<td>70/100</td>
<td>Labs</td>
<td>12/14</td>
<td>86%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Fall 04</td>
<td>Bataineh</td>
<td>70/100</td>
<td>Final Exam</td>
<td>23/25</td>
<td>92%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>Spr. 05</td>
<td>Harrell</td>
<td>70/125</td>
<td>Midterm/Final/Labs</td>
<td>16/21</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4304L</td>
<td>Fall 04</td>
<td>Bataineh</td>
<td>70/100</td>
<td>Labs</td>
<td>13/13</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 4304L</td>
<td>Fall 04</td>
<td>Gilbar</td>
<td>7/10</td>
<td>Labs</td>
<td>10/10</td>
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<td>Final Exam</td>
<td>14/20</td>
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<td></td>
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<td>Projects</td>
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<td>39/39</td>
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<td>Fall 04</td>
<td>Kerr</td>
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<td>Final Exam</td>
<td>14/20</td>
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<td>Spr. 05</td>
<td>Khabou</td>
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<td>18/19</td>
<td>95%</td>
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<th>The broad education and knowledge of contemporary issues necessary to understand the impact of electrical and computer engineering solutions in a global and societal context</th>
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<th>A recognition of the need for, and an ability to engage in lifelong learning</th>
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<td>Term</td>
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<td>EEL 4713</td>
<td>Spr. 05</td>
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14 Knowledge of the fundamental theory and practice of computer science and computer engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software

15 Understanding of all the elements required to design a complete computer system (hardware and software)
Figure 3-7: Faculty Assessments of Student’s Outcome Achievements
(Fall 2004 - Spring 2005)
## Table 3-14(a) Student Outcome Achievements Audit

### STUDENT ABET OUTCOME CERTIFICATION

**4/12/2006**

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129
Table 3-14(b) Outcome Assessment and Certification

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<tr>
<td>Program Director's Signature:</td>
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<td>Date:</td>
<td>4/13/06</td>
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<td>Program Director's Signature:</td>
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<tr>
<td>7</td>
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<tr>
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<td>9</td>
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<tr>
<td>10</td>
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<tr>
<td>11</td>
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<tr>
<td>12</td>
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<tr>
<td>13</td>
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<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I certify that I understand that I need to meet all 15 of the department outcomes in at least 2 courses in order to graduate. The outcomes that I have met are indicated above.

Pre-evaluation of Outcomes: Advisor and Student Signature: Date: 10/31/05

Final Evaluation of Outcomes: Advisor and Student Signature: Date: 10/31/05

Student Print Name: Cecil David Musgrove

Student Sign Name: [Signature]

Date: 10/31/05
Table 3-15(a): Summary of the Faculty Ratings for EEL 4914 (Electrical Engineering Design)  
(for Spring 2005)

All students were expected to have met the outcomes in the table below.

<table>
<thead>
<tr>
<th>ABET ENGINEERING &amp; PROGRAM CRITERIA</th>
<th>WHICH CRITERIA</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>N/A</th>
<th>TOTAL RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>Program Criteria</td>
<td>2</td>
<td>14%</td>
<td>5</td>
<td>36%</td>
<td>3</td>
<td>22%</td>
<td>2</td>
</tr>
<tr>
<td>2. Knowledge of core electrical and computer engineering topics</td>
<td>Program Criteria</td>
<td>10</td>
<td>72%</td>
<td>2</td>
<td>14%</td>
<td>2</td>
<td>14%</td>
<td>14</td>
</tr>
<tr>
<td>3. An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>ABET Criterion 3(k)</td>
<td>10</td>
<td>72%</td>
<td>2</td>
<td>14%</td>
<td>2</td>
<td>14%</td>
<td>14</td>
</tr>
<tr>
<td>4. An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>ABET Criterion 3(a)</td>
<td>7</td>
<td>50%</td>
<td>4</td>
<td>28%</td>
<td>3</td>
<td>22%</td>
<td>14</td>
</tr>
<tr>
<td>5. An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>ABET Criterion 3(b)</td>
<td>8</td>
<td>57%</td>
<td>2</td>
<td>14%</td>
<td>3</td>
<td>22%</td>
<td>1</td>
</tr>
<tr>
<td>6. Knowledge of probability and statistics, including electrical and computer engineering applications</td>
<td>Program Criteria</td>
<td>2</td>
<td>14%</td>
<td>4</td>
<td>29%</td>
<td>4</td>
<td>29%</td>
<td>2</td>
</tr>
<tr>
<td>7. An ability to identify, formulate, and solve novel electrical or computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements</td>
<td>ABET Criterion 3(c,e) Program Criteria</td>
<td>10</td>
<td>72%</td>
<td>2</td>
<td>14%</td>
<td>2</td>
<td>14%</td>
<td>14</td>
</tr>
<tr>
<td>8. An ability to function on multi-disciplinary teams, where possible</td>
<td>ABET Criterion 3(d)</td>
<td>8</td>
<td>57%</td>
<td>2</td>
<td>14%</td>
<td>3</td>
<td>22%</td>
<td>1</td>
</tr>
<tr>
<td>9. An understanding of professional and ethical responsibility</td>
<td>ABET Criterion 3(f)</td>
<td>2</td>
<td>14%</td>
<td>8</td>
<td>57%</td>
<td>3</td>
<td>22%</td>
<td>1</td>
</tr>
<tr>
<td>10. An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>ABET Criterion 3(g)</td>
<td>8</td>
<td>57%</td>
<td>3</td>
<td>22%</td>
<td>1</td>
<td>7%</td>
<td>14</td>
</tr>
<tr>
<td>11. The broad education and knowledge of contemporary issues necessary to understand the impact of electrical engineering solutions in a global and societal context</td>
<td>ABET Criterion 3(h,j)</td>
<td>2</td>
<td>14%</td>
<td>6</td>
<td>42%</td>
<td>3</td>
<td>22%</td>
<td>3</td>
</tr>
<tr>
<td>12. A recognition of the need for, and an ability to engage in life-long learning</td>
<td>ABET Criterion 3(l)</td>
<td>9</td>
<td>64%</td>
<td>1</td>
<td>8%</td>
<td>4</td>
<td>28%</td>
<td>14</td>
</tr>
</tbody>
</table>

* A score of 3 or higher is considered to achieve the outcome.
<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcome</th>
<th>Assessor</th>
<th>Type of student work</th>
<th>Rating 1 to 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.3</strong></td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>5</strong></td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.9</strong></td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.7</strong></td>
</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.8</strong></td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical engineering applications</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>0.6</strong></td>
</tr>
<tr>
<td>7</td>
<td>An ability to identify, formulate, and solve novel electrical engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.75</strong></td>
</tr>
<tr>
<td>8</td>
<td>An ability to function on multi-disciplinary teams, where possible</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.9</strong></td>
</tr>
<tr>
<td>9</td>
<td>An understanding of professional and ethical responsibility</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>2.4</td>
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<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>3.2</strong></td>
</tr>
<tr>
<td>10</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>3.5</strong></td>
</tr>
<tr>
<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to understand the impact of electrical engineering solutions in a global and societal context</td>
<td>Gilbar</td>
<td>Presentation</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harrell</td>
<td>Presentation</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>3.65</strong></td>
</tr>
<tr>
<td></td>
<td>Knowledge of the need for, and an ability to engage in life-long learning</td>
<td>Gilbar Presentation</td>
<td>3.7</td>
<td></td>
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<tr>
<td>---</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Harrell Presentation</td>
<td>3.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>3.65</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Knowledge of discrete mathematics</th>
<th>Gilbar Presentation</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Harrell Presentation</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</th>
<th>Gilbar Presentation</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Harrell Presentation</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.6</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Understanding of all the elements required to design a complete computer system (hardware and software)</th>
<th>Gilbar Presentation</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Harrell Presentation</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Average appraisal score</strong></td>
<td></td>
<td></td>
<td><strong>4.5</strong></td>
</tr>
</tbody>
</table>

### Figure 3-8: Summary of Senior Design Project Assessments (Fall 2005)

![Average Rating](Average_Rating.png)

#### 3.4.5 Co-op Employer Evaluations

At the end of each co-op assignment, each student writes a co-op report. The co-op employer also completes an evaluation report. The summary of the co-op employer evaluations from Spring 1998 to summer 2005 is included in Section B, Appendix VII. The questions and the responses are summarized below. The Summary of the Co-op Employer Evaluations for electrical engineering is shown in Figure 3-9 (from 1998-2005). Many of co-op students find full-time employment with the same co-op employers. For examples, few comments on student’s work assignment during 2004-2005 and on their personal traits that may help or hinder the student’s advancement are as follow:
• Joe’s willingness to research system protection theory and study the complete operational characteristics of a specific Protection & Control Scheme is excellent. Joe should expand the research of the input and output devices associated with Protection & Control Relays.
• Willingness to be actively involved with projects will help enhance Joe’s engineering development, as he progresses towards becoming a practicing engineer.
• Brian works industrious on projects, including putting in extra hours to maximize his productivity as required complete tasks in the field. Brian needs to allocate some of these extra hours to review Protection and Controls manuals and Field Folder with each project to help bring in the big picture associated with tasks assigned.
• None
• Mr. Stringer is quick to grasp new technical material and works well in a team environment.
• Works extremely well with others. Shown self confidence to go on her own, introduce herself to another project team and be readily accepted. Exhibited the maturity to recognize the importance of completing an assigned task and taken the initiative to put in the time necessary to complete the task.
• Ms. Elizondo recognizes the demands of the work environment are such that she needs to go off on her own many times with a minimum amount of guidance and has done so very successfully. Her ability to earn is excellent and cooperation and ability to work with others is outstanding.
• Mr. Stringer works well independently to research and solve problems.
• John is just getting into his field of study & needs to have challenging tasks in order to understand his goals.

Summary Results: All of the evaluators indicated that they would recommend the co-op students to their companies and/or other companies. More than 90% of Co-op students are evaluated as outstanding and very good. Although the results are not directly to the program outcomes, they are indicative of a certain measure of the program quality and achievement towards the program outcomes.

Figure 3-9: The Summary of the Co-op Employer Evaluations (from 1999-2005)
### 2004-2005 Results: A summary of the Co-op Employer Evaluations is shown below:

<table>
<thead>
<tr>
<th>ATTITUDE</th>
<th>APPLICATION TO WORK</th>
<th>ABILITY TO LEARN</th>
<th>DEPENDABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding in enthusiasm 11 (58%)</td>
<td>Learned work exceptionally well 15 (79%)</td>
<td>Completely dependable 14 (74%)</td>
<td></td>
</tr>
<tr>
<td>Very interested and industrious 8 (42%)</td>
<td>Learned work readily 4 (21%)</td>
<td>Above average in dependability 4 (21%)</td>
<td></td>
</tr>
<tr>
<td>Average in diligence and interest 0 (0%)</td>
<td>Average in understanding work 0 (0%)</td>
<td>Usually dependable 1 (5%)</td>
<td></td>
</tr>
<tr>
<td>Somewhat indifferent 0 (0%)</td>
<td>Rather slow in learning 0 (0%)</td>
<td>Sometimes neglectful or careless 0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Definitely not interested 0 (0%)</td>
<td>Very slow to learn 0 (0%)</td>
<td>Unreliable 0 (0%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INITIATIVE</th>
<th>QUALITY OF WORK</th>
<th>QUANTITY OF WORK</th>
<th>JUDGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds well on his/her own 11 (58%)</td>
<td>Excellent 13 (68%)</td>
<td>Unusually high output 10 (53%)</td>
<td>Exceptionally mature in judgment 8 (42%)</td>
</tr>
<tr>
<td>Goes ahead independently at times 4 (21%)</td>
<td>Very good 5 (26%)</td>
<td>More than average 6 (32%)</td>
<td>Above average in making decisions 8 (42%)</td>
</tr>
<tr>
<td>Does all assigned work 4 (21%)</td>
<td>Average 1 (5%)</td>
<td>Below Average 0 (0%)</td>
<td>Usually makes the right decision 3 (16%)</td>
</tr>
<tr>
<td>Hesitates 0 (0%)</td>
<td>Below Average 0 (0%)</td>
<td>Low out-put, slow 0 (0%)</td>
<td>Often uses poor judgment 0 (0%)</td>
</tr>
<tr>
<td>Must be pushed frequently 0 (0%)</td>
<td>Very poor 0 (0%)</td>
<td></td>
<td>Consistently uses bad judgment 0 (0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATURITY POISE</th>
<th>RELATIONS WITH OTHERS</th>
<th>OVER-ALL PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite poised and confident 8 (42%)</td>
<td>Exceptionally well accepted 10 (53%)</td>
<td>Outstanding 11 (58%)</td>
</tr>
<tr>
<td>Has good self assurance 10 (53%)</td>
<td>Works well with others 7 (37%)</td>
<td>Very Good 7 (37%)</td>
</tr>
<tr>
<td>Average maturity and poise 1 (5%)</td>
<td>Gets along satisfactorily 4 (21%)</td>
<td>+ Average - 1 (5%)</td>
</tr>
<tr>
<td>Seldom asserts himself/herself 0 (0%)</td>
<td>Has difficulty working with others 0 (0%)</td>
<td>Marginal 0 (0%)</td>
</tr>
<tr>
<td>Timid 0 (0%)</td>
<td>Works very poorly with others 0 (0%)</td>
<td>Unsatisfactory 0 (0%)</td>
</tr>
<tr>
<td>Brash 0 (0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2003-2004 Results: A summary of the Co-op Employer Evaluations is shown below:

<table>
<thead>
<tr>
<th>ATTITUDE</th>
<th>APPLICATION TO WORK</th>
<th>ABILITY TO LEARN</th>
<th>DEPENDABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding in enthusiasm 7 (37%)</td>
<td>Learned work exceptionally well 12 (63%)</td>
<td>Completely dependable 11 (58%)</td>
<td></td>
</tr>
<tr>
<td>Very interested and industrious 12 (63%)</td>
<td>Learned work readily 7 (37%)</td>
<td>Above average in dependability 4 (21%)</td>
<td></td>
</tr>
<tr>
<td>Average in diligence and interest (%)</td>
<td>Average in understanding work</td>
<td>Usually dependable 4 (21%)</td>
<td></td>
</tr>
<tr>
<td>Somewhat indifferent</td>
<td>Rather slow in learning</td>
<td>Sometimes neglectful or careless</td>
<td></td>
</tr>
<tr>
<td>Definitely not interested</td>
<td>Very slow to learn</td>
<td>Unreliable</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INITIATIVE</th>
<th>QUALITY OF WORK</th>
<th>QUANTITY OF WORK</th>
<th>JUDGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds well on his/her own 10 (53 %)</td>
<td>Excellent 9 (47%)</td>
<td>Unusually high output 4 (21%)</td>
<td>Exceptionally mature in judgment 9 (47%)</td>
</tr>
<tr>
<td>Goes ahead independently at times 8 (42%)</td>
<td>Very good 10 (53%)</td>
<td>More than average 11 (58%)</td>
<td>Above average in making decisions 9 (47%)</td>
</tr>
<tr>
<td>Does all assigned work 1 (5%)</td>
<td>Average</td>
<td>Normal amount 4 (21%)</td>
<td>Usually makes the right decision 1 (5%)</td>
</tr>
<tr>
<td>Hesitates</td>
<td>Below Average</td>
<td>Below average</td>
<td>Often uses poor judgment</td>
</tr>
<tr>
<td>Must be pushed frequently</td>
<td>Very poor</td>
<td>Low out-put, slow</td>
<td>Consistently uses bad judgment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATURITY POISE</th>
<th>RELATIONS WITH OTHERS</th>
<th>OVER-ALL PERFORMANCE</th>
</tr>
</thead>
</table>
| Quite poised and confident 11 (58%) | Exceptionally well accepted 10 (53%) | Outstanding 19 (100%)
| Has good self assurance 8 (42%) | Works well with others 9 (47%) | Very Good 17 (89%)
| Average maturity and poise (%) | Gets along satisfactorily 4 (21%) | + Average - 1 (5%)
| Seldom asserts himself/herself | Has difficulty working with others | Marginal 0 (0%)
| Timid | Works very poorly with others | Unsatisfactory 0 (0%)
| Brash | | |

<table>
<thead>
<tr>
<th>ATTENDANCE</th>
<th>PUNCTUALITY</th>
<th>OVER-ALL PERFORMANCE</th>
</tr>
</thead>
</table>
| Regular 19 (100%) | Regular 18 (95%) | Outstanding 8 (42%)
| Irregular 0 (0%) | Irregular 0 (0%) | Very Good 10 (53%)
| | + Average - 1 (5%) | + Average - 1 (5%)
| | Marginal 0 (0%) | Marginal 0 (0%)
| | Unsatisfactory 0 (0%) | Unsatisfactory 0 (0%)
### 2002-2003 Results:
A summary of the Co-op Employer Evaluations is shown below:

<table>
<thead>
<tr>
<th>ATTITUDE</th>
<th>APPLICATION TO WORK</th>
<th>ABILITY TO LEARN</th>
<th>DEPENDABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding in enthusiasm 2 (20%)</td>
<td>Very interested and industrious 7 (70%)</td>
<td>Learned work exceptionally well 5 (50%)</td>
<td>Completely dependable 6 (60%)</td>
</tr>
<tr>
<td>Very interested and industrious 7 (70%)</td>
<td>Average in diligence and interest 1 (10%)</td>
<td>Learned work readily 5 (50%)</td>
<td>Above average in dependability 3 (30%)</td>
</tr>
<tr>
<td>Average in diligence and interest 1 (10%)</td>
<td>Somewhat indifferent</td>
<td>Rather slow in learning</td>
<td>Usually dependable 1 (10%)</td>
</tr>
<tr>
<td>Somewhat indifferent</td>
<td>Definitely not interested</td>
<td>Very slow to learn</td>
<td>Sometimes neglectful or careless</td>
</tr>
<tr>
<td>Definitely not interested</td>
<td>TIMIDITY / POISE</td>
<td>QUALITY OF WORK</td>
<td>RELATIONS WITH OTHERS</td>
</tr>
<tr>
<td>Timid</td>
<td>Seldom asserts himself/herself</td>
<td>Excellent 5 (50%)</td>
<td>Exceptionally well accepted 7 (70%)</td>
</tr>
<tr>
<td>Seldom asserts himself/herself</td>
<td>Average maturity and poise 1 (10%)</td>
<td>Very good 4 (40%)</td>
<td>Works well with others 2 (20%)</td>
</tr>
<tr>
<td>Average maturity and poise 1 (10%)</td>
<td>Brash</td>
<td>Average 1 (10%)</td>
<td>Gets along satisfactorily 1 (10%)</td>
</tr>
<tr>
<td>Has good self assurance 4 (40%)</td>
<td>Brash</td>
<td>Below Average</td>
<td>Has difficulty working with others</td>
</tr>
<tr>
<td>Average in diligence and interest 1 (10%)</td>
<td>Must be pushed frequently</td>
<td>Below average</td>
<td>Works very poorly with others</td>
</tr>
<tr>
<td>Seldom asserts himself/herself</td>
<td>Timid</td>
<td>Low out-put, slow</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OVER-ALL PERFORMANCE</th>
<th>ATTENDANCE</th>
<th>PUNCTUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding</td>
<td>Regular 10 (100%)</td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Very Good</td>
<td>Regular 10 (100%)</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>Average</td>
<td>Irregular 10 (100%)</td>
<td>1 (10%)</td>
</tr>
</tbody>
</table>

| 2001-2002 Results: | A summary of the Co-op Employer Evaluations is shown below: |

<table>
<thead>
<tr>
<th>ATTITUDE</th>
<th>APPLICATION TO WORK</th>
<th>ABILITY TO LEARN</th>
<th>DEPENDABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding in enthusiasm 9 (64%)</td>
<td>Very interested and industrious 4 (28%)</td>
<td>Learned work exceptionally well 10 (71%)</td>
<td>Completely dependable 12 (85%)</td>
</tr>
<tr>
<td>Very interested and industrious 4 (28%)</td>
<td>Average in diligence and interest 1 (7%)</td>
<td>Learned work readily 4 (28%)</td>
<td>Above average in dependability 2 (14%)</td>
</tr>
<tr>
<td>Average in diligence and interest 1 (7%)</td>
<td>Somewhat indifferent</td>
<td>Average in understanding work</td>
<td>Usually dependable</td>
</tr>
<tr>
<td>Somewhat indifferent</td>
<td>Definitely not interested</td>
<td>Rather slow in learning</td>
<td>Sometimes neglectful or careless</td>
</tr>
<tr>
<td>Definitely not interested</td>
<td>TIMIDITY / POISE</td>
<td>QUALITY OF WORK</td>
<td>RELATIONS WITH OTHERS</td>
</tr>
<tr>
<td>Quite poised and confident 5 (50%)</td>
<td>Has good self assurance 4 (40%)</td>
<td>Unusually high output 1 (10%)</td>
<td>Exceptionally well accepted 8 (57%)</td>
</tr>
<tr>
<td>Has good self assurance 4 (40%)</td>
<td>Average maturity and poise 1 (10%)</td>
<td>More than average 9 (90%)</td>
<td>Works well with others 6 (42%)</td>
</tr>
<tr>
<td>Average maturity and poise 1 (10%)</td>
<td>Seldom asserts himself/herself</td>
<td>Normal amount (%)</td>
<td>Gets along satisfactorily</td>
</tr>
<tr>
<td>Seldom asserts himself/herself</td>
<td>Timid</td>
<td>Below average</td>
<td>Has difficulty working with others</td>
</tr>
<tr>
<td>Timid</td>
<td>Brash</td>
<td>Low out-put, slow</td>
<td>Works very poorly with others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OVER-ALL PERFORMANCE</th>
<th>ATTENDANCE</th>
<th>PUNCTUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding</td>
<td>Regular 14 (100%)</td>
<td>11 (79%)</td>
</tr>
<tr>
<td>Very Good</td>
<td>Regular 14 (100%)</td>
<td>3 (21%)</td>
</tr>
<tr>
<td>Average</td>
<td>Irregular 14 (100%)</td>
<td>1 (10%)</td>
</tr>
</tbody>
</table>

| 136 |
**2000-2001 Results:** A summary of the Co-op Employer Evaluations is shown below:

<table>
<thead>
<tr>
<th>ATTITUDE APPLICATION TO WORK</th>
<th>ABILITY TO LEARN</th>
<th>DEPENDABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding in enthusiasm 3 (%)</td>
<td>Learned work exceptionally well 2 (%)</td>
<td>Completely dependable 3 (%)</td>
</tr>
<tr>
<td>Very interested and industrious 1 (%)</td>
<td>Learned work readily 2 (%)</td>
<td>Above average in dependability 1 (%)</td>
</tr>
<tr>
<td>Average in diligence and interest</td>
<td>Average in understanding work</td>
<td>Usually dependable</td>
</tr>
<tr>
<td>Somewhat indifferent</td>
<td>Rather slow in learning</td>
<td>Sometimes neglectful or careless</td>
</tr>
<tr>
<td>Definitely not interested</td>
<td>Very slow to learn</td>
<td>Unreliable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INITIATIVE</th>
<th>QUALITY OF WORK</th>
<th>RELATIONS WITH OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds well on his/her own 3 (%)</td>
<td>Excellent 3 (%)</td>
<td>Exceptionally well accepted 3 (%)</td>
</tr>
<tr>
<td>Goes ahead independently at times 1 (%)</td>
<td>Very good 1 (%)</td>
<td>Works well with others 1 (%)</td>
</tr>
<tr>
<td>Does all assigned work</td>
<td>Average</td>
<td>Gets along satisfactorily</td>
</tr>
<tr>
<td>Hesitates</td>
<td>Below Average</td>
<td>Has difficulty working with others</td>
</tr>
<tr>
<td>Must be pushed frequently</td>
<td>Very poor</td>
<td>Works very poorly with others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATURE POISE</th>
<th>JUDGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite poised and confident 2 (%)</td>
<td>Exceptionally mature in judgment 2 (%)</td>
</tr>
<tr>
<td>Has good self assurance 1(%)</td>
<td>Above average in making decisions 2 (%)</td>
</tr>
<tr>
<td>Average maturity and poise 1 (%)</td>
<td>Usually makes the right decision</td>
</tr>
<tr>
<td>Seldom asserts himself/herself</td>
<td>Often uses poor judgment</td>
</tr>
<tr>
<td>Timid</td>
<td>Consistently uses bad judgment</td>
</tr>
<tr>
<td>Brash</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTENDANCE</th>
<th>PUNCTUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular 4 (100%)</td>
<td>Regular 4 (100%)</td>
</tr>
<tr>
<td>Irregular</td>
<td>Irregular</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OVER-ALL PERFORMANCE</th>
<th>Outstanding</th>
<th>Very Good</th>
<th>Average</th>
<th>Marginal</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (75%)</td>
<td>1 (25%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1998 - 1999 Results:** A summary of the Co-op Employer Evaluations is shown below:

<table>
<thead>
<tr>
<th>ATTITUDE APPLICATION TO WORK</th>
<th>ABILITY TO LEARN</th>
<th>DEPENDABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding in enthusiasm 14 (64%)</td>
<td>Learned work exceptionally well 14 (64%)</td>
<td>Completely dependable 15 (68%)</td>
</tr>
<tr>
<td>Very interested and industrious 8 (36%)</td>
<td>Learned work readily 8 (36%)</td>
<td>Above average in dependability 7 (32%)</td>
</tr>
<tr>
<td>Average in diligence and interest</td>
<td>Average in understanding work</td>
<td>Usually dependable</td>
</tr>
<tr>
<td>Somewhat indifferent</td>
<td>Rather slow in learning</td>
<td>Sometimes neglectful or careless</td>
</tr>
<tr>
<td>Definitely not interested</td>
<td>Very slow to learn</td>
<td>Unreliable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INITIATIVE</th>
<th>QUALITY OF WORK</th>
<th>RELATIONS WITH OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds well on his/her own 17 (7%)</td>
<td>Excellent 14 (64%)</td>
<td>Exceptionally well accepted 16 (73%)</td>
</tr>
<tr>
<td>Goes ahead independently at times 5 (23%)</td>
<td>Very good 8 (36%)</td>
<td>Works well with others 5 (23%)</td>
</tr>
<tr>
<td>Does all assigned work</td>
<td>Average</td>
<td>Gets along satisfactorily 1 (04%)</td>
</tr>
<tr>
<td>Hesitates</td>
<td>Below Average</td>
<td>Has difficulty working with others</td>
</tr>
<tr>
<td>Must be pushed frequently</td>
<td>Very poor</td>
<td>Works very poorly with others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATURE POISE</th>
<th>JUDGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite poised and confident 8 (36%)</td>
<td>Exceptionally mature in judgment 5 (23%)</td>
</tr>
<tr>
<td>Has good self assurance 13 (60%)</td>
<td>Above average in making decisions 14 (64%)</td>
</tr>
<tr>
<td>Average maturity and poise 1 (04%)</td>
<td>Usually makes the right decision 3 (13%)</td>
</tr>
<tr>
<td>Seldom asserts himself/herself</td>
<td>Often uses poor judgment</td>
</tr>
<tr>
<td>Timid</td>
<td>Consistently uses bad judgment</td>
</tr>
<tr>
<td>Brash</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTENDANCE</th>
<th>PUNCTUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular 22 (100%)</td>
<td>Regular 22 (100%)</td>
</tr>
<tr>
<td>Irregular</td>
<td>Irregular</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OVER-ALL PERFORMANCE</th>
<th>Outstanding</th>
<th>Very Good</th>
<th>Average</th>
<th>Marginal</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 (64%)</td>
<td>8 (36%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4.6 Pre-Tests for Course Feedback and Outcome Assessments

In addition to various assessment methods, the ECE curriculum committee wanted to demonstrate the attainment of outcomes by the curriculum and its courses. To do that, the committee implemented an internal formal process for continuous improvements at the course and curriculum level, effective fall 2002. The following are steps in the process:

- Pre-tests for courses in order to demonstrate student achievements in pre-requisites courses and identify weaknesses.
- Evaluating the student’s performances in courses towards meeting the program outcomes.
- Reviewing the course materials contributing to each outcome for verification that outcomes are addressed.
- Identification and implementation of course syllabus and curriculum changes to improve attainment of outcomes.

Pre-Tests

The committee identified the courses that need to be tested and the courses to administer the pre-test as shown in Table 3-16. Generally it is felt that only one pretest needs to be administered for each course to be pre-tested. In addition, the courses that administer the pretest should be rotated from time to time. The process for implementing the pre-tests is shown in Fig. 3-10 (see Page # 139).

### Table 3-16: Curriculum Committee Recommendations on Courses To Pretest

<table>
<thead>
<tr>
<th>Course that needs to be tested</th>
<th>Possible course * to administer the pre-test in</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3111</td>
<td>EEL 3112, EEL 3211, EEL 3304, EEL 3396</td>
</tr>
<tr>
<td>EEL3701C</td>
<td>EEL 4712C, EEL 4744</td>
</tr>
<tr>
<td>EEL 3112</td>
<td>EEL 4514, EEL 4657, EEL 4306C</td>
</tr>
<tr>
<td>EEL 3304</td>
<td>EEL 4306C</td>
</tr>
<tr>
<td>EEL 3135</td>
<td>EEL 4514, EEL 4657</td>
</tr>
<tr>
<td>Prerequisite math courses</td>
<td>EEL 3135, EEL 3111, EGM 4313</td>
</tr>
<tr>
<td>Prerequisite programming courses</td>
<td>EEL 3135, EEL 3701C</td>
</tr>
<tr>
<td>**</td>
<td>Technical Electives</td>
</tr>
</tbody>
</table>

* Each course shall be pre-tested at least once a year

** The pre-tests will be administered in technical electives as well
The testing results (as per course schedule in Table 3-16) are shown in Table 3-17. The weakness of complex numbers is addressed by covering topics in EGM 4313. After the analysis of the pre-test results, the faculty decided to pre-test in discipline based one/or two courses for electrical engineering and one/or two courses for computer engineering. The results of pre-testing in Spring 2005 and the recommendations are shown in Table 3-18.
### Table 3-17 Summary of Pre-Test Results (conducted in Fall 2002)

**Actual date 10/8/02**

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Course</th>
<th>Pre-Requisite(s)</th>
<th>No. of students</th>
<th>Class Average</th>
<th>Topics covered by the Pretest</th>
<th>Feedback comments from the committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harrell</td>
<td>EEL 3111</td>
<td>MAC2313, PHY2049C</td>
<td>25</td>
<td>81</td>
<td>Algebra, Calculus, Complex numbers</td>
<td>Students are weak in complex numbers. FWB students are weak in everything</td>
</tr>
<tr>
<td>Mathews</td>
<td>EEL 3112</td>
<td>EEL3111</td>
<td>25</td>
<td>44</td>
<td>comprehensive coverage of circuits I</td>
<td>Students weak in ac circuit analysis / phasors</td>
</tr>
<tr>
<td>Gorman</td>
<td>EEL 3135</td>
<td>MAC2313, COP2334 or CIS3020</td>
<td>27</td>
<td>70.1</td>
<td>Calculus, C-programming</td>
<td>Generally ok, but Somewhat weak in Programming</td>
</tr>
<tr>
<td>Rashid</td>
<td>EEL 3304</td>
<td>EEL3111</td>
<td>16</td>
<td>60</td>
<td>KVL&amp; KCL, Thevenins Superposition, Voltage and current dividers</td>
<td>More applications of basic circuit laws</td>
</tr>
<tr>
<td>Khabou</td>
<td>EEL 3701</td>
<td>COP 2334 CIS 3020</td>
<td>38</td>
<td>71.5</td>
<td>Simple set theory C programming Basic computer knowledge</td>
<td>Weak in programming and basic set theory</td>
</tr>
<tr>
<td>Gorman</td>
<td>EEL 4514</td>
<td>EEL3112, EEL3135</td>
<td>21</td>
<td>62.4</td>
<td>Convolution, Differential equations</td>
<td>Weak in differential equations</td>
</tr>
<tr>
<td>Khabou</td>
<td>EEL 4712</td>
<td>EEL3701C</td>
<td>14</td>
<td>84.8</td>
<td>K maps/ SOP, POS Simple circuit design Circuit simplification</td>
<td>Good, overall</td>
</tr>
<tr>
<td>Mathews</td>
<td>EEL 4750</td>
<td>EEL3135, EEL4744C</td>
<td>5</td>
<td>66</td>
<td>sampling, convolution, z-transforms</td>
<td></td>
</tr>
<tr>
<td>Manseur</td>
<td>EGM 4313</td>
<td>EGM3311 or MAP3202</td>
<td>13</td>
<td>45.6</td>
<td>Fractions, line equations, derivatives, integrals, complex arithmetic.</td>
<td>General weakness in Math (it’s a national problem) especially in complex numbers. We should integrate a thorough study of complex numbers early in our program (in Circuits 1, 2, or in Sig. Sys.) or request that the math department cover complex numbers in one of the required math courses.</td>
</tr>
</tbody>
</table>
Table 3-18 Results of Pre-Tests (conducted in Spring 2005)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Targeted course for Pre-testing</th>
<th>Faculty</th>
<th>Results</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2005</td>
<td>EEL 4306 for testing pre-requisite knowledge in EEL 3112</td>
<td>Gorman</td>
<td>48% to 71%, depending on the test questions.</td>
<td>The minimum requirements for passing circuits I and circuits II be raised somewhat based upon these test results.</td>
</tr>
<tr>
<td>Spring 2005</td>
<td>EEL 3701 for testing pre-requisite computer programming</td>
<td>Khabou</td>
<td>Test average 86.7% which was very good.</td>
<td>More rigorous programming assignments in EEL4834, CDA3101, CEN3031, and COP3530.</td>
</tr>
<tr>
<td>Spring 2005</td>
<td>EEL 4744 for or testing pre-requisite EEL 3701</td>
<td>Khabou</td>
<td>The average 75.8%</td>
<td>More emphasis on sequential circuit analysis in EEL3701 (i.e. students should be able to figure out the function/operation of a circuit given its schematic)</td>
</tr>
<tr>
<td>Spring 2005</td>
<td>EEL 4712C for or testing pre-requisite EEL 3701</td>
<td>Khabou</td>
<td>The test average was 86.3% which was very good.</td>
<td>More practice of simple data representation in EEL3701 (e.g. more hw on 2’s complement representation, Hex notation, and addition and subtraction of binary numbers) More emphasis on tracing and debugging code written by other people. I noticed that my EEL4744 students almost always fail questions where they are asked to figure out what a code is supposed to do or to find mistakes in that code. This could be accomplished in EEL4834, CDA3101, CEN3031, and COP3530.</td>
</tr>
</tbody>
</table>

3.4.7 Academic Competition

Since 1998, the department has participated in the IEEE Southeast Conference Student-Hardware Competition. The UWF-Team of six students won First place at the 1999 IEEE Southeast Conference Student Hardware Competition in March of1999 in Lexington, Kentucky. Under the supervision of professors Rachid Manseur and Doug Jordan, the students designed and built two different mobile robots and a competition track. In the 2000 IEEE SECON Student Hardware Competition, the UWF robotics team achieved third place, competing against teams from Georgia Tech The University of Kentucky, Virginia Military Institute, and Old Dominion U, The UWF Robotic Submarine Team ranked fourth among thirteen other schools in the Association of Unmanned Vehicle Systems Third International Underwater Vehicle Competition in 2000. The competing teams included MIT, Cornell, and the University of Florida. In the 2001 IEEE SECON Student Hardware Competition, the UWF robotics team achieved 2nd place. This competition was held at Clemson University, South Carolina, and had 19 engineering schools competing. The UWF robotics team also participated in the 2002 IEEE SECON Student Hardware Competition held at North Carolina State University. The second place went to the University of South Alabama in Mobile. Nineteen engineering schools participated in the contest. The participating engineering schools are listed below:
Table 3-19 shows the summary list of academic competitions in which UWF students participated. These competitions are instructional events for UWF students, and their high level of achievement in them attests to the quality of their education. The faculty estimates of the outcome achievements through academic competitions are shown in Table 3-20.

**Table 3-19: List of Academic Competitions**

<table>
<thead>
<tr>
<th>Year</th>
<th>Academic Competitions</th>
<th>Participants</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1999</td>
<td>Southeast Conference Student Hardware Competition. Lexington, Kentucky</td>
<td>6 students competed and 1 instructor</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
</tr>
<tr>
<td>April 2000</td>
<td>IEEE Southeastcon 2000 StudentHardware Competition. Nashville, Tennessee</td>
<td>3 students competed and 1 instructor</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
</tr>
<tr>
<td>July 2000</td>
<td>AUVSI &amp; ONR 3&lt;sup&gt;rd&lt;/sup&gt; International Autonomous Underwater Vehicle Competition, Orlando, Florida</td>
<td>9 students competed and 1 instructor</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>March 2001</td>
<td>IEEE Southeastcon 2001 Hardware Competition, Clemson, South Carolina</td>
<td>6 students competed and 1 instructor</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
</tr>
<tr>
<td>April 2002</td>
<td>EEE Student Hardware Competition. Columbia, South Carolina</td>
<td>6 students competed and 1 instructor</td>
<td>None</td>
</tr>
<tr>
<td>April 2002</td>
<td>Trinity College Home Fire Fighting Contest, Hartford, Connecticut. (First Place Winner of the National Collegiate Inventors &amp; Innovators Alliance)</td>
<td>4 students competed 1 instructor</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; place</td>
</tr>
<tr>
<td>July 2002</td>
<td>AUVSI Autonomous Underwater Vehicle Competition. San Diego, California</td>
<td>5 students competed</td>
<td>None</td>
</tr>
<tr>
<td>August 2003</td>
<td>AUVSI Underwater Competition. San Diego, California</td>
<td>4 students competed and 1 instructor</td>
<td>None</td>
</tr>
<tr>
<td>March 2004</td>
<td>IEEE Southeastcon 2004 Competition. Greensboro, North Carolina</td>
<td>2 students competed and 1 instructor</td>
<td>None</td>
</tr>
<tr>
<td>April 2005</td>
<td>IEEE SoutheastCon 2005. Ft. Lauderdale, Florida.</td>
<td>5 students competed and 1 instructor</td>
<td>None</td>
</tr>
</tbody>
</table>
Table 3-20: Faculty appraisal of student academic competitions
Rating score: 1= poor (20%); 2= fair, below expectation (40%); 3= good, met expectation (60%); 4= very good, above expectation (80%); 5= excellent, exceeding expectation (100%);  

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SECON</td>
<td>SECON</td>
<td>UVS</td>
<td>SECON</td>
<td>UVS</td>
<td>SECON</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics</td>
<td>rating</td>
<td>rating</td>
<td>rating</td>
<td>rating</td>
<td>rating</td>
<td>rating</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including applications</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>7</td>
<td>An ability to identify, formulate, and solve novel electrical and computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>8</td>
<td>An ability to function on multi-disciplinary teams</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>9</td>
<td>An understanding of professional and ethical responsibility</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>10</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to understand the impact of electrical and computer engineering solutions in a global and societal context</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>12</td>
<td>A recognition of the need for, and an ability to engage in lifelong learning</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>14</td>
<td>Knowledge of the fundamental theory and practice of computer science and computer engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>15</td>
<td>Understanding of all the elements required to design a complete computer system (hardware and software)</td>
<td>60%</td>
<td>70%</td>
<td>30%</td>
<td>30%</td>
<td>60%</td>
<td>80%</td>
</tr>
</tbody>
</table>
3.4.8 Results Of FE Exam

The program does not require students to take the FE exam, however it encourages all students to take the exam. It invites representatives from the Florida Engineering Society to talk about the process and the benefits of professional registration. In April 2002, two students took the FE exam and identified their affiliations with the University of West Florida. Both students passed the exam. There could be other UWF students who took the FE exam and identified themselves with the University of Florida (UF) because they receive the UF degree. UF does not differentiate between the graduates of the Joint Program and those at UF in Gainesville. Table 3-21 shows the report of the FE exam for the UWF graduates. Separate reports are not prepared any more for UWF graduates.
### Table 3-21: Report of the FE exam for the UWF graduates

**National Council of Examiners for Engineering and Surveying (NCEES)**  
**Fundamentals of Engineering Examination**

**APRIL 2002 Administration**

**Report 5 - Subject Matter Report by Major Based on Particular PM Examination Selected**

**ABET-Accredited Engineering Program Examinees**  
Currently Enrolled in School

---

**Board:** FLORIDA  
**Board Code:** 51  
**Major:** ELECTRICAL

| Name of Institution: University of West Florida | Institution Code: 72 |
| PM Examination Selected: ELECTRICAL |

<table>
<thead>
<tr>
<th>This</th>
<th>State</th>
<th>Nat'l</th>
<th>Comparator Groupings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Examinees Taking</td>
<td>2</td>
<td>21</td>
<td>1116</td>
</tr>
<tr>
<td>No. Examinees Passing</td>
<td>2</td>
<td>14</td>
<td>898</td>
</tr>
<tr>
<td>% Examinees Passing</td>
<td>100%</td>
<td>67%</td>
<td>80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Exam Questions</td>
<td>This Institution Average Percent Correct</td>
<td>Nat'l Average Percent Correct</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AM Subject (1 point each)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEMISTRY</td>
<td>11</td>
<td>41</td>
<td>60</td>
</tr>
<tr>
<td>COMPUTERS</td>
<td>7</td>
<td>57</td>
<td>72</td>
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<tr>
<td>DYNAMICS</td>
<td>9</td>
<td>39</td>
<td>54</td>
</tr>
<tr>
<td>ELECTRICAL CIRCUITS</td>
<td>12</td>
<td>67</td>
<td>73</td>
</tr>
<tr>
<td>ENGINEERING ECON</td>
<td>5</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>ETHICS</td>
<td>5</td>
<td>40</td>
<td>64</td>
</tr>
<tr>
<td>FLUID MECHANICS</td>
<td>8</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>MAT SCI/STR MATTER</td>
<td>8</td>
<td>19</td>
<td>46</td>
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<tr>
<td>MATHEMATICS</td>
<td>24</td>
<td>60</td>
<td>68</td>
</tr>
<tr>
<td>MECH OF MATERIALS</td>
<td>8</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>STATICS</td>
<td>12</td>
<td>50</td>
<td>54</td>
</tr>
<tr>
<td>THERMODYNAMICS</td>
<td>11</td>
<td>23</td>
<td>44</td>
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</table>

<table>
<thead>
<tr>
<th>PM Subject (2 points each)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ANALOG ELEC CIRCUITS</td>
<td>6</td>
<td>67</td>
<td>52</td>
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<tr>
<td>CONT SYS THEORY ANAL</td>
<td>6</td>
<td>58</td>
<td>63</td>
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<tr>
<td>COMP HARDWR ENGINRNG</td>
<td>3</td>
<td>67</td>
<td>50</td>
</tr>
<tr>
<td>COMP &amp; NUM METHODS</td>
<td>3</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>COMP SOFTWR ENGINRNG</td>
<td>3</td>
<td>100</td>
<td>73</td>
</tr>
<tr>
<td>COMM THEORY</td>
<td>6</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>DIGITAL SYSTEMS</td>
<td>6</td>
<td>67</td>
<td>51</td>
</tr>
<tr>
<td>ELECTRO THEORY &amp; APP</td>
<td>6</td>
<td>42</td>
<td>50</td>
</tr>
<tr>
<td>INSTRUMENTATION</td>
<td>3</td>
<td>83</td>
<td>57</td>
</tr>
<tr>
<td>NETWORK ANALYSIS</td>
<td>6</td>
<td>83</td>
<td>60</td>
</tr>
<tr>
<td>POWER SYSTEMS</td>
<td>3</td>
<td>33</td>
<td>57</td>
</tr>
<tr>
<td>SIGNAL PROCESSING</td>
<td>3</td>
<td>67</td>
<td>41</td>
</tr>
<tr>
<td>SOLID ST ELEC &amp; DEV</td>
<td>6</td>
<td>42</td>
<td>54</td>
</tr>
</tbody>
</table>
3.5 Results and Analysis of Supplementary Assessment Tools on Program Outcomes

The results of the surveys are shown in Tables 3-22 to 3-33 and Figures 3-11 to 3-22. The graduating seniors believe that the degree program has prepared them with the desirable skills. The lowest amount of agreement is 75% to 87% for item on impact of engineering solutions in a global societal context and 72 to 94% on the item on contemporary engineering issues.

3.5.1 Summary of Outcome Assessments by Graduating Seniors

The results of the surveys are shown in Tables 3-22 to 3-27 and Figures 3-11 to 3-16. The graduating seniors believe that the degree program has prepared them with the desirable skills. The summary of the survey results from Fall 1999 to Spring 2005 is included in Appendix VIII, Secton F, Outcome self Assessments.

**Summary Results**: The lowest amount of agreement is 50% to 90% for the outcome # 6 on knowledge of probability and statistics, and 70 to 90% for outcome # 11 on contemporary issues. However, changes in the program have improved the outcomes.
**2004-2005 Results:** A summary of the skills assessments is shown in Table 3-22 and Figure 3-11.

**Table 3-22: Summary of Outcome Assessments by Graduating Seniors (conducted in 2004-2005)**

<table>
<thead>
<tr>
<th>Item</th>
<th>The electrical/computer degree program has prepared</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Comments</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To embark upon a professional career in electrical engineering, or to begin graduate study.</td>
<td>7 (23%)</td>
<td>22 (71%)</td>
<td>0</td>
<td>0</td>
<td>2 (6%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td>7 (23%)</td>
<td>23 (74%)</td>
<td>1 (3%)</td>
<td>0</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>With an understanding of the basic and engineering sciences for applications in the analysis, design, synthesis, and operation of electrical engineering components, devices, and systems</td>
<td>11 (35%)</td>
<td>20 (65%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>3</td>
<td>To use modern engineering techniques, skills, and tools, including computer-based tools for analysis and Design.</td>
<td>10 (32%)</td>
<td>21 (68%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>To apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.</td>
<td>10 (32%)</td>
<td>21 (68%)</td>
<td>(%)</td>
<td>0</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>To design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>10 (32%)</td>
<td>21 (68%)</td>
<td>0</td>
<td>(%)</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical or computer engineering applications.</td>
<td>0</td>
<td>28 (90%)</td>
<td>(%)</td>
<td>1 (3%)</td>
<td>1 (3%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>7</td>
<td>To identify, formulate, and solve novel electrical or computer engineering problems</td>
<td>8 (26%)</td>
<td>22 (71%)</td>
<td>0</td>
<td>0</td>
<td>1 (3%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>8</td>
<td>To function on multi-disciplinary teams.</td>
<td>9 (29%)</td>
<td>18 (58%)</td>
<td>3 (10%)</td>
<td>0</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>9</td>
<td>With an understanding of professional and ethical responsibility.</td>
<td>11 (35%)</td>
<td>19 (61%)</td>
<td>1 (3%)</td>
<td>0</td>
<td>0</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>10</td>
<td>To communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience.</td>
<td>9 (29%)</td>
<td>20 (65%)</td>
<td>1 (3%)</td>
<td>0</td>
<td>1 (3%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>11</td>
<td>With the broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context.</td>
<td>3 (10%)</td>
<td>25 (81%)</td>
<td>3 (10%)</td>
<td>0</td>
<td>0</td>
<td>31 (95%)</td>
</tr>
<tr>
<td>12</td>
<td>To recognize the need for and to have the ability to engage in lifelong learning.</td>
<td>11 (35%)</td>
<td>19 (61%)</td>
<td>0</td>
<td>0</td>
<td>1 (3%)</td>
<td>31 (%)</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>10 (31%)</td>
<td>20 (65%)</td>
<td>(%)</td>
<td>0</td>
<td>1 (3%)</td>
<td>31 (100%)</td>
</tr>
</tbody>
</table>

**Figure 3-11: Results of Outcome Assessments by Graduating Seniors (conducted in 2004-2005)**
**2003-2004 Results:** A summary of the skills assessments is shown in Table 3-23 and Figure 3-12.

<table>
<thead>
<tr>
<th>Item</th>
<th>The electrical/computer degree program has prepared</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No Comments</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To embark upon a professional career in electrical engineering, or to begin graduate study.</td>
<td>9 (41%)</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td>11 (50%)</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>With an understanding of the basic and engineering sciences for applications in the analysis, design, synthesis, and operation of electrical engineering components, devices, and systems</td>
<td>10 (45%)</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>3</td>
<td>To use modern engineering techniques, skills, and tools, including computer-based tools for analysis and Design.</td>
<td>10 (45%)</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>To apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.</td>
<td>8 (36%)</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>To design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>7 (32%)</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical or computer engineering applications.</td>
<td>2 (9%)</td>
<td>17</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>7</td>
<td>To identify, formulate, and solve novel electrical or computer engineering problems</td>
<td>6 (27%)</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>8</td>
<td>To function on multi-disciplinary teams.</td>
<td>6 (27%)</td>
<td>15</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>9</td>
<td>With an understanding of professional and ethical responsibility.</td>
<td>6 (27%)</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>10</td>
<td>To communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience.</td>
<td>7 (32%)</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
<tr>
<td>11</td>
<td>With the broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context.</td>
<td>3 (14%)</td>
<td>17</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>21 (95%)</td>
</tr>
<tr>
<td>12</td>
<td>To recognize the need for and to have the ability to engage in lifelong learning.</td>
<td>9 (41%)</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>21 (95%)</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>7 (32%)</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>22 (100%)</td>
</tr>
</tbody>
</table>

**Figure 3-12:** Results of Outcome Assessments by Graduating Seniors (conducted in 2003-2004)

![Figure 3-12: Results of Outcome Assessments by Graduating Seniors (conducted in 2003-2004)](image-url)
2002-2003 Results: A summary of the skills assessments is shown in Table 3-24 and Figure 3-13.

Table 3-24: Summary of Outcome Assessments by Graduating Seniors (conducted in 2002-2003)

<table>
<thead>
<tr>
<th>Item</th>
<th>The electrical/computer degree program has prepared</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N0 Comments</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To embark upon a professional career in electrical engineering, or to begin graduate study.</td>
<td>5 (26%)</td>
<td>14 (74%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td>3 (16%)</td>
<td>16 (84%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 2</td>
<td>With an understanding of the basic and engineering sciences for applications in the analysis, design, synthesis, and operation of electrical engineering components, devices, and systems.</td>
<td>5 (26%)</td>
<td>14 (74%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 3</td>
<td>To use modern engineering techniques, skills, and tools, including computer-based tools for analysis and Design.</td>
<td>5 (26%)</td>
<td>13 (68%)</td>
<td>1 (5%)</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 4</td>
<td>To apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.</td>
<td>2 (11%)</td>
<td>17 (89%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 5</td>
<td>To design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>4 (21%)</td>
<td>13 (68%)</td>
<td>1 (5%)</td>
<td>0</td>
<td>1 (5%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 6</td>
<td>Knowledge of probability and statistics, including electrical or computer engineering applications.</td>
<td>1 (5%)</td>
<td>11 (58%)</td>
<td>3 (16%)</td>
<td>1 (5%)</td>
<td>2 (11%)</td>
<td>18 (95%)</td>
</tr>
<tr>
<td>Item 7</td>
<td>To identify, formulate, and solve novel electrical or computer engineering problems.</td>
<td>8 (42%)</td>
<td>11 (58%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 8</td>
<td>To function on multi-disciplinary teams.</td>
<td>8 (42%)</td>
<td>10 (53%)</td>
<td>0</td>
<td>0</td>
<td>1 (5%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 9</td>
<td>With an understanding of professional and ethical responsibility.</td>
<td>9 (47%)</td>
<td>9 (47%)</td>
<td>1 (5%)</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 10</td>
<td>To communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience.</td>
<td>6 (32%)</td>
<td>12 (63%)</td>
<td>1 (5%)</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 11</td>
<td>With the broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context.</td>
<td>1 (5%)</td>
<td>15 (79%)</td>
<td>3 (16%)</td>
<td>0</td>
<td>0</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 12</td>
<td>To recognize the need for and to have the ability to engage in lifelong learning.</td>
<td>6 (32%)</td>
<td>12 (63%)</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>Item 13</td>
<td>Knowledge of discrete mathematics</td>
<td>5 (2%)</td>
<td>12 (63%)</td>
<td>1 (5%)</td>
<td>0</td>
<td>1 (5%)</td>
<td>19 (100%)</td>
</tr>
</tbody>
</table>

Figure 3-13: Results of Outcome Assessments by Graduating Seniors (conducted in 2002-2003)
2001-2002 Results: A summary of the skills assessments is shown in Table 3-25 and Figure 3-14.

Table 2-25: Summary of Outcome Assessments by Graduating Seniors (conducted in 2001-2002)

<table>
<thead>
<tr>
<th>Item</th>
<th>The electrical/computer degree program has prepared</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N0 Comments</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To embark upon a professional career in electrical engineering, or to begin graduate study.</td>
<td>6 (35%)</td>
<td>11 (65%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td>8 (47%)</td>
<td>9 (53%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>With an understanding of the basic and engineering sciences for applications in the analysis, design, synthesis, and operation of electrical engineering components, devices, and systems</td>
<td>4 (24%)</td>
<td>13 (76%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>3</td>
<td>To use modern engineering techniques, skills, and tools, including computer-based tools for analysis and Design.</td>
<td>6 (35%)</td>
<td>9 (53%)</td>
<td>1 (6%)</td>
<td>0</td>
<td>0</td>
<td>16 (94%)</td>
</tr>
<tr>
<td>4</td>
<td>To apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.</td>
<td>7 (41%)</td>
<td>10 (59%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>To design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>5 (29%)</td>
<td>10 (59%)</td>
<td>2 (12%)</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical or computer engineering applications.</td>
<td>1 (6%)</td>
<td>8 (47%)</td>
<td>6 (35%)</td>
<td>0</td>
<td>0</td>
<td>15 (88%)</td>
</tr>
<tr>
<td>7</td>
<td>To identify, formulate, and solve novel electrical or computer engineering problems</td>
<td>4 (24%)</td>
<td>12 (71%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16 (94%)</td>
</tr>
<tr>
<td>8</td>
<td>To function on multi-disciplinary teams.</td>
<td>5 (29%)</td>
<td>10 (59%)</td>
<td>2 (12%)</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>9</td>
<td>With an understanding of professional and ethical responsibility.</td>
<td>6 (35%)</td>
<td>11 (65%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>10</td>
<td>To communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience.</td>
<td>6 (35%)</td>
<td>9 (53%)</td>
<td>2 (12%)</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>11</td>
<td>With the broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context.</td>
<td>5 (29%)</td>
<td>9 (53%)</td>
<td>2 (12%)</td>
<td>0</td>
<td>0</td>
<td>16 (94%)</td>
</tr>
<tr>
<td>12</td>
<td>To recognize the need for and to have the ability to engage in lifelong learning.</td>
<td>8 (47%)</td>
<td>9 (53%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>8 (47%)</td>
<td>9 (53%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17 (100%)</td>
</tr>
</tbody>
</table>

Figure 3-14: Results of Outcome Assessments by Graduating Seniors (conducted in 2001-2002)
2000-2001 Results: A summary of the skills assessments is shown in Table 3-26 and Figure 3-15

Table 3-26: Summary of Outcome Assessments by Graduating Seniors (conducted in 2000-2001)

<table>
<thead>
<tr>
<th>Item</th>
<th>The electrical/computer degree program has prepared</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N0 Comments</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To embark upon a professional career in electrical engineering, or to begin graduate study.</td>
<td>2 (25%)</td>
<td>5 (63%)</td>
<td>0</td>
<td>0</td>
<td>1 (12.5%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td>3 (38%)</td>
<td>5 (63%)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>With an understanding of the basic and engineering sciences for applications in the analysis, design, synthesis, and operation of electrical engineering components, devices, and systems</td>
<td>1 (13%)</td>
<td>6 (75%)</td>
<td>0</td>
<td>0</td>
<td>1 (13%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>3</td>
<td>To use modern engineering techniques, skills, and tools, including computer-based tools for analysis and Design.</td>
<td>1 (13%)</td>
<td>7 (88%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>To apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.</td>
<td>2 (25%)</td>
<td>6 (75%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>To design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>8 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical or computer engineering applications.</td>
<td>8 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>7</td>
<td>To identify, formulate, and solve novel electrical or computer engineering problems</td>
<td>1 (13%)</td>
<td>6 (75%)</td>
<td>1 (13%)</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>8</td>
<td>To function on multi-disciplinary teams.</td>
<td>2 (25%)</td>
<td>4 (50%)</td>
<td>0</td>
<td>0</td>
<td>2 (25%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>9</td>
<td>With an understanding of professional and ethical responsibility.</td>
<td>2 (50%)</td>
<td>5 (63%)</td>
<td>0</td>
<td>0</td>
<td>1 (13%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>10</td>
<td>To communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience.</td>
<td>1 (13%)</td>
<td>7 (87%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>11</td>
<td>With the broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context.</td>
<td>6 (18%)</td>
<td>0 (56%)</td>
<td>1 (13%)</td>
<td>0</td>
<td>1 (13%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>12</td>
<td>To recognize the need for and to have the ability to engage in lifelong learning.</td>
<td>8 (100%)</td>
<td>0 (0%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>8 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (100%)</td>
</tr>
</tbody>
</table>

Figure 3-15: Results of Outcome Assessments by Graduating Seniors (conducted in 2000-2001)
1999-2000 Results: A summary of the skills assessments is shown in Table 3-27 and Figure 3-16

Table 3-27: Summary of Outcome Assessments by Graduating Seniors (conducted in 1999-2000)

<table>
<thead>
<tr>
<th>Item</th>
<th>The BSEE degree program has prepared</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N0</th>
<th>Comments</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To embark upon a professional career in electrical engineering, or to begin graduate study.</td>
<td>9 (39%)</td>
<td>11 (48%)</td>
<td>1 (4%)</td>
<td>0</td>
<td>2 (9%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.</td>
<td>13 (57%)</td>
<td>9 (39%)</td>
<td>1 (4%)</td>
<td>0</td>
<td>0</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>With an understanding of the basic and engineering sciences for applications in the analysis, design, synthesis, and operation of electrical engineering components, devices, and systems</td>
<td>11 (48%)</td>
<td>11 (48%)</td>
<td>0</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>To use modern engineering techniques, skills, and tools, including computer-based tools for analysis and Design.</td>
<td>14 (61%)</td>
<td>9 (39%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>To apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.</td>
<td>10 (44%)</td>
<td>12 (52%)</td>
<td>0</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>To design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>9 (39%)</td>
<td>13 (57%)</td>
<td>0</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical or computer engineering applications.</td>
<td>3 (13%)</td>
<td>13 (57%)</td>
<td>5</td>
<td>0</td>
<td>2 (9%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>To identify, formulate, and solve novel electrical or computer engineering problems</td>
<td>9 (39%)</td>
<td>11 (48%)</td>
<td>2 (9%)</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>To function on multi-disciplinary teams.</td>
<td>8 (35%)</td>
<td>12 (52%)</td>
<td>2 (9%)</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>With an understanding of professional and ethical responsibility.</td>
<td>8 (35%)</td>
<td>14 (61%)</td>
<td>0</td>
<td>1 (4%)</td>
<td>0</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>To communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience.</td>
<td>4 (18%)</td>
<td>18 (78%)</td>
<td>0</td>
<td>1 (4%)</td>
<td>0</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>With the broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context.</td>
<td>4 (18%)</td>
<td>13 (56%)</td>
<td>5</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>To recognize the need for and to have the ability to engage in lifelong learning.</td>
<td>8 (35%)</td>
<td>14 (61%)</td>
<td>0</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>4 (18%)</td>
<td>16 (69%)</td>
<td>2</td>
<td>0</td>
<td>1 (4%)</td>
<td>23 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-16: Results of Outcome Assessments by Graduating Seniors (conducted in 1999-2000)
3.5.2 Summary of Exit Interviews

The results of the surveys are shown in Tables 3-28 to 3-32 and Figures 3-17 to 3-21. The graduating seniors believe that the degree program has prepared them with the desirable skills for the program objectives. The summary of Exit Interviews from Fall 2000 – Spring 2005 is included in Section G, Appendix VIII.

Summary Results: The lowest amount of agreement is 75 to 87% for item on impact of engineering solutions in a global societal context and 72 to 94% on the item on contemporary engineering issues.

2004-2005 Results: The summary of Questionnaire 14 on “As a result of my University of West Florida engineering education, I am well prepared to” is shown in Table 3-28 and Figure 3-17.

Table 3-28: Results of Preparedness Assessments by Graduating Seniors (conducted in 2004-2005)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Capability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>11 (34%)</td>
<td>13 (41%)</td>
<td>7 (22%)</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>32 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>11 (34%)</td>
<td>18 (56%)</td>
<td>3 (9%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>32 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>12 (38%)</td>
<td>15 (47%)</td>
<td>5 (16%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>32 (100%)</td>
</tr>
<tr>
<td>2,3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>9 (28%)</td>
<td>17 (53%)</td>
<td>5 (16%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>16 (50%)</td>
<td>13 (41%)</td>
<td>2 (6%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>9 (28%)</td>
<td>14 (44%)</td>
<td>7 (22%)</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>31 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>14 (44%)</td>
<td>14 (44%)</td>
<td>4 (13%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>32 (100%)</td>
</tr>
</tbody>
</table>

Figure 3-17: Results of Preparedness Assessments by Graduating Seniors (conducted in 2004-2005)
2003-2004 Results: The summary of Questionnaire 14 on “As a result of my University of West Florida engineering education, I am well prepared to” is shown in Table 3-29 and Figure 3-18.

Table 3-29: Results of Preparedness Assessments by Graduating Seniors (conducted in 2003-2004)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>7 (29%)</td>
<td>10 (42%)</td>
<td>6 (25%)</td>
<td>1 (4%)</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>10 (42%)</td>
<td>14 (58%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>6 (25%)</td>
<td>16 (67%)</td>
<td>2 (8%)</td>
<td>0</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
<tr>
<td>2,3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>7 (29%)</td>
<td>12 (50%)</td>
<td>4 (17%)</td>
<td>1 (4%)</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>11 (46%)</td>
<td>11 (46%)</td>
<td>2 (8%)</td>
<td>0</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>6 (25%)</td>
<td>12 (50%)</td>
<td>6 (25%)</td>
<td>0</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>10 (42%)</td>
<td>10 (42%)</td>
<td>2 (8%)</td>
<td>1 (4%)</td>
<td>0</td>
<td>24 (100%)</td>
</tr>
</tbody>
</table>

Figure 3-18: Results of Preparedness Assessments by Graduating Seniors (conducted in 2003-2004)
2002-2003 Results: The summary of Questionnaire 14 on “As a result of my University of West Florida engineering education, I am well prepared to” is shown in Table 3-30 and Figure 3-19

Table 3-30: Results of Preparedness Assessments by Graduating Seniors (conducted in 2002-2003)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>3 (16%)</td>
<td>10 (53%)</td>
<td>5 (26%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>7 (37%)</td>
<td>12 (63%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>3 (16%)</td>
<td>15 (79%)</td>
<td>0 (0%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>2,3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>2 (11%)</td>
<td>15 (79%)</td>
<td>2 (11%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>7 (37%)</td>
<td>9 (47%)</td>
<td>2 (11%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>2 (11%)</td>
<td>14 (74%)</td>
<td>2 (11%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>4 (21%)</td>
<td>15 (79%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>19 (100%)</td>
</tr>
</tbody>
</table>

Figure 3-19: Results of Preparedness Assessments by Graduating Seniors (conducted in 2002-2003)
2001-200 Results: The summary of Questionnaire 14 on “As a result of my University of West Florida engineering education, I am well prepared to” is shown in Table 3-31 and Figure 3-20.

Table 3-31: Results of Preparedness Assessments by Graduating Seniors (conducted in 2001-2002)

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>6</td>
<td>32%</td>
<td>8</td>
<td>42%</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>5</td>
<td>50%</td>
<td>12</td>
<td>50%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>5</td>
<td>26%</td>
<td>10</td>
<td>53%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2,3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>4</td>
<td>21%</td>
<td>10</td>
<td>53%</td>
<td>3</td>
<td>16%</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>7</td>
<td>37%</td>
<td>9</td>
<td>47%</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>4</td>
<td>50%</td>
<td>10</td>
<td>50%</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>8</td>
<td>42%</td>
<td>7</td>
<td>46%</td>
<td>2</td>
<td>11%</td>
</tr>
</tbody>
</table>

Figure 3-20: Results of Preparedness Assessments by Graduating Seniors (conducted in 2001-2002)
**2000-2001 Results**: The summary of Questionnaire 14 on “As a result of my University of West Florida engineering education, I am well prepared to” is shown in Table 3-32 and Figure 3-21.

**Table 3-32: Results of Preparedness Assessments by Graduating Seniors (conducted in 2000-2001)**

<table>
<thead>
<tr>
<th>Obj #</th>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Understand the impact of engineering Solutions in a global societal context</td>
<td>2 18%</td>
<td>6 54%</td>
<td>2 18%</td>
<td>0 %</td>
<td>0 %</td>
<td>10 90%</td>
</tr>
<tr>
<td>1</td>
<td>Apply knowledge of mathematics, science, and engineering skills</td>
<td>2 18%</td>
<td>8 72%</td>
<td>1 9%</td>
<td>0 %</td>
<td>0 %</td>
<td>11 100%</td>
</tr>
<tr>
<td>4</td>
<td>Apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>3 27%</td>
<td>6 54%</td>
<td>2 18%</td>
<td>0 %</td>
<td>0 %</td>
<td>11 100%</td>
</tr>
<tr>
<td>2,3</td>
<td>Design systems, components or processes to meet my employer’s needs</td>
<td>3 27%</td>
<td>4 36%</td>
<td>3 27%</td>
<td>1 9%</td>
<td>0 %</td>
<td>11 100%</td>
</tr>
<tr>
<td>5</td>
<td>Understand my professional and ethical responsibilities</td>
<td>2 18%</td>
<td>6 54%</td>
<td>2 18%</td>
<td>0 %</td>
<td>0 %</td>
<td>10 90%</td>
</tr>
<tr>
<td>5</td>
<td>Understand contemporary engineering issues</td>
<td>2 18%</td>
<td>8 72%</td>
<td>1 9%</td>
<td>0 %</td>
<td>0 %</td>
<td>11 100%</td>
</tr>
<tr>
<td>2</td>
<td>Function on multi-disciplinary teams</td>
<td>4 36%</td>
<td>4 36%</td>
<td>3 27%</td>
<td>0 %</td>
<td>0 %</td>
<td>11 100%</td>
</tr>
</tbody>
</table>

**Figure 3-21: Results of Preparedness Assessments by Graduating Seniors (conducted in 2000-2001)**
3.5.3 Student Agreement of Outcome Achievements in Classes

This is a dialogistic measure type, reflecting what students discover, what they know, what they are learning and what they do not understand. Effective the summer semester of 1999, the department has initiated two class assessments - Instructor Assessment of Class and Student Assessment of Class. The instructor is asked to identify the skill content of the course. Students are then asked to rate the level of achievement in those specific skills. The results are not used to support the outcome achievements. However, these assessments provide feedback to the instructor for any improvements and curricular revision. The summary of assessment results for student agreements on outcome achievement, which was conducted in 2004-2005, is shown in Table 3-33 (see Page # 159).

**Summary Results:** Each outcome can be met by more than one course. According to the students, the desired outcomes are achieved by all linked courses to a certain degree as shown in Figure 3-22 (see Page # 161). Each outcome is met a primary course and others courses contribute to the outcome secondary course(s). The maximum value for each outcome as shown in Figure 3-22 is contributed by the primary course and the minimum value is contributed by the secondary courses that are linked to the specific outcome. There is a wider variation on outcomes # 8, 9 and 11 depending on the course. According to student opinions, the lowest achievement is in the outcome # 8 on “An ability to function on multi-disciplinary teams”.

This is a dialogistic measure, reflecting what students discover, what they know, what they are learning and what they do not understand.
# TABLE 3-33: SUMMARY OF STUDENT AGREEMENTS ON COURSE OUTCOMES FOR ELECTRICAL AND COMPUTER ENGINEERING
(From Spring 2004 – Fall 2005)

<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcome</th>
<th>Course</th>
<th>Spring '04</th>
<th>Fall '04</th>
<th>Spring '05</th>
<th>Summer '05</th>
<th>Fall '05</th>
<th>Spring '06</th>
<th>Summer '06</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112</td>
<td>CM 92</td>
<td>RM 100</td>
<td>RM 80</td>
<td>TG 100</td>
<td>AF 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3135</td>
<td>XM 93</td>
<td>XM 78</td>
<td>XM 100</td>
<td></td>
<td>RA 100</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>EEL 4663</td>
<td>RM 80</td>
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<tr>
<td></td>
<td></td>
<td>EGM 3400</td>
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<td>C 90</td>
<td></td>
<td>RA 100</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>EEL 3111</td>
<td>TG 100</td>
<td>DH 88</td>
<td>TG 100</td>
<td>DH 96</td>
<td>DH 84</td>
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<tr>
<td></td>
<td></td>
<td>EEL 3211</td>
<td>DM 94</td>
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<tr>
<td></td>
<td></td>
<td>EEL 3701</td>
<td>MB 100</td>
<td>TG 83</td>
<td>CM 81</td>
<td>RM 59</td>
<td>TG 100</td>
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<tr>
<td></td>
<td></td>
<td>EEL 4712</td>
<td>MK 90</td>
<td></td>
<td></td>
<td>RM 67</td>
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<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>MB 100</td>
<td>MB 90</td>
<td>DH 100</td>
<td>BS 100</td>
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<td></td>
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<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>EEL 3303L</td>
<td>XM 86</td>
<td>DH 83</td>
<td>BW 100</td>
<td>DH 100</td>
<td>RA 100</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>EEL 3304</td>
<td>MB 100</td>
<td>MB 100</td>
<td>DH 100</td>
<td>BS 78</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>EEL 4304L</td>
<td>CM 93</td>
<td>TG 88</td>
<td>DH 100</td>
<td>WW 80</td>
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<tr>
<td></td>
<td></td>
<td>EEL 4712L</td>
<td>MK 90</td>
<td></td>
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<td>RM 100</td>
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<td></td>
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<td>EEL 4750</td>
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<td>BC 67</td>
<td>TG 88</td>
<td>JC 100</td>
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</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>EEL 3135</td>
<td>XM 93</td>
<td>XM 95</td>
<td>XM 50</td>
<td>RA 67</td>
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<td></td>
<td></td>
<td>EEL 4242C</td>
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<td></td>
<td>MR 83</td>
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<td></td>
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<td>EEL 4514</td>
<td>SG 96</td>
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<td></td>
<td></td>
<td>EEL 4445</td>
<td>MB 83</td>
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<td>EIN 4354</td>
<td>RR 100</td>
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<td></td>
<td>OS 78</td>
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</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>EEL 3303L</td>
<td>XM 83</td>
<td>DH 100</td>
<td>BW 100</td>
<td>TG 100</td>
<td>RA/AF/ 89</td>
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<td></td>
<td></td>
<td>EEL 3701L</td>
<td>MB 100</td>
<td>RM 35</td>
<td>CM 88</td>
<td>RM 100</td>
<td>TG 100</td>
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<td></td>
<td></td>
<td>EEL 4304L</td>
<td>CM 100</td>
<td>MB 100</td>
<td>DH 92</td>
<td>WW/BS 95</td>
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<td></td>
<td></td>
<td>EEL 4744L</td>
<td>MK 80</td>
<td>CM 100</td>
<td>MK 94</td>
<td>RA 100</td>
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<td>EEL 4306L</td>
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<td>EEL 4514L</td>
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<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical and computer engineering applications</td>
<td>EEL 3396</td>
<td>MB 56</td>
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<td>MB 88</td>
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<tr>
<td>7</td>
<td>An ability to identify, formulate, and solve novel electrical and computer engineering problems, including the</td>
<td>EEL 4213</td>
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<td>DH 93</td>
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<tr>
<td>COP 4600</td>
<td>planning, specification, design, implementation, and operation of</td>
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<tr>
<td></td>
<td>systems, components, and/or processes that meet performance, cost,</td>
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<tr>
<td></td>
<td>time, safety, and quality requirements</td>
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</tr>
<tr>
<td>8</td>
<td>An ability to function on multi-disciplinary teams</td>
<td>MR 66</td>
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<td>EEL 4914C</td>
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<td>MB 82</td>
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<td>EEL 4657</td>
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<td>RM 69</td>
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<td>EEL 4657L</td>
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<td>RM 35</td>
<td>RA/AF 89</td>
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<td>9</td>
<td>An understanding of professional and ethical responsibility</td>
<td>MR 89</td>
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<td>EGN 4034</td>
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<td>EEL 4354</td>
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<td>RR 100</td>
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<td>EEL 3473</td>
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<td>10</td>
<td>An ability to communicate effectively in writing and to convey</td>
<td>MR 84</td>
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<tr>
<td>EGN 4034</td>
<td>technical material through oral presentation and interaction with</td>
<td>MR 70</td>
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<tr>
<td>EEL 4914</td>
<td>an audience</td>
<td>MB 82</td>
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<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to</td>
<td>MR 89</td>
<td></td>
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<tr>
<td>EGN 4034</td>
<td>understand the impact of electrical and computer engineering</td>
<td>MR 70</td>
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<tr>
<td>EEL 4834</td>
<td>solutions in a global and societal context</td>
<td>MB 82</td>
<td></td>
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<td>MB 71</td>
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<td>12</td>
<td>A recognition of the need for, and an ability to engage in life-long</td>
<td>MR 88</td>
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<tr>
<td>EEL 4914C</td>
<td>learning</td>
<td>MR 70</td>
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<td>EEL 4445</td>
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<td>MB 100</td>
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<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>RA 83</td>
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<td>XM 77</td>
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<td>EEL 3701</td>
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<td>MB 62</td>
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<td>CM 100</td>
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<td>14</td>
<td>Knowledge of the fundamental theory and practice of computer</td>
<td>RM 100</td>
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<tr>
<td>EEL 4744</td>
<td>science and computer engineering, as it applies to computer</td>
<td>MK 79</td>
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<tr>
<td>EEL 4744L</td>
<td>hardware and software, and the understanding of the interaction</td>
<td>MK 93</td>
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<tr>
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<td>between hardware and software</td>
<td>MK 65</td>
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<td>MK 54</td>
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<td>15</td>
<td>Understanding of all the elements required to design a complete</td>
<td>RM 100</td>
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<tr>
<td>EEL 4744</td>
<td>computer system (hardware and software)</td>
<td>MK 82</td>
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<td>MK 86.7</td>
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<td>MK 73</td>
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<td>EEL 4713L</td>
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<td>RA/MK 92</td>
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3.5.4 Students Surveys and Student Group Meetings

In order to receive feedback from students, student survey questionnaires were sent to all (208) engineering students through group e-mails and 47 responses were received. The summary of student surveys is shown in Table 3-34 (see Page # 162). As a result of the student surveys and other feedback comments, few changes made or to be made are as follow:

- Control and communication labs to be upgraded and the equipment to be recalibrated (Done)
- Offer more courses a night, especially at the FWB campus (in progress)
- Modify STA4321 to include more applications (in progress)
- New course (1.0 Credit) as Applications of Software tools for Engineering (Done, effective Spring 2006)
- Make sure computers are operational in the DLL class rooms (in progress)
- Wireless internet access at FWB campus (done)
- Report periodic student progress reports based on their achievements of program outcomes (in progress)
Table 3-34: Summary of Student Surveys (conducted in Spring 2005)

<table>
<thead>
<tr>
<th>#</th>
<th>Questionnaires for Student Surveys</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do you know our program educational objectives?</td>
<td>43 (91%)</td>
<td>4 (9%)</td>
</tr>
<tr>
<td>2.</td>
<td>Do you know our program outcomes?</td>
<td>43 (91%)</td>
<td>4 (9%)</td>
</tr>
<tr>
<td>3.</td>
<td>Do you know our course linkage to the program outcomes?</td>
<td>38 (81%)</td>
<td>8 (17%)</td>
</tr>
<tr>
<td>4.</td>
<td>Do you know our new requirement that a student must demonstrate each outcome achievement in at least two courses to satisfy the graduation requirements?</td>
<td>26 (55%)</td>
<td>20 (43%)</td>
</tr>
<tr>
<td>5.</td>
<td>Do you suggest any changes to our educational objectives?</td>
<td>2 (4%)</td>
<td>41 (87%)</td>
</tr>
<tr>
<td>6.</td>
<td>Do you suggest any changes to our program outcomes?</td>
<td>27 (57%)</td>
<td>41 (87%)</td>
</tr>
<tr>
<td>7.</td>
<td>Do you have any suggestions for improving our curriculum (courses, laboratories, computer facilities) so that we could better meet our objectives and outcomes?</td>
<td>7 (57%)</td>
<td>16 (34%)</td>
</tr>
</tbody>
</table>

Group Student Meetings: The Director met with the IEEE students during their meeting on November 16, 1999. The following actions were taken as a result of the meeting: (a) planning for courses in the BSEE, BSCEN and Dual degree programs was expanded, (b) a Bulletin Board was added to the departmental web page for academic and other announcements, (c) an Advising link was added to the departmental web page for posting Advising Guidelines, advising office hours, and any announcements regarding curriculum and advising issues, and (d) a web-link to the ASEE pre-college web-site for information on considering Engineering was added. Based on experience with Focus group meetings, The department developed a set of Interview Guidelines\(^2\) (see Section A, Appendix IX).

At a meeting of IEEE-students with Dr. Rashid on September 20, 2001, the following suggestions were made: standardize course syllabi for basic courses such as EEL 3111, EEL 3135, EEL 3112 and EEL 3701C (in this way, the same course materials will be covered irrespective of whoever teaches the course), add more courses in the power area, formalize the course number for Robotics, and increase faculty availability for advising. As a result, the department revised the ABET course syllabi for EEL 3111, EEL 3135, EEL 3112 and EEL 3701C (Samples of revised course document in Section B, Appendix I).

As a result of the meeting with students in FWB in Fall 2004, changes made: (1) moved the course EEL 3211 from Spring offering to Summer, (2) a new course on Applications of Software Tools for Engineering (not to be used for credits for a degree), and (3) more offering of evening classes.

Focus Group Meeting With Students in EGN 4034: EGN 4034 – Engineering Ethics is a required course for engineering students. It is the largest class in the program, consisting of juniors and seniors. Director Rashid’s meeting with these students disclosed that they would like to see more technical electives, increased faculty advising, and consideration of some evening classes. As a result of this meeting, The department prepared a list of faculty advisors with their area of specialization and has scheduled classes after 5pm since Fall 2002 (see Examples of Improvements in Table 3-43, Page # 182).

\(^2\) [http://www.cise.ufl.edu](http://www.cise.ufl.edu)
As a result of a presentation on the benefits of professional registration by Mr. Chris Curb of the Florida Engineering Society and the class visit by Dr. Rashid on September 28, 2001, 38 students expressed an interest in taking the EIT examination.

As a result of the meeting with students on April 8, 2005 changes made are: (1) more connection with UF, and (2) exploring the possibility of offering BS/MS program with UF.

### 3.5.5 Estimate of the outcome achievements through FOG

The Festival on the Green (FOG) event held in April of 2005 and the Fall 2005 Frenzy events held in October of 2004 and 2005 exposed students, who were displaying their projects, at each event. The estimate of the outcome achievements is shown in Table 3-35. Two examples of engineering displays in the 2005 FOG are shown in Figure 3-23 (see Page # 164)

#### Table 3-35: Estimate of the outcome achievements through FOG

<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcomes</th>
<th>Activities</th>
<th>Estimated outcome achievements</th>
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</thead>
<tbody>
<tr>
<td>5.</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data.</td>
<td>Each student presented their project to the public and explained how their project worked and why their project may be acting different from what it is programmed to do. For example, there may be conditions (i.e. too much lighting or wind) and problems (i.e. project not fully finished or working properly) at that time with their project.</td>
<td>50%</td>
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<td>8.</td>
<td>An ability to function on multi-disciplinary teams, where possible.</td>
<td>At FOG electrical engineering majors were interacting with computer engineering majors, but at the Fall Frenzy they were also exposed to physics students who also participated.</td>
<td>60%</td>
</tr>
<tr>
<td>9.</td>
<td>An understanding of professional and ethical responsibility</td>
<td>Students were in public and presented themselves professionally and with good intentions.</td>
<td>60%</td>
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<tr>
<td>10.</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>Some students brought their display boards of information pertaining to their project and orally presented to their audience, but also answered questions.</td>
<td>70%</td>
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<td>12.</td>
<td>A recognition of the need for, and an ability to engage in life-long learning</td>
<td>Students saw the need to keep their attention on grade school students and explain to them at their level. For example, a home school student was very much interested in electrical engineering specializing in robotics. Special care was given to answer his questions. As a result of the interaction going so well, the college student and grade school student developed a stronger bond with each other. This encounter ended with the grade school student being given the robotics poster that was displayed, which excited the student even more, and the college student learned that he can change another student's life with the education that he attains.</td>
<td>60%</td>
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</tbody>
</table>
Figure 3-23: Examples of Engineering Displays in the 2005 FOG

(a) Aeroplane

(b) SUV project.
3.5.6 External ABET Consultants

In January 2000, The department invited an external reviewer (Dr. Joseph Hughes from Georgia Institute of Technology) who had prior experience in the ABET evaluation process as an ABET evaluator and in the ABET preparation for his/her institution under Criteria 2000. This mock-visit provided feedback on the curriculum, program outcomes, assessments, and the feedback process. The reviewer made a presentation to faculty members who are involved in teaching courses for electrical and computer engineering degrees. The reviewer also met with the ECE faculty as a group and shared his/her recommendations and suggestions.

In fall 2005, Dr. Victor Nelson (from Auburn University) reviewed the draft copy of the Self-Study Report for electrical engineering and provided written feedback. He had a conference call on September 16, 2005 with Drs. Cammy Abernathy (UF), Mark Law (UF), Muhammad H. Rashid, Dale Harrell, Mohamed Khabou, and Mohammad Bataineh.

In fall 2005, Dr. James McDonald (from Monmouth University) reviewed the draft copy of the Self-Study Report for computer engineering and provided written feedback. He also had a conference call on September 23, 2005 with Drs. Cammy Abernathy (UF), Mark Law (UF), Muhammad H. Rashid, Dale Harrell, Mohamed Khabou, and Mohammad Bataineh.

Dr. Ed Jones (from Iowa State) reviewed the draft copy of the Self-Study Reports for both computer engineering and electrical engineering. He had a mock visit on September 28 and 29, 2005. This visit provided feedback on the curriculum, program outcomes, assessments, and the feedback process. The reviewer made a presentation to faculty members who are involved in teaching courses for electrical and computer engineering degrees. The reviewer also met with a group of students and the ECE faculty and shared his recommendations and suggestions to Dean Jane Halonen, Provost Sandra Flake and Director Muhammad Rashid.

3.5.7 SACS Accreditation Review

The University of West Florida went through the SACS review in 1994 when the department was at the implementation stage. There was no SACS report on the electrical engineering program. The last SACS review was in Spring 2005. There were no comments on engineering programs.

3.5.8 Board of Regents (BoR) Review

The Electrical and Computer Engineering Degree programs went through BoR reviews in Spring 2000 for the first time. In addition to educational objectives and outcomes, the programs must meet other BoR requirements such as retention and graduation rates. The BoR requirements are included in Appendix XV, BoR Review. The summary of the BoR review and Responses are shown in Table 3-36 (see page # 166).
Table 3-36: Summary of BoR Review

University of West Florida
Cooperative Bachelor of Science in Computer Engineering (CIP Code 14.0901)
Cooperative Bachelor of Science in Electrical Engineering (CIP Code 14.1001)

I. Summary Of Programs Strengths Reported By The Program Review Team

1. The UWF ECE Department established an assessment process that was used for the continuous improvement of the undergraduate programs and the Department's educational operations. The process involved listing the program education objectives and program outcomes that were identified.

2. Thirteen outcomes for the UF/UWF electrical engineering program corresponded to the curricular requirements and graduate attributes specified in the ABET Engineering Criteria 2000 and the relevant program criteria. There were fifteen outcomes for the computer engineering program. All UWF graduates of electrical and computer engineering were expected to have met the specified outcomes for their programs.

3. Satisfaction with curricular requirements was the primary mechanism for ensuring that program graduates achieved the attributes associated with the outcomes specified in Criteria 3 as well as the program criteria and program educational objectives.

4. The process that was used to monitor student academic progress ensured that all program graduates satisfactorily achieved the program outcomes related to curricular content.

5. The UWF faculty member teaching a course evaluated the relationship of each course to the program outcomes/skill. Additionally, the students evaluated the course in relation to achieving those desired outcomes/skills.

6. The joint engineering program was a unique arrangement that benefitted from the advantages of the UF curriculum and offered classes in a small-class, practice-oriented environment. It combined the strengths of both UF and UWF to serve the educational needs of the Northwest Florida region.

7. The small student body at UWF permitted the development of a tight, collegial community among students, faculty, and staff. As a part of the retention effort, program personnel arranged for tutors for pre-engineering (mathematics and physics) and electrical engineering courses. The active student advising program helped the students individually and led to close student-faculty relationships.

8. The faculty members were dedicated to teaching undergraduate students as an end within itself, not as an adjunct to research activates. Faculty excellence in teaching was required, regularly monitored, and rewarded. Faculty members, rather than teaching assistants, taught laboratory sections.

9. UWF personnel recognized the importance of research to support strong academic programs. They indicated that faculty members were evaluated annually in the areas of teaching, research, and service, and evidence of research and publications was required for gaining promotion and/or tenure.

10. The interdisciplinary program, with its emphasis on breadth, provided a strong base for industrial employment and/or research. The co-operative program helped deserving students to gain industrial experience during the process of earning an undergraduate degree.

11. The Institute of Electrical and Electronics Engineers (IEEE) student section was very active and organized activities which included social gatherings, student recruitment, visitations of
various industries, attending lectures delivered by highly regarded speakers, attending career
and job exhibitions, and meeting top leaders from industries and universities.

12. The Engineering Advisory Committee, composed of high-level executives from local industry,
supported the joint engineering program. The local industries also were very supportive of the
engineering programs. The Committee and local industries were advocates of the joint
engineering program and contributed part-time and summer employment for students, student
tours, speakers for student groups, feedback concerning graduates, and critical and constructive
analysis.

II. Summary Of Program Recommendations Reported By Program Review

1. There was no clear analysis or summary provided by UWF or the ECE Department faculty
indicating how well their unique programmatic goals and objectives of the joint engineering
program were met:
2. The BOR Program Review Team reiterated the potential barriers reported in the 1999-2000 self
study report.
3. The BOR Program Review Team reiterated the opportunities identified in the 1999-2000 self-
study report.
4. The BOR Program Review Team reiterated the recommendations of the UWFF-ECE faculty.

III. Identification Of Action Taken To Date To Address Each Recommendation

1. Continue maintaining the state-of-the-art laboratory and computing facilities: The UWF-ECE
purchased all new laboratory equipment for FWB engineering labs. The some lab equipment at
Pensacola campus, which was purchased in 1994 at the start of the UF-UWF Joint Program,
has become either obsolete, or does not work. Students complain about the lab equipment.
2. Arrange more space for lectures: Currently, there are two DLL class rooms one in Pensacola
and one in FWB. All classes are taught through the DLL classrooms, and they are fully booked
from 8 am – 8 pm from Mondays to Thursdays and from 8 am – 5 pm from Fridays. These
class rooms are becoming outdated and do not meet the needs for distance delivery needs. They
need to be updated for more effective and efficient uses.
3. Arrange more space for labs: With the growth of student enrollments, the labs are crowed and
can not accommodate the student needs. The ECE department has to put a cap on the lab
classes. The department needs more lab space to accommodate the enrollment growth.
4. Place more emphasis on advising and retaining electrical and computer engineering and pre-
engineering students: The ECE department has a full-time dedicated student academic advisor
and registration officer.
5. Maintain the usage and currency of computer facilities: The ECE department is moving in the
direction of wireless in its classrooms and lab facilities and plans to require tablet PCs for all
incoming students, effective fall 205. We will need more wireless ports for faculty offices and
labs.
6. Introduce more technical electives into the curriculum: At least two technical electives are
offered in every semester.
7. EGN 4034 – Professional Engineering is required for electrical and computer engineering.
8. The ECE department will work on addressing how well their unique programmatic goals and
objectives were met: in the next self-study report for the forthcoming ABET visit in fall 2006.
3.5.9 UWF Internal Reviews For Academic Learning Compacts

As a result of the UWF-wide Quality Enhancement Plan (QEP) initiative\(^3\), the ECE department developed the academic learning compact (ALC) for computer engineering\(^4\) as shown in Table 3-37 (see Page # 168). The relationship of the courses to the ALC contents is shown in Table 3-38 (see Page # 170).

Table 3-37: Academic Learning Compact for Computer Engineering

<table>
<thead>
<tr>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recognize and apply concepts, principles and theories in the following areas:</td>
</tr>
<tr>
<td>o mathematics, including differential and integral calculus, differential equations, linear algebra, and complex variables, discrete mathematics</td>
</tr>
<tr>
<td>o core electrical and computer engineering topics: basic circuit analysis, signals and systems, and electronics, digital logic, and microprocessors</td>
</tr>
<tr>
<td>o digital design, data structure, operating systems, computer hardware and software,</td>
</tr>
<tr>
<td>o interaction between hardware and software</td>
</tr>
<tr>
<td>o discrete mathematics</td>
</tr>
<tr>
<td>o probability and statistics</td>
</tr>
<tr>
<td>• Describe the interrelatedness of contemporary issues in a global and society context with computer engineering solutions</td>
</tr>
</tbody>
</table>

Critical Thinking

• Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of computer engineering
• Identify, formulate and solve novel computer engineering problems
• Design and conduct scientific and electrical and computer engineering experiments including analysis and interpretation of data

Communication

• Communicate effectively in writing electrical and computer engineering topics.
• Convey technical material through oral presentations of computer engineering topics.

Project Management

• Function effectively on multi-disciplinary teams
• Deliver computer engineering results that meet performance standards for cost, safety, and quality

Integrity/Ethics

• Describe the ethical and professional responsibilities of the computer engineer
• Make and defend ethical judgments in keeping with professional standards of computer engineering
• Profess commitment to life-long learning to satisfy the ABET accreditation requirement.

Job Prospects for Computer Engineering Graduates

Computer engineers find career opportunities in a wide variety of companies or organizations involving the design, development, building, testing, and operation of computer systems. Computer engineers deal with both hardware and software (programming) problems. In designing a computer system, computer engineers must decide how much of the computer logic to put into hardware and how much to put into software. The work of the computer engineers and computer scientists is closely related. Computer engineers tend to be more involved with the computer hardware, whereas computer scientists tend to be more involved with the computer software and less emphasis on hardware.

The typical job functions include research, design, develop, and test computer or computer-related equipment for

\(^3\) [http://nautical.uwf.edu/accreditation/main.cfm?fuseaction=ufw_qep]

\(^4\) [http://uwf.edu/cutl/newer/EE.doc]
commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components. According to the US Federal Bureau of Labor Statistics, the demand for electrical engineering is expected to continue growing.

For US Occupational Outlook:  http://www.bls.gov/oco/ocos266.htm


Table 3-38: COMPUTER ENGINEERING CURRICULUM AUDIT OF COURSES FOR ACADEMIC LEARNING COMPACT

DEPARTMENT: Electrical and Computer Engineering Date: February 24, 2005

*Note: All courses that are used to fulfill the degree requirements must contribute to at least one component of the academic learning compact.

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<tr>
<th>Courses</th>
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<th>Integrity/Ethics</th>
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</table>
3.6 Evaluation to Determine and Demonstrating Achievements of Program Outcomes

The analysis of the results by direct assessment methods over the period from 2000 -2005 indicates achievements of all program outcomes. The degree of outcome achievements is shown in Table 3-39. As expected, there are some variations of the results. However, the results of the exit interviews show the highest amount of disagreement on the outcome # 11 on contemporary issues and outcome # 8 on multi-disciplinary teams. These results show improvements over the time due to interval changes in the curriculum and its delivery.

Table 3-39: Achievements of Program Outcomes

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Outcome achievements</th>
<th>Type of outcome achievements</th>
<th>Degree of Outcome achievements</th>
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</thead>
<tbody>
<tr>
<td>Faculty Assessment of Samples of Student work</td>
<td>100%</td>
<td>Aggregated results of samples</td>
<td>&gt; 90%</td>
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<td>Individual</td>
<td>100%</td>
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<tr>
<td>Faculty Assessment of Student Portfolios</td>
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<td>Individual</td>
<td>100%</td>
</tr>
<tr>
<td>Faculty Assessment of Senior Design Projects</td>
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<td>Aggregated results of projects</td>
<td>100%</td>
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<td>Co-op Employer Reports</td>
<td>Indicative</td>
<td>Aggregated samples</td>
<td>Not known</td>
</tr>
<tr>
<td>Academic Competition</td>
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<td>Aggregated results</td>
<td>&gt; 60%</td>
</tr>
<tr>
<td>Outcome Assessments by Graduating Seniors</td>
<td>&gt; 80 %</td>
<td>Individual</td>
<td>&gt; 80%</td>
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<tr>
<td>Exit Interviews</td>
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</tr>
<tr>
<td>Student Assessment of Outcome Achievements</td>
<td>&gt; 80 %</td>
<td>Individual</td>
<td>&gt; 80%</td>
</tr>
</tbody>
</table>

3.6.1 Process for Student’s Outcome Portfolio Audit

The portfolios of student work should demonstrate the achievements of all program outcomes by all students. The Department has the following steps in place for the management of the portfolios and certification of the meeting the program requirements.

1. For students needing College holds lifted, they will meet with their ECE Academic Advisor to go over the requirement of program outcomes and to sign a consent form.
2. Faculty must submit a list of class roster divided into two groups: (i) students who achieved course outcomes, and (ii) students who did not achieve course outcomes, for every course they teach, every semester. The list must be accompanied with the course ABET outcomes form and students course materials to demonstrate the students' achievement of course outcomes.
3. Student Assistant enters the data (student name/outcomes achieved) into the spreadsheet to update the students' course portfolios. Student Assistant sends an email to all students who did not meet the course outcomes and requests that they arrange to meet with their Academic Advisor A.S.A.P. This should happen at the end of each semester.
4. All students must arrange to meet with their Academic Advisor four semesters before they plan to graduate to in order to go over their outcomes portfolios and make sure they are aware of any missed or unmet outcomes in their portfolios. The Academic Advisor will advise students of the steps needed to take in order to achieve or meet all program outcomes before the time they graduate.
5. When a student completes all degree requirements and is ready to graduate, Ms. Whitlock and Dr. Bataineh will each review his/her outcomes portfolio and initial the outcome certification indicating that the student has met all program outcomes (see Table 3-1, Page # 93).

6. The student's record is now complete, and the director certifies his/her graduation form, if the student has met all other degree requirement.

3.6.2 Process for Demonstrating Achievements of Program Outcomes

The following steps demonstrate the student achievements of program outcomes.

1. Each course is linked to the program outcomes and contributes to the program outcomes.
2. Course content is designed to meet the program outcomes.
3. Faculty knows the program outcomes and objectives.
4. Faculty knows how his/her course is linked to the program outcomes and what contributions are made by his/her course.
5. Faculty evaluates the student achievements in a course through tests and/or presentations of other means.
6. Faculty ensures that students are tested on various contributing elements through tests, home works, assignments, presentation and/or reports.
7. Faculty collects samples of student work and reviews the course materials. This is summarized in Tables 3-10 (see page # 112) and 3-11 (see page # 116). The samples of student’s work were collected for faculty reviews and will be made available for inspections.
8. Faculty writes a report on which outcomes and how they are met for each course. Effective fall 2003, the program outcome achievement report is completed by the faculty at the end of each semester. The report on the outcome achievements by Fall 2005 graduating students are shown in Table 3-40 and Figure 3-24(see pages # 174 & 175). When the portfolios are completely implemented, all graduating students should meet all outcomes by at least 1 time. The ultimate goal is achieve 100% for 2 times for all outcomes. The implementation and demonstration of program educational objectives is shown in Table 3-41 (see page # 176). The degrees of outcome achievements are shown in Figure 3-25 (see page # 179).
### Table 3-40(a): Portfolio Report of Outcome Achievements Compliance

**Semester: Fall 2005  BS in Computer Engineering**

**Number of Times the Program Outcomes met**

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</table>

**Figure 3-23(a): Number of Times of the Outcome Achievements Compliance (for Fall 2005 Graduates)**
Table 3-40(b): Portfolio Report of Outcome Achievements Compliance

**Semester: Spring 2006  BS in Computer Engineering**

<table>
<thead>
<tr>
<th>Student Name</th>
<th>1</th>
<th>2</th>
<th>3</th>
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% met of 1 Time:
- Out_1: 100
- Out_3: 100
- Out_5: 85
- Out_7: 100
- Out_9: 92
- Out_11: 85
- Out_13: 92
- Out_15: 92

% met of 2 Times:
- Out_1: 85
- Out_3: 100
- Out_5: 92
- Out_7: 85
- Out_9: 54
- Out_11: 31
- Out_13: 69
- Out_15: 54

% met of 3 Times:
- Out_1: 69
- Out_3: 54
- Out_5: 92
- Out_7: 62
- Out_9: 54
- Out_11: 31
- Out_13: 0
- Out_15: 38

% met of 4 Times:
- Out_1: 54
- Out_3: 54
- Out_5: 62
- Out_7: 31
- Out_9: 38
- Out_11: 0
- Out_13: 0
- Out_15: 23

Figure 3-23(b): Number of Times of the Outcome Achievements Compliance (for Spring 2006 Graduates)
<table>
<thead>
<tr>
<th>#</th>
<th>Program Outcomes</th>
<th>Constituents</th>
<th>Processes</th>
<th>Assessment of Outcomes</th>
<th>Results</th>
<th>System and Degree of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 80% to 95% for different tools.</td>
<td>The results obtained through periodic assessments how the improvement and/or sustained results caused by systematic integrated approach At least 80% or better degree of achievement.</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of core electrical and computer engineering topics</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 80% to 100% for different tools.</td>
<td>At least 80% or better degree of achievement.</td>
</tr>
<tr>
<td>3</td>
<td>An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 90% to 100% for different tools.</td>
<td>At least 90% or better degree of achievement.</td>
</tr>
<tr>
<td>4</td>
<td>An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 70% to 100% for different tools.</td>
<td>At least 70% or better degree of achievement.</td>
</tr>
<tr>
<td>5</td>
<td>An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 63% to 100% for different tools.</td>
<td>At least 60% or better degree of achievement.</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of probability and statistics, including electrical engineering applications</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 70% to 90% for different tools.</td>
<td>At least 70% or better degree of achievement.</td>
</tr>
<tr>
<td></td>
<td>An ability to identify, formulate, and solve novel electrical engineering problems, including the planning,</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 30% to 100% for different tools.</td>
<td>At least 30% or better degree of achievement.</td>
</tr>
<tr>
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</tr>
<tr>
<td>8</td>
<td>An ability to function on multi-disciplinary teams, where possible</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 40% to 85% for different tools.</td>
<td>At least 40% or better degree of achievement.</td>
</tr>
<tr>
<td>9</td>
<td>An understanding of professional and ethical responsibility</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 40% to 100% for different tools.</td>
<td>At least 40% or better degree of achievement.</td>
</tr>
<tr>
<td>10</td>
<td>An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 45% to 100% for different tools.</td>
<td>At least 45% or better degree of achievement.</td>
</tr>
<tr>
<td>11</td>
<td>The broad education and knowledge of contemporary issues necessary to understand the impact of electrical engineering solutions in a global and societal context</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 60% to 90% for different tools.</td>
<td>At least 60% or better degree of achievement.</td>
</tr>
<tr>
<td>12</td>
<td>A recognition of the need for, and an ability to engage in life-long learning</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 60% to 100% for different tools.</td>
<td>At least 60% or better degree of achievement.</td>
</tr>
<tr>
<td>13</td>
<td>Knowledge of discrete mathematics</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 63% to 100% for different tools.</td>
<td>At least 60% or better degree of achievement.</td>
</tr>
<tr>
<td>14</td>
<td>Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 63% to 100% for different tools.</td>
<td>At least 60% or better degree of achievement.</td>
</tr>
<tr>
<td>15</td>
<td>Understanding of all the elements required to design a complete computer system (hardware and software)</td>
<td>Active involvement and partnership with all key constituents of Alumni, Employers, Engineering Advisory Council, Students and faculty</td>
<td>The process of defining the program objectives is tied to institutional mission, and the constituent needs to support the engineering manpower demand of the region.</td>
<td>Assessment tools such as Alumni surveys, employer surveys, cop-employer surveys and student surveys are in place. Systematic evaluation plan is in place. The common sources of problems are identified for improvement</td>
<td>The results on agreement vary from 63% to 100% for different tools.</td>
<td>At least 60% or better degree of achievement.</td>
</tr>
</tbody>
</table>
3.7 Results Applied to Improvement of the Program

The Curriculum Committee recommended that changes are not needed as long as any given question or criteria has at least an 80 percent favorable response. Critical program comments were mostly related to a lack of more choices for technical electives. As a result of these comments a new Digital Communications elective was offered in the spring of 2002 and Digital Image Processing in Spring 2006. With the increase of ECE faculty since Fall of 2002, the opportunity to expand the number of technical electives will also continue to increase. The assessment process led to the review and revision of the program outcomes (see Table 3-43 in Page # 182 for revised outcomes and Page # 92 for the previous version). But these will be continually reviewed as stated earlier. In Spring 2005, the Curriculum committee recommended the following:

- Assign faculty advisor to all students, effective fall 2005
- Increase offering of technical electives (scheduled for 3 technical elective courses in fall 2005)
- Update the laboratory equipment for control, communication and digital labs in Pensacola (purchased new equipment, operational since Fall 2005).

The department continues to seek improvements so as to provide a smoother and more effective educational experience for its students. Few examples of some changes made to the degree program are summarized in Table 3-42 (see Page # 180). Other changes were implemented from the Fall semester of 2000 to the Spring semester of 2005 in the following areas:

- Changes made to program outcomes and assessments
- Changes made to program curriculum
- Teaching improvements
- Technical Service Improvements
- Administrative Student Service Improvements
### Table 3-42: Examples of Outcome Assessments and changes made

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<tr>
<th>Type of Assessment</th>
<th>Changes Made</th>
</tr>
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<td>The ECE Committee Reviews</td>
<td>The comments from the Graduating seniors and Exit Interviews indicated that lecture &amp; lab sections should be combined so that lectures &amp; labs could be better coordinated. The UF-ECE Committee recommended that the first course to be combined should be EEL 3304 &amp; 4304L, followed by EEL 3111 and EEL 3303L. Effective Fall 2002. The department changed these courses to EEL 3111C (4 credits) and EEL 3304C (4 credits). With program expansion to FWB and multiple lab sections taught by different faculty, UWF is going back to separate courses and labs such EEL 3701 and EEL 3701L rather than a combined course EEL 3701C, effective Fall 2004.</td>
</tr>
<tr>
<td>Ongoing review of general education and diversity requirements</td>
<td>The department recommends ECO 2013 – Economics, PHI – Ethics, and EUH 1001 – Western Perspectives I. As a part of the on-going assessment, the General Education is undergoing through changes in order to achieve measurable academic learning outcomes.</td>
</tr>
<tr>
<td>UWF student meetings.</td>
<td>UWF students would like to have more choices of technical elective. The department publishes an offering list of technical electives. Each faculty can schedule two technical courses in each year. UWF-ECE and CS Departments hired more faculty members.</td>
</tr>
<tr>
<td>Focus Group Meeting with UWF Students and Exit Interviews</td>
<td>UF Students indicated that they would like applications of engineering mathematics, rather than the theory. Effective Fall 2001, replaced MAP 4403 - Engineering Mathematics to EGM 4313 – Intermediate Engineering Analysis. It will be offered for the time in Fall 2002. Assigning faculty advisors to all students, offering more evening courses, and a new course on software tools.</td>
</tr>
<tr>
<td>Space Assessment</td>
<td>The department is sharing lab space with technology programs. Purchased more lab equipment in 2000 and 2001. Once the network connection is completed in Fall 2002, The department will share the CAD Lab with technology programs and will have a free room for lecture room or lab. Working a plan for a new Science and Technology Building, with plan money in 2006-2007 and construction 2007-2008., moving in to the new faculty in fall 2008.</td>
</tr>
<tr>
<td>Graduating Senior Information.</td>
<td>Indicated lower scores in lifelong leaning experience and contemporary issues. The department is continuously changing the course content of EGN 4034. It included lectures on the importance of professional registration.</td>
</tr>
<tr>
<td>exit interviews</td>
<td>Indicated emphasis on communication skills. The ECE faculty requires notebook-type lab reports, formal design reports in some course, and oral presentation for senior course. Arranged so that a student can also work a CS faculty for a special project and for the senior design project.</td>
</tr>
<tr>
<td>Pre-tests</td>
<td>In order to identify the weakness in the pre-requisite course, the ECE faculty instituted pre-tests which led to change sin the courses (see Tables 3-17 &amp; 3-18, Pages # 133 &amp; 134).</td>
</tr>
<tr>
<td>ABET review process</td>
<td>New advising and registration procedures, and updated degree plan with an UF GPA calculation in the student’s file Effective fall 2001, The department emphasize on the both the applications and knowledge of probability and statistics in STA 4321 – Mathematical Statistics Developed operating procedures with the UWF Departments of Computer Science, Mathematics and Statistics, and UF College of Engineering.</td>
</tr>
<tr>
<td>UWF entering student and advising center</td>
<td>Indicated the need for a course to freshman engineering course. Effective Fall 2002, a non-credit course EGN 1002 - Introduction to Engineering will be offered. New student mentoring and advising by students, involving students in FOG Frenzy event of the Festival on the Green (FOG). Tutoring by students, formation of the IEEE sedan section in FWB campus and formation of student section of SWE.</td>
</tr>
</tbody>
</table>

### 3.7.1 Changes Made To Program Outcomes and Assessments

The Curriculum Committee reviewed the responses to the surveys noted above on January 15, 2005. Based on the input received, it was considered that no changes were needed at that time. The review process will continue, however, as noted in the schedule provided earlier in the report. But, as a result of the review process, other program improvements have been made (see Examples of Improvements, see sections 3.7.3 to 3.7.5).
During the preparation of the ALCs for the UWF QEP, the review of course syllabi and the preparation of the separation documents, it was realized that the program outcomes in Table 3-1 which begins with words such as ‘understating of’ and ‘knowledge’ are not measurable. The outcomes in Table 3-1 are revised as shown in Table 3-43 (see Page # 182).

As a result of the assessment process, the faculty can complete the information on line how each outcome is met by the courses that are linked to the outcome. The Summary of outcome achievements for Spring 206 courses, which is generated on line, is shown in Table 3-45 (page # 186). The equivalent Table 3-13 was generated manually.

3.7.2 Changes Made To Program Curriculum

The curriculum is subjected to frequent revisions. The department also needs to coordinate for implementing those changes.

- STA 4321 - Mathematical Statistics (3 credits) is required for electrical and computer engineering, effective fall 2001
- EGM 4313 – Intermediate Engineering Analysis (4 Credits) (Effective Fall 2002) in place of MAP 4403 – Mathematics for Engineers (3 credits)
- EGN4034 –Professional Issues, required for is required for electrical and computer engineering, effective fall 2000
- EEL 4843 - C++ for Electrical Engineers is required for electrical engineering
- Combined the course EEL 3111 (3 credits) and EEL 3303L (1 credit lab) to EEL 3111C in Fall 2002 to follow the UF changes.
- Due to problems for multiple sections in different locations and distributing faculty teaching FTE (Full-time-equivalent), the labs are separated for all required courses effective fall 2004. These courses are: EEL 3701C (4) to EEL 3701 (3) and EEL 3701L (1), EEL 4744C (4) to EEL 4744 (3) and EEL 4744L (1), EEL 4712C (4) to EEL 4712 (3) and EEL 4712L (1), EEL 4713C (4) to EEL 4713 (3) and EEL 4713L (1).
### Table 3-43: Program Outcomes (Revised in Spring 2005)

<table>
<thead>
<tr>
<th>#</th>
<th>Computer Engineering Program Outcomes</th>
<th>Targeted Courses</th>
<th>Required Courses</th>
<th>Tech Elect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Recognize and apply concepts, principles and theories of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables</td>
<td>EEL 3112, 3135, EGM4313, MAS310, EGM 2500</td>
<td>EEL 3111, 3211, 3701, 3304, EEL 4834, CIS 3020</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Recognize and apply concepts, principles and theories of core computer engineering topics: basic circuit analysis, electronics, digital logic design, and computer programming.</td>
<td>EEL 3304, 3303L, 4304L, 4712C, 4834, COP 3530</td>
<td>4750, COP 4020</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of computer engineering problems</td>
<td>EEL 3135, 3472, 4514</td>
<td>4242C, 4445</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Apply knowledge of mathematics, science, and engineering to the analysis of computer engineering problems</td>
<td>EEL 3303L, 3701L, 4744L, 4306L, 4514L</td>
<td>3473, EIN 4354</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Design and conduct scientific and computer engineering experiments, as well as to analyze and interpret data</td>
<td>EEL 4914C, 4306L, COP 4600</td>
<td>4213</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Recognize and apply concepts, principles and theories in probability and statistics, including computer engineering applications</td>
<td>EEL 4914C, 4306L, COP 4600</td>
<td>4213</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Identify, formulate, and solve novel computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements</td>
<td>EEL 4914C, 4306L, COP 4600</td>
<td>4213</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Function effectively on multi-disciplinary teams</td>
<td>EEL 4914C, 4657</td>
<td>4242</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Describe the ethical and professional responsibilities of the computer engineer. Make and defend ethical judgments in keeping with professional standards.</td>
<td>EGN 4034, CEN 3031</td>
<td>EEL 4515, 3473, EIN 4354</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Communicate effectively in writing and convey technical material through oral presentation of computer engineering topics and interaction with an audience</td>
<td>EGN 4034, EEL4914, ENC 3240</td>
<td>2413</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Describe the interrelatedness of contemporary issues in a global and society context with computer engineering solutions</td>
<td>EGN 4034, 4834</td>
<td>4445, 4663</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Justify the need for engaging in life-long learning in computer engineering</td>
<td>EEL 4914C, EGN 4034, CEN 3031</td>
<td>4750, 4445</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Recognize and apply concepts, principles and theories of discrete mathematics</td>
<td>EEL 3135, 3701C, COT 3100</td>
<td>COT 4400</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Recognize and apply concepts, fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and identify the interaction between hardware and software</td>
<td>EEL 4744C, 4713C, CDA 3101, COP 4600, CDA 3101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Describe and apply all the elements required to design a complete computer system (hardware and software)</td>
<td>EEL 4744C, 4713C, CDA 3101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.7.3 Examples of Teaching Improvements

The faculty of the department is dedicated to undergraduate education and strives to improve teaching and delivery of the curriculum so as to maintain or improve the quality of the engineering programs. The list of the course improvements is shown in Table 3-44 (see Page # 183).
## Table 3-44: COURSE IMPROVEMENTS FOR ELECTRICAL AND COMPUTER ENGINEERING

DEPARTMENT: Electrical and Computer Engineering  
Dated: February 15, 2005

<table>
<thead>
<tr>
<th>Course</th>
<th>Faculty</th>
<th>List the improvements you made since Spring 2003?</th>
<th>What are the results?</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL 3111</td>
<td>Harrell</td>
<td>New text for course Nilsson/Riedel. Allotment of time spent on basic circuit concepts increased due to pre-test evaluations. Developed web-site for students to gather pertinent information about assignments/solutions. Implemented Mathcad on all homework assignments and as option on tests. Incorporated both a writing assignment and research assignment into course.</td>
<td>Less student complaints about text. Better pre-test scores on circuit’s area. Meet partial fulfillment of ABET requirements for communication and research in life long learning. Web-site make for the only area for students to get course information/assignments/solutions; cuts down on communication errors.</td>
</tr>
<tr>
<td>EEL 3112</td>
<td>Manseur</td>
<td>Used new textbook. Old one was not popular with students. Introduced MathCad examples of Fourier series. Developed Class web site for ease of communication with students. Revised lessons for course delivery to remote classroom. Requested that students from remote sections email their scanned homework assignments.</td>
<td>Less student complaints about the choice of textbook. Students understand Fourier series better. Reduced student complaints about lost homework in the mail.</td>
</tr>
<tr>
<td>EEL 3135</td>
<td>Mathews</td>
<td>Used D2L web-based learning tool to post course materials for student access. Used Matlab to study discrete-time systems.</td>
<td>Students had better access to course materials. Simulation using Matlab gave students additional insight into the theories studied in class.</td>
</tr>
<tr>
<td>EEL 3211</td>
<td>Harrell</td>
<td>New text for course Glover/Sarma. Developed web-site for students to gather pertinent information about assignments/solutions. Implemented Mathcad on all homework assignments and as option on tests. Incorporated both a writing assignment and research assignment into course. Implemented field trips to local industry/utilities to see apparatus studied in class. Implemented in-class laboratories.</td>
<td>New for Summer 2005</td>
</tr>
<tr>
<td>EEL 3303L</td>
<td>Harrell</td>
<td>Incorporated both FWB and PNS instrumentation into laboratory assignments. Developed web-site for students to gather pertinent information about assignments/lab schedules. Implemented Mathcad into all math oriented work. Initiated computer generated report in research oriented format for laboratory reports.</td>
<td>Less complaints from FWB about lab assignments since labs include FWB instrumentation. One place to get information about scheduling and assignments. Eliminate math mistakes but not engineering mistakes.</td>
</tr>
<tr>
<td>EEL 3304</td>
<td>Bataineh</td>
<td>Developed new class notes. Maintained course, homework, and class note web pages to ease communication with students in remote delivery site.</td>
<td>The modified course content better meets today’s needs in electronic circuits design.</td>
</tr>
<tr>
<td>EEL 3701</td>
<td>Gilbar</td>
<td>Added more emphasis on sequential circuits.</td>
<td>Have not been able to test the results yet.</td>
</tr>
<tr>
<td>EEL 3701L</td>
<td>Gilbar</td>
<td>Developing a new sequential circuit lab that will be implemented in Fall 2004.</td>
<td>Have not been able to test the results yet.</td>
</tr>
<tr>
<td>EEL 4242</td>
<td>Rashid</td>
<td>Introduced design projects and Bloom’s Taxonomy based multiple choice type testings.</td>
<td>Developing skills for higher levels of critical thinking.</td>
</tr>
<tr>
<td>EEL 4304L</td>
<td>Bataineh</td>
<td>Introduced new lab experiments to better meets today’s needs in electronic circuits design and applications.</td>
<td>Better prepare students for today’s job market.</td>
</tr>
<tr>
<td>EEL 4306C</td>
<td>Gorman</td>
<td>Modified class notes for teaching distance learning. Posted selected handouts on Argus group mail and ECE ftp site gives better planning and</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Instructor</td>
<td>Description</td>
<td>Notes</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>-------------</td>
<td>-------</td>
</tr>
<tr>
<td>4306L EEL</td>
<td>Gorman</td>
<td>Modified Lab Experiments, split lab sections between FWB and Pensacola.</td>
<td>Coordination between lab and lecture difficult for this combined course with addition of FWB program and different instructor for lab and lecture. Students complain that lab should be a separate course.</td>
</tr>
<tr>
<td>4514 EEL</td>
<td>Gorman</td>
<td>Modified class notes for teaching distance learning. Posted selected handouts on ftp site. Used Argus to group mail students. Administered pre-tests.</td>
<td>Argus group mail and ECE ftp site gives better planning and material access for students.</td>
</tr>
<tr>
<td>4514L EEL</td>
<td>Gorman</td>
<td>Modified Lab Experiments. Taught labs using new spectrum analyzers</td>
<td>New spectrum analyzers make learning material much better.</td>
</tr>
<tr>
<td>4657 EEL</td>
<td>Manseur</td>
<td>Remote course delivery has forced changes in teaching methods. Developed power point lecture presentations. Established course, homework, and class notes web pages for ease of communication with students. Stopped collecting homework in response to constant student complaints about delays and loss due to mail system. Assign homework and provide solutions for individual study.</td>
<td>Less student complaints about computer screen hand-writing (with Power point presentations)</td>
</tr>
<tr>
<td>4657L EEL</td>
<td>Manseur</td>
<td>Developed new laboratory experiments</td>
<td>Simpler labs allow students more time spent on understanding the concepts</td>
</tr>
<tr>
<td>4663 EEL</td>
<td>Manseur</td>
<td>Developed new class notes</td>
<td>The visualization and computational software greatly enhance delivery and understanding of the material. Students have expressed great satisfaction for the new mobile robot projects.</td>
</tr>
<tr>
<td>4712 EEL</td>
<td>Khabou</td>
<td>Replaced old VHDL software with a more powerful and user friendly new one. Switched to a new textbook that covers VHDL in more depth. Increased the amount of HW dealing with VHDL. Allocated more class time to talk about design using components. Allocated more class time to talk about design of arithmetic circuits.</td>
<td>Students are writing better VHDL code Students are designing more complex circuits with relative ease</td>
</tr>
<tr>
<td>4712L EEL</td>
<td>Khabou</td>
<td>Brought new and more powerful boards to be used in testing circuits designed/simulated in VHDL. Designed new lab experiments to go with the new board. Replaced old VHDL software with a more powerful and user friendly new one.</td>
<td>Students are able to design and test more complex circuits than they could do previously Students are having easier time designing/simulating circuits with the new software</td>
</tr>
<tr>
<td>4713 EEL</td>
<td>Khabou</td>
<td>Replaced old VHDL software with a more powerful and user friendly new one. Allocated less class time to talk about VHDL and used to extra time to talk more about pipelining and control unit design.</td>
<td>Students efficiency in VHDL did not seem to be affected since they can get lots of VHDL practice in the lab Better student understanding of control unit design, pipelining and memory hierarchy Having a copy of the instructor’s notes seems to help students focus better in class in stead of worrying about taking notes</td>
</tr>
<tr>
<td>4713L EEL</td>
<td>Khabou</td>
<td>Introduced new and more powerful board. Designed new lab experiments to go with the new board. Replaced old VHDL software with a new more powerful one.</td>
<td>Students can now design and test more complex circuits using the new board and software</td>
</tr>
<tr>
<td>4744 EEL</td>
<td>Khabou</td>
<td>Allocated more time to talk about interrupts</td>
<td>Noticed better student understanding of resets/interrupts</td>
</tr>
<tr>
<td>Course</td>
<td>Instructor</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>EEL 4744L</td>
<td>Khabou</td>
<td>Allocated more time to talk about serial communication. Created new power point presentation with numerous serial communication examples. A slightly better student understanding of serial communication. Due to time constraints, I don’t think we can spend more class time on this subject.</td>
<td></td>
</tr>
<tr>
<td>EEL 4750</td>
<td>Mathews</td>
<td>Introduced new lab experiments where students have to use interrupts. Noticed better student understanding of resets/interrupts.</td>
<td></td>
</tr>
<tr>
<td>EEL 4751</td>
<td>Mathews</td>
<td>Used D2L web-based learning tool to post course materials for student access. Used Matlab to study discrete-time systems and design digital filters. Students had better access to course materials. Students learned to use state of the art software tools for digital signal processing system design.</td>
<td></td>
</tr>
<tr>
<td>EEL 4834</td>
<td>Khabou</td>
<td>NA: This is a new course; it was taught for the first time in fall 2004.</td>
<td></td>
</tr>
<tr>
<td>EGN 4034</td>
<td>Rashid</td>
<td>Assigned a textbook and readings, required format presentations and teamwork, required quizzes, and self-study report. Improvements in written and oral presentation skills, formal assessments through quizzes, different ethical dimensions and ability to analyze ethical cases studies.</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Course</td>
<td>Instructor</td>
<td>Assessment Methods</td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>1</td>
<td>EEL4930</td>
<td>Khabou</td>
<td>Successfully completing the hw assignments which involves designing and implementing image processing algorithms using Matlab.</td>
</tr>
<tr>
<td>2</td>
<td>EEL3211</td>
<td>Harrell</td>
<td>Final Exam</td>
</tr>
<tr>
<td></td>
<td>EEL3701</td>
<td>Gilbar</td>
<td>Final Exam</td>
</tr>
<tr>
<td>3</td>
<td>EEL4304L</td>
<td>An</td>
<td>•Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering. •Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data. •Students will obtain an ability to communicate effectively.</td>
</tr>
<tr>
<td></td>
<td>EEL4306C</td>
<td>Gorman</td>
<td>lab 8 filter design grade&gt;7/10</td>
</tr>
<tr>
<td></td>
<td>EEL4713L</td>
<td>Gilbar</td>
<td>Lab #3</td>
</tr>
<tr>
<td></td>
<td>EEL4713L</td>
<td>Khabou</td>
<td>Students must complete/demonstrate all 10 labs which require the use the Quartus software, an Altera CPLD/FPGA board and a scope/logic analyzer. Students are required to write a report for every lab they complete.</td>
</tr>
<tr>
<td></td>
<td>EEL4744L</td>
<td>Gilbar</td>
<td>Lab #5</td>
</tr>
<tr>
<td></td>
<td>EEL4834</td>
<td>Khabou</td>
<td>successful completion of programming assignments</td>
</tr>
<tr>
<td></td>
<td>EEL4930</td>
<td>Khabou</td>
<td>Successfully completing the hw assignments which involves designing and implementing image processing algorithms using Matlab.</td>
</tr>
<tr>
<td>4</td>
<td>EEL3472</td>
<td>Avant</td>
<td>Students having less than the pre-requisite skill levels in the vector calculus were developed to the needs of the course through frequent testing.</td>
</tr>
</tbody>
</table>
Tests were short-subject followed by full-span comprehensive exams. Tests were balanced between closed book memorization based short problems and open book indepth multi-part problems. This enabled the students to develop the necessary math skills in a modular fashion thereby facilitating their comprehension of the advanced material in the later phases of the course course.

<table>
<thead>
<tr>
<th>Course</th>
<th>Instructor</th>
<th>Assessment</th>
<th>Requirement</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3701</td>
<td>Gilbar</td>
<td>Final exam</td>
<td>28/40 (70%) on final exam, minimum C grade in the course</td>
<td>77%</td>
</tr>
</tbody>
</table>

5. EEL3701L An Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering. Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data. Students will obtain an ability to communicate effectively.

<table>
<thead>
<tr>
<th>Course</th>
<th>Instructor</th>
<th>Assessment</th>
<th>Requirement</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL4514L</td>
<td>Gorman</td>
<td>FM lab grade 7/10 or better</td>
<td>FM lab</td>
<td>100</td>
</tr>
<tr>
<td>EEL4713L</td>
<td>Gilbar</td>
<td>Lab #3</td>
<td>60% or better on lab #3, minimum of a C in the lab</td>
<td>100%</td>
</tr>
<tr>
<td>EEL4713L</td>
<td>Khabou</td>
<td>Lab #3</td>
<td>Students must complete/demonstrate all 10 labs which require the use the Quartus software, an Altera CPLD/FPGA board and a scope/logic analyzer. Students are required to write a report for every lab they complete.</td>
<td>89</td>
</tr>
<tr>
<td>EEL4744L</td>
<td>Gilbar</td>
<td>Lab #5 and overall grade</td>
<td>Minimum of 60% on lab #5, minimum of a C in the course.</td>
<td>100%</td>
</tr>
</tbody>
</table>
3.7.4 Examples of Technical Service Improvements

- The Department has established an on-going program to maintain current software applications that are used in the Program. All software is updated on an annual basis or more often.
- ArgoAir wireless network access is available in the engineering building and on most of the Pensacola UWF campus, and in the library and computer buildings at the Fort Walton Beach campus. A plan is in place to continue expanding wireless coverage.
- MATLAB and MathCAD and Altera software usage is controlled by a central license manager, which enables students with laptop and tablet computers to make use of the software from any location on-campus.
- ECE students are highly encouraged to purchase tablet computers.
- New processes have been implemented for paperless flow of course information, student homework, lab reports and examinations; between students and faculty. This has significantly speeded up the flow of information and eliminated missing and misrouted paperwork.
- The ECE Department has an on-going process of upgrading laboratory facilities as old equipment becomes obsolete, new technology becomes available, and the student load increases. Examples in the current academic year are:
  - In the Digital/Computer Engineering lab 16 logic analyzers and 16 oscilloscopes were replaced with new items, and 16, 300MHz computers were replaced with 1 GHz computers.
  - In the Communications/Controls Lab, three additional workstations were added, five spectrum analyzers and five oscilloscopes were replaced with new items, and eight new computers were installed.
  - In the Senior Design and Robotics labs, five 600MHz computers were replaced with four 2.4 GHz and two 2 GHz computers.

3.7.5 Examples of Administrative Student Service Improvements

- Installation of a student suggestion box. Students are given an opportunity to suggest changes and point out problems in a way that allows them to remain anonymous.
- UF Dean’s office invites honors students to do an honors project late in the term. As a result, The department alerts qualified students so that they may get started on a project before UF contacts them.
- A new GPA grid (Exel Spreadsheet) was created so that the student can understand the grading system.
- The GPA grid also established a quicker system to identify honor students.
- A full time receptionist was employed to better serve the students and the faculty.
- The UF and The department exit interview surveys were updated to better associate the student with the co-op program.
- A calendar of deadlines with UF was created to facilitate a faster delivery of student records to UF.
- A grid advising-sheet (in Appendix IV, Section A) was also established to show the student what classes to take and when to take them.
- The grid also gave the student a working sheet to enter his or her grades.
- An ECE pre-certified graduation form was established to alert students to any problems in graduating.
- The department is more involved with the senior banquet. Representatives from different companies at the banquet award Scholarship Certificates; as a result, the department gives the IEEE Student Chapter advice and an opportunity to utilize the program’s equipment and supplies.
- Students may call at any time and leave a phone message on the new phone system.
• All ECE students and alumni receive a correspondence each year with updates of the program.
• Names of companies where Alumni work are recorded in a flyer, along with the growth of the size of
  the student population in The department.
• Students have more accessibility to computers outside office hours to include providing the IEEE with
  a donation to maintain the computer rooms beyond the regular office hours.
• IEEE members improved the student study room by painting and expanding the room to help in
  allowing more student utilization of the space.
• The Student Branch of IEEE is very active in organizing tours of local industries and helps to locate
  volunteers for student recruitment through tours of labs and facilities.
• The IEEE students also organize two semi-annual cookouts in order to display the robot used in the
  IEEE Southeast Conference Student Hardware Competition and to involve all other ECE students in
  an ongoing process of participation with the robot competition.

3.8 Summary of Criteria 3.0

The electrical engineering program has in place the following:

(a) A curriculum and processes to produce the program outcomes
(b) An assessment process that the program outcomes are being measured and assessed.
(c) A process of ongoing evaluation and the result are used to develop and improve the program
    outcomes.

The results of different assessment tools (as shown in Fig. 3-24) indicate that the program outcomes are
achieved beyond the benchmark of 80% or better. The variations between the highest and lowest
achievements are wide in outcomes # 7 (70%), 8 (45%), 9 (60%), 10 (55%) and 13 (90%). The ECE
department plans to monitor the results and takes appropriate actions to reduce the variations and make
improvements on others. Changes to be made include the following:

• Pre-tests for improvements at the course level (see Table s 3-17 in page # 140, 3-18 in page # 141
  and 3-44 in page # 183)
• Archive the EEL course syllabi in every semester to maintain uniformity among instructors.
• Monitor class performance by monitoring the % of C or better grade in the class (see Tables 3-12
  & 3-13) and the % of outcome achievements in the class (see Table 3-43)
• The revision of in Table 3-1and implementation of the outcomes shown in Table 3-42 (see Page #
  180).
• Revise the Graduating Senior Information Questionnaires to include computer engineering
  outcomes # 14 ands 15.
• Revise the item #14 in Exit Interview Questionnaires to ask directly the program objectives.
• Full implement the student portfolios to demonstrate 100% compliance of all outcomes by at least
  two courses (see Tables 3-40 and 3-41)

3.9 Materials Available for Review under Criteria 3.0

The department has established an assessment process, which is used for continuous improvement of the
undergraduate programs and the department’s educational operations. The process involves listing the
program education objectives and program outcomes that have been identified. It is intended to be a
working notebook. The documentation includes following reports:
Summary Results and Raw Data of Exit Interview Questionnaires
Summary of Faculty assessments and Raw Data of senior design projects
Summary of Faculty assessments and Raw Data of sample course folders
Results of Course/Teacher Assessments
Minutes of ECE Curriculum Committee meetings
Summary Results and Raw Data of Co-op Employer Evaluations
Pre-Tests Questions and Summary of the Results
Focus Interview Guide and Coordinating Procedure
The Florida Board of Regents (BoR) Reviews
Summary of Course Outcome Assessments
4. Professional Component

The program meets the math and basic sciences, engineering science and design, general education, and major design experience requirements of Criterion 4. In Appendix I, Table 1 shows the Plan of Study, that is, the courses in the order in which they should be taken in the curriculum. In Appendix I, Table 2, Course and Section Size Summary, provides information about the number of sections and average section size for each undergraduate electrical engineering course. Students are required to have a combined grade point average of 2.5 or higher in the pre-professional courses (chemistry, calculus, physics, and biological science) and make a grade of ‘C’ or higher in each electrical or computer engineering course which is a prerequisite for another electrical or computer engineering course. The How-Tables in Appendix III describe how the program outcomes are met and what topics are covered in different courses to achieve the program outcomes.

The computer engineering program includes the following components;
1. At least one year of a combination of college level mathematics and basic sciences including three (3) labs in CHM 2045L – General Chemistry I, PHY 2048 L University Physics I Lab, and PHY 2049 L University Physics II Lab.
2. At least one and one-half years of engineering topics, consisting of engineering sciences and engineering design related to electrical engineering. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the Senior Design Project course.
3. General education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.
4. Major Senior Design Project course which is based on the knowledge and skills acquired in earlier course work and incorporates appropriate engineering standards and multiple realistic constraints to meet desired needs.

4.1 Math and Basic Sciences

The curriculum requires in excess of one year a combination of college level mathematics and basic sciences. The required courses alone meet Criterion 4 for math and basic sciences. Students take at least 15 credits in basic sciences and at least 19 credits in math. These courses total 37 credits, excluding any technical electives. This is 5 credits above the one year minimum required by Criterion 4 (32 credits equal to one year). Two physics laboratory courses and one chemistry laboratory course provide experimental experience in the basic sciences. Students take the following courses:

- Calculus (MAC 2311, 2312, and 2313): 12 credits
- Differential equations (MAP 2302): 3 credits
- Mathematical Statistics (STA 4321), 3 Credits
- Linear Algebra (MAS 3105)): 3 credits
- Physics (PHY 2048, 2049L, 2049, and 2048L): 8 credits
- Chemistry (CHM 2045 and 2045L): 4 credits
- Physical or biological sciences (CHM 2046 or alternatives): 3 credits
- Discrete mathematics in COT 3100 - App. of Discrete Structures
- COP3530 - Data Structures & Algorithms

At the same time, students learn and apply advanced math in required electrical engineering courses (EEL 3111, EEL 3112, and EEL 3135).
4.2 Engineering Topics

Engineering Topics are covered in several courses, including basic electrical engineering courses in circuits and digital design. The basic science courses are followed by engineering courses in statics, dynamics, electromagnetics, circuit analysis, electronic devices, digital systems, and microprocessor applications. In addition to a circuit course (with a laboratory) covering basic DC, AC and analog circuits, students take four courses in digital logic and computer hardware. EEL 3701C - Introduction to Digital Systems deals with design of components and how to arrange them into larger functional units. In EEL 4712C - Digital Design, students learn advanced logic design using programmable logic devices. EEL 4744C - Microprocessor Applications allows students to build and program an application-specific system, combining both hardware and software.

The required computer engineering courses provide depth in the foundation of engineering topics and design. In CIS 3020 - Introduction to CIS students are required to design and implement many relatively small programs or program fragments placed in an existing context to solve specific problems and learn particular approaches and principles. CDA 3101 - Introduction to Computer Organization teaches students how a computer is built at the component level, and how higher level system abstractions are layered on top of the raw machine.

Circuit and electronic device theory is covered by the following required courses: EEL 3111 - Circuits 1, EEL 3303L - Electrical Circuits Laboratory, EEL 3135 Discrete-time Signals & Systems, EEL 3304 - Electronic Circuits1, EEL 4304L - Electronics Laboratory, and EEL 3396 - Solid State Electronic Devices. EEL 3396 includes the general engineering component. These courses provide the student with an understanding of the device physics and linear/non-linear circuit theory underlying the design of digital and computer hardware. They also provide the foundation for further study in digital integrated circuit design (a technical elective) and other topics in electrical engineering that impact the domain of electrical engineering.

The required courses alone provide an excellent coverage of analog and digital topics relating to computer engineering. The engineering science topics in the program are primarily in engineering and in computer engineering. Design experience is integrated throughout the required electrical engineering curriculum culminating in a major design experience in the course EEL 4914C – Electrical Engineering Design. Additional design experience occurs in the technical electives. The required courses meet Criterion 4 for engineering topics. Students take 85 credits of engineering topics; 56 of which are in required courses and 12 credits of which are through required EEL/CS technical electives. The program meets the 48 credit minimum criterion in the required courses alone.

4.3 General Education Component

The general education component complements the technical content of the curriculum and is consistent with the program and UWF objectives. The UWF General Education requirements include the following:

1. General Studies requirements
2. Foreign language requirement
3. Writing requirements

These general education requirements provide an appropriate combination of breadth, depth, and freedom to the student. The general education component of the program relates to Objective # 5 and outcomes # 9, 10 and 11 of the computer program, which is for the student to understand the ethical, legal, and social issues in the computing discipline, and in the engineering discipline in general.
4.3.1 General Studies requirements

Students must satisfy the general studies requirements of the University of West Florida. The details of the UWF general education requirements can be found in UWF catalog on web-site\(^4\). Students with an A.A. degree from a Florida public community college or Florida SUS institution are considered to have met the General Studies requirements.

The requirements include 6 credits in English composition, and 15 credits of humanities and social sciences with a 3-credit course in each area of historical perspectives, behavioral perspectives, socio-political perspectives, contemporary values and expressions, and literature/fine arts. The general education requirements should cover the four (4) Academic Learning Compacts (ALCs) as shown in Table 4-1. Students should achieve one or more elements in each of the 4 ALCs. Although, it is not required to satisfy the UWF general education requirements, the Department recommends and advises all engineering students to take the following courses.

- ECO2013 - Economics for Social Sciences
- EUH 1001 - Western Perspectives II for Social Sciences
- PHI2603 - Ethics for Humanities

Table 4-1 Academic Learning Compacts (ALCs)

<table>
<thead>
<tr>
<th>Critical Thinking</th>
<th>Communication</th>
<th>Values/Integrity</th>
<th>Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis/Evaluation Skills</td>
<td>Writing/Verbal</td>
<td>Academic Integrity</td>
<td>Project Planning</td>
</tr>
<tr>
<td>Exhibit discipline-based</td>
<td>Communicate effectively and</td>
<td>Practice appropriate standards related to</td>
<td>Apply discipline-based knowledge to design</td>
</tr>
<tr>
<td>higher order thinking skills</td>
<td>persuasively in multiple writing modes</td>
<td>the respect for intellectual property</td>
<td>a problem-solving strategy</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>Speaking/Oral</td>
<td>Personal Values Expression</td>
<td>Self-Regulation</td>
</tr>
<tr>
<td>Solve discipline-based</td>
<td>Communicate effectively and</td>
<td>Articulate own values and</td>
<td>Exhibit disciplined work</td>
</tr>
<tr>
<td>problems using conventional</td>
<td>persuasively in multiple speaking modes</td>
<td>describe how they influence</td>
<td>habits as individual</td>
</tr>
<tr>
<td>contexts</td>
<td></td>
<td>personal decisions</td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>Interpersonal Communication</td>
<td>Ethical Reasoning</td>
<td>Team Work Skills</td>
</tr>
<tr>
<td>Produce novel approaches in</td>
<td>Communicate effectively in one-on-one contexts</td>
<td>Develop and maintain defensible ethical</td>
<td>Exhibit effective</td>
</tr>
<tr>
<td>disciplinary contexts</td>
<td></td>
<td>positions in moral challenges</td>
<td>collaboration skills</td>
</tr>
<tr>
<td>Information Literacy</td>
<td>Quantitative Reasoning</td>
<td>Civic Engagement</td>
<td></td>
</tr>
<tr>
<td>Select credible evidence to</td>
<td>Use mathematics to assist in problem solving</td>
<td>Make a difference in a concern related to</td>
<td></td>
</tr>
<tr>
<td>support arguments</td>
<td></td>
<td>the broader context</td>
<td></td>
</tr>
<tr>
<td>Technological Literacy</td>
<td></td>
<td>Diversity Skills</td>
<td></td>
</tr>
<tr>
<td>Use technology effectively for a</td>
<td></td>
<td>Interact effectively with</td>
<td></td>
</tr>
<tr>
<td>variety of purposes</td>
<td></td>
<td>individuals who do not share your</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>heritage</td>
<td></td>
</tr>
</tbody>
</table>

4.3.2 Foreign language requirement

This is required for graduation that students must meet the foreign language requirement. Florida Statutes require that students admitted to an SUS institution meet the foreign language requirement for demonstrating competency in a foreign language. This requirement is strictly enforced through the SASS Audit for graduation certification.

\(^4\) Refer to [http://uwf.edu/catalog/acad.htm](http://uwf.edu/catalog/acad.htm)
Students who have earned an A.A. degree from a Florida public community college may be admitted to the upper division but must demonstrate competency prior to graduation with a baccalaureate degree. Competency may be demonstrated in the following ways:

A. Earning two credits of a single foreign language in high school or one credit in high school and the second semester (four semester hours) of the same foreign language at an accredited post-secondary institution.
B. Satisfactory completion of two semesters (8-10 semester hours) of a single foreign language at a post-secondary institution prior to admission to UWF. Grades of "P" are acceptable for this requirement.
C. Satisfactory completion of two semesters (8-10 semester hours) of a single foreign language at UWF. Grades of "P" are acceptable for this requirement.
D. Successful completion of the following tests with appropriate test scores:
   1. CLEP subject matter examinations.
   2. MAPS-Latin examination published by the College Entrance Examination Board.

Students completing 8-10 semester hours of American Sign Language with passing grades will have satisfied the foreign language admission requirement.

4.3.3 Writing requirements

Students must meet the writing requirements (Gordon Rule). Florida Statutes require that students admitted to an SUS institution should fulfill the writing requirement by completing 12 semester hours of English or humanities course work with 24,000 written words. This requirement relates to program outcome # 10 on communication skills. In addition, the program also requires ENC 3240 – Technical Writing as the program requirements.

4.4 Major Engineering Design Experience

The program has a logical sequence of courses. After a solid background in mathematics and science, the program starts students on the major track with a problem-solving course that emphasizes the engineering science needed for later engineering design topics. First, it provides a foundation in circuit analysis and electronic devices along with the fundamentals of digital logic circuits. Next, it builds on this foundation with problems solving skills in analog and digital circuits. At the same time, it provides a thorough background for the analysis and design of electronic, digital and communication circuits and systems. The labs integrate the hands-on experience in a formal way, and the senior engineering design course requires students to utilize all the things they have learned in a significant project.

4.4.1 Foundation Courses for Design

The required computer engineering courses provide depth in the foundation of engineering topics and design. In EEL 3111– Circuits 1, students learn important concepts of AC and DC electrical circuits, and in EEL 3303L – Electrical Circuits Laboratory they exercise what they have learned in the design, implementation and testing of various (primarily linear) circuits.

EEL 3701C - Introduction to Digital Systems covers logic design and how to build and assemble basic components of a computer system. It includes a significant laboratory experience that allows the students to put their academic designs into practice, and many of the more advanced courses build on this knowledge and the skills developed in this course. EEL 4744C - Microprocessor Applications builds on
both EEL 3701C and on the Circuits course. In this course students design and build a computer-based system from lower level components and program it to perform some applications. **EEL 4712C - Digital Design** builds on EEL 3701C with advanced logic design, providing additional laboratory experience in design and implementation of more complex digital components

In **EEL 3304 –Electronic Circuits** and its associated laboratory, EEL 4304L, students build and characterize circuits which include diodes, op-amps, FETs, and BJT's, which provides them with basic analog electronic circuit design and analysis skills. The electrical engineering elective courses cover a range of specific engineering topics.

In **CIS 3020 - Introduction to CIS** students are required to design and implement many relatively small programs or program fragments placed in an existing context to solve specific problems and learn particular approaches and principles. This course is the basis for most of the remaining courses in the program, including many focusing primarily on computer hardware.

**CDA 3101 - Introduction to Computer Organization** teaches students how a computer is built at the component level, and how higher level system abstractions are layered on top of the raw machine. Its extensive laboratory requirements have the students exercise their design abilities at the hardware/software interface.

Software design experience is based on the engineering science taught in **CIS 3020 - Introduction to CIS**. Good programming practice and design techniques are taught throughout the curriculum, starting with this course. **COT 3100 - Applications of Discrete Structures** provides students with the necessary mathematical concepts, techniques and paradigms to prepare them for the subsequent courses. The concepts taught in Introduction to CIS and in Applications of Discrete Structures are used repeatedly throughout the remainder of the curriculum. **COP 3530 - Data and Program Structures** requires students to apply these concepts to design, analyze and implement specific data structures within the context of larger problems. This course provides students with the building blocks they will use in software design, as well as the knowledge of how to design, analyze and implement new building blocks. Larger programs and software design principles are the focus of the hands-on part of **CEN 3031 - Introduction to Software Engineering**. In this course, the principles of software engineering and programming in the large are taught.

**COP 4600 - Operating Systems** teaches not only operating systems concepts and systems programming but requires students to understand and modify a functional operating system. This is a complementary exercise to that of **CEN 3031 - Software Engineering**. Code maintenance is likely to be a significant part of the experiences that our graduates will encounter in the working world. Also, it represents a substantial fraction of the software life cycle; therefore, it is equally important. Over the course of the required curriculum, students design and implement software at all levels from components to large programs and maintain a large program. In addition, they work both individually and collectively in teams. Together the software-oriented courses provide the primary elements necessary for a strong background in software design, analysis, development, and maintenance.

### 4.4.2 Senior Design Project

Each student is required to go through a major design experience through the required course **EEL 4914C – Electrical Engineering Design**. In EEL 4914C, each student is usually a member of a design group, which consists of two or three students. This group completes a design project to specifications. The student does have the freedom to choose his/her own design project.
Design has been progressively developed and organized into a standard industrial practice format which includes preliminary design review, critical design review, oral presentation and final documentation in a report form.

The exposure to engineering ethics and factors in professional practice is accomplished through the required course EGN 4034 – Professional Ethics, and student's participation in professional societies such as the Institute of Electrical and Electronics Engineers (IEEE).

### 4.4.3 Engineering Standards and Constraints

The engineering standards and realistic constraints are incorporated into the senior design project. Table 4-2 shows the examples of senior design projects incorporating these requirements. A typical calendar for EEL 4914C is shown in Table 4-2. The design and final report requirements include sections:

- **Design objectives** – This subsection summarizes the major design objectives of the project
- **Design constraints** – This subsection summarizes the standards and major constraints that were considered during the design and implementation such as economical, environmental, social, political, ethical, health, safety, manufacturability, and sustainability.

The faculty evaluations of the professional components toward meeting the ABET criteria in EEL 4914 – Senior Design is shown in Tables 3-15(a) & 3-15(b) (see page # 131 & 132).

The outcome scores are low in outcome #1 on applications of advanced math (because some projects do not apply too much advanced math), outcome # 6 on probability and statistics (because some projects do not use probability and statistics), and outcome # 8 on multidisciplinary teams (some projects are as an individual project due to work conflict in working as a team).

In order to improve the professional skills and formalize incorporation of engineering standards and constraints, the department has initiated two sequence senior design courses, effective fall 2006 or 2007 depending on the completion of the course review process for assigning the State-wide course numbers.

**Capstone Design EGN 4xx1 (1 credit)**

**Course** Preliminary work on senior design project. This portion of the senior design will focus on the objectives and criteria, synthesis, and analysis elements of project development. After developing design concepts, researching for implementation methods, and performing a feasibility study (which will include economic, social, ethical, etc. factors), the semester will culminate with a senior design project proposal and presentation. Permission is required.

**Prerequisites:** Senior standing/permission required; ECN 3240 with a grade of C (2.0/4.0) or better

**Capstone Design EGN 4xx2 II (2 credits)**

**Course** Continuation of Capstone Design I, with emphasis on construction, testing, and evaluations elements of project development. Material and supply fee will be assessed. Permission is required.

**Prerequisites:** EGN 4XX1 Capstone Design I with a grade of C or better
The finished products of two senior design projects are shown in Figures 4-1 to 4-3 (see pages # 201 & 202). Table 4-3 lists the standards and specifications of these projects.

Figure 4-1 shows the project on Autonomous Recovery of Targets. A robot was designed that is capable of autonomously detecting and retrieving small, spherical metallic targets with no prior knowledge of the target's exact location. This was accomplished by utilizing a camera and vision processing board to locate the various landmarks and target locations. Ground sensors were used to control the position of the robot as well as to prevent it from leaving the playing surface. Object-avoidance sensors were used to prevent the robot from colliding with the other team's robot. The robot was designed to detect the activation of an infrared starting signal. Following target retrieval, the robot was programmed to return to its starting position and signal the end of its task by illuminating a blue LED located near the top most point of its chassis.

Figure 4-2 shows the PostalPro: Automated Email Notification Device. The PostalPro automates the email process in one vein by telling a user how many email messages are waiting to be downloaded, letting the user decide if he or she wants to go online and read the messages. The PostalPro, at the second push of a button, automatically connects to the internet, logs into an email server, checks how many email messages are available, disconnects, and displays how many email messages are waiting. After a short time, it turns itself off, and retains the number of unchecked messages. If the user missed the final display or left before seeing the message, he need only push the button again, waking up the PostalPro and displaying the number of messages from the last retrieval. The PostalPro utilizes the fundamentals of digital microprocessor design, including serial communication, multiple input and output mediums, and combinational logic design. The project also deals with power and the use of embedded systems to connect and communicate with the internet.

Figure 4-3 shows the 3D Surface Plotter: The product designed and built can maneuver itself along the x and y planes from a distance while a laser rangefinder gathers z-plane data. The platform is mobilized by the use of stepper motors and a microprocessor board. The points are all collected into a computer and the 3-D surface image is then graphed on the screen. The laser proved valuable for having a serial port connection. The serial connection allowed for direct interface with a computer. However, the resolution of the 3-D surface graph was restricted only by the laser’s limitation of +/- two inches.
Table 4-2: Typical Calendar for EEL 4914C, Spring 2005

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 January</td>
<td>Orientation meeting, 8:00AM, Room 106</td>
</tr>
<tr>
<td>19 January</td>
<td>Design proposals due to coordinator and mentor</td>
</tr>
<tr>
<td></td>
<td>One page, typed including all design specifications</td>
</tr>
<tr>
<td>21 January</td>
<td>Class meeting, 8:00AM, Room 106</td>
</tr>
<tr>
<td></td>
<td>Preliminary design review (see students' handbook)</td>
</tr>
<tr>
<td></td>
<td>Students must bring in their patent-style notebook</td>
</tr>
<tr>
<td>21-24 February</td>
<td>Critical design review (see students' handbook)</td>
</tr>
<tr>
<td></td>
<td>Scheduled with mentor &amp; coordinator</td>
</tr>
<tr>
<td></td>
<td>Mentor must sign the critical design grade sheet</td>
</tr>
<tr>
<td>25 February</td>
<td>Class meeting, 8:00 AM, Room 106</td>
</tr>
<tr>
<td></td>
<td>Critical design grade sheets are due</td>
</tr>
<tr>
<td></td>
<td>Students must bring in their patent-style notebook</td>
</tr>
<tr>
<td>11-15 April</td>
<td>Project demonstration/test</td>
</tr>
<tr>
<td></td>
<td>Scheduled with mentor and course coordinator</td>
</tr>
<tr>
<td></td>
<td>Students must bring in their patent-style notebook</td>
</tr>
<tr>
<td>18-22 April</td>
<td>Final acceptance</td>
</tr>
<tr>
<td></td>
<td>Mentor must sign the final approval grade sheet</td>
</tr>
<tr>
<td></td>
<td>Students must bring in their patent-style notebook</td>
</tr>
<tr>
<td>27 April</td>
<td>Final reports, final mentor approval sheets, and the patent-style notebooks are due</td>
</tr>
<tr>
<td>29 April</td>
<td>Final presentations and project demonstrations</td>
</tr>
</tbody>
</table>

EEL 4914C SENIOR DESIGN PROJECTS - SPRING 2005

PRESENTATION REQUIREMENTS

1. INTRODUCTION

One important skill any engineer must acquire is effective communications with others. An engineer's job may include technical communications with other fellow engineers, or may have to communicate with non-engineers who have little or no experience in engineering. There are specific requirements we ask our students to follow in preparing their final presentations.

2. OUTLINE OF PRESENTATION CONTENT

All presentations must be Power Point prepared. Each presentation will be limited to a maximum of 10 minutes. All team members must participate. The presentation is expected to at least include the following sections:

2.1 Project Title:

The title of the project should be descriptive but reasonable in length.

2.2 Names:
The names of the project team members and faculty mentor shall all be provided.

### 2.3 Abstract:

The abstract for the project shall be included, and should briefly describe the technical aspect of the project design and final results. It should be similar to that in the proposal and final report, except for possible shortening.

### 2.4 Presentation Outline:

The presentation outline is required to include the following sections:

#### 2.4.1 Introduction:

- Problem/Need – This subsection shall summarize the problem area/product need in a non-technical manner.
- Intended user(s) and use(s) – This subsection shall summarize the intended user and intended uses.
- Assumptions and limitations – This subsection shall summarize the major assumptions and limitations of the project.

#### 2.4.2 Design Requirements:

- Design objectives – This subsection shall summarize the major design objectives of the project.
- Design constraints – This subsection shall summarize the major constraints that were considered during the design and implementation such as economical, environmental, social, political, ethical, health, safety, manufacturability, and sustainability.

#### 2.4.3 End-Product Description:

This shall be a one-paragraph description of the commercialized end product. It shall be in the form of a technical product announcement.

#### 2.4.4 Technical Approach:

This section shall summarize the technical approaches used for the design. This section often includes block diagrams, flow charts, schematics, etc.

#### 2.4.5 Testing Approach:

This section shall summarize the testing approach used.

#### 2.4.6 Budget Effort:

This section shall indicate the actual budget of the project.

#### 2.4.7 Final Product/Project Results:

This section shall describe the final design or product achieved. It should document the product/design performance in comparison to the design specification. This section may also discuss areas or ideas for future improvement. Photographs of the final product may be appropriate in this section.

#### 2.4.8 References: (If required by content)

This section shall provide citations of sources of any protected material used in the presentation.
Figure 4-1: Autonomous Recovery of Targets (Spring 2005)
Figure 4-2: The PostalPro: Automated Email Notification Device (Spring 2005)

Figure 4-3: 3D Surface Plotter (Spring 2006)
<table>
<thead>
<tr>
<th>Students</th>
<th>Faculty Mentor</th>
<th>Design Project</th>
<th>Constraints</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brett Henne &amp;</td>
<td>Dr. Manseur</td>
<td>Autonomous Recovery of Targets</td>
<td>The goal of the competition was to design a completely autonomous robot that had the ability to collect 5 randomly placed metallic balls on a predefined playing surface. The rules of the competition stated that the robot must be able to detect an infrared starting signal to indicate the start of a competition round. The competition was designed so that two robots from different universities competed for points on the same playing surface simultaneously. This requirement called for the implementation of either active or passive object avoidance. The robot was required to remain on the playing surface throughout the entire round and then return to a predefined finishing point.</td>
<td>Maximum Robot Dimensions: L=6&quot;, W=6&quot;, H=8&quot;  Completely Autonomous  Capable of detecting an infrared starting signal via an infrared L.E.D. mounted at the center of the starting square. Capable of object avoidance. Must incorporate active searching (i.e. no sweeping). May have a device that extends no more than 3&quot; from one side of the robot. Time limit to complete task - 5 minutes</td>
</tr>
<tr>
<td>Michael Santoro</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matthew Howell</td>
<td>Dr. Khabou</td>
<td>The PostalPro: Automated Email Notification Device</td>
<td>Communication over the internet is described by the IP Stack; it breaks up the different problems involved in transporting data from one computer to another. They consist of 4 layers. In essence, each of these layers can be considered as packets of data, consisting of start information (headers), data, and some contain stop information (trailers, or footers). Each layer's header and data is handed to the next layer down from abstraction, interpreted as the lower layer's data. This creates essentially embedded packets to be sent and received. The actual breakdown of all the bits of data, and the various interaction and recognition of data is slightly complex to be handled at the microprocessor level, especially given the small memory size of the 68HC11.</td>
<td>The POP3 protocol was the method considered for this project. MAP, which is the other major email retrieval protocol, was not considered due to its complexity, lack of popularity, and requirements for manipulation. POP3 is actually a series of ASCII command, issued to a POP3 server over port 1 loa and responses sent back are ASCII messages as well. A POP3 server can also be accessed and queried using the telnet protocol, making a telnet connection to the POP3 server address, specifying the port as 110 (telnet's usual port is port 23 [5]). The server can then be queried by sending the POP3 ASCII commands over the telnet connection. It is worthy to note that POP3 and telnet are two completely separate and distinct protocols.</td>
</tr>
<tr>
<td>Melinda Al Banna</td>
<td>Dr. Andreas Fuchs</td>
<td>3D Surface Plotter</td>
<td>For this project a 3-D surface plotter was built. The product designed can maneuver itself along the x and y planes from a distance while a laser rangefinder gathers z-plane data. The platform is mobilized by the use of stepper motors and a microprocessor board. The points are all collected into a computer and the 3-D surface image is then graphed on the screen. The laser proved valuable for having a serial port connection. The serial connection allowed for direct interface with a computer. However, the resolution of the 3-D surface graph was restricted only by the laser’s limitation of +/- two inches.</td>
<td></td>
</tr>
<tr>
<td>Tony Rodriguez</td>
<td>Dr. Thomas Gilbar</td>
<td></td>
<td>The platform designed is capable of scanning a simple object within a 1” by 1” area autonomously. As the laser rangefinder scans the object it measures a distance from the laser to the object, collects that point and maps it to an x-y grid that is used for plotting, it continues this process till the entire object is scanned.</td>
<td></td>
</tr>
</tbody>
</table>
4.5  Samples of Student Work

To verify that our program meets the professional requirements, samples of graded student work will be available for all required courses in the program and for most of the technical electives. Since the required courses amply meet the minimum engineering science and design criterion of 45 credit hours (1.5 years), we will provide samples of student work for the primary technical electives: all 3000 and 4000-level courses. Sample work will be available in the department. Student Portfolio that contains the samples of student outcome achievements through different courses will also be valuable.

4.6  Differences Between UF and UWF Programs

The Department uses some courses, which are only offered at UWF and hence, limits the choices of some required courses and technical electives. Students can not choose an area of specialization. The differences between the UF and Joint Program degree requirements for the Computer Engineering Program are listed in Table 4-4 (see page # 206). The differences between the Joint Program and the UWF degree requirements for the Computer Engineering Program after fall 2008 are listed in Table 4-5 (see page # 207).
### Table 4-4: Differences between UF and Joint Program Degree for Computer Engineering

<table>
<thead>
<tr>
<th>UF Degree Requirements</th>
<th>Credits</th>
<th>UWF Joint Program Degree Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genera Education</td>
<td>15</td>
<td>Genera Education</td>
<td>15</td>
</tr>
<tr>
<td>Mathematics: MAC 2311, MAC 2312, MAC 23141, MAP 2302</td>
<td>15</td>
<td>Mathematics: MAC 2311, MAC 2312, MAC 23141, MAP 2302</td>
<td>15</td>
</tr>
<tr>
<td>Physics: PHY 4048, PHY 4048L, PHY 4049 and PHY 4049L</td>
<td>8</td>
<td>Physics: PHY 4048, PHY 4048L, PHY 4049 and PHY 4049L</td>
<td>8</td>
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<td>CEN 3031 – Intro to Software Engineering (3)</td>
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<td>CIS 3020 - Introduction to CIS (3)</td>
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<td>CIS 3020 - Introduction to CIS (3)</td>
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<tr>
<td>COP 3530 – Data Structures and Algorithms (4)</td>
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<tr>
<td>COP 4600 – Operating Systems (3)</td>
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<td>COP 4600 – Operating Systems (3)</td>
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<tr>
<td>COT 3100 – Applications of Discrete Structures (3)</td>
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<td>COT 3100 – Applications of Discrete Structures (3)</td>
<td></td>
</tr>
<tr>
<td>STA 4321 – Mathematical Statistics I (3)</td>
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<td>MAS3114 – Computational Linear Algebra</td>
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<td>EEL 3304C – Electronic Circuits I (4)</td>
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<td>EEL 3396 – Solid-State Devices (3)</td>
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<td>EEL 3396 – Solid-State Devices (3)</td>
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<td>EEL 3701C – Digital Logic (4)</td>
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<td>EEL 3701C – Digital Logic (4)</td>
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<td>EEL 4712C – Digital Design (4) or EEL 4713C – Digital Architecture (4) EEL 4744C- Microprocessor Appls. (4) EEL 4914C – Senior Design (3)</td>
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<td></td>
<td></td>
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<tr>
<td>Required EEL Courses</td>
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<td>Required EEL Courses</td>
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<td>Electrical Engineering Technical Electives</td>
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<td><strong>Total</strong></td>
<td><strong>126</strong></td>
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Table 4-5: Differences between Joint Program and UWF Degree in Computer Engineering*
(From Spring 2009, it will be an UWF degree)

<table>
<thead>
<tr>
<th>UWF Joint Program Degree Requirements</th>
<th>Credits</th>
<th>UWF Degree Requirements</th>
<th>Credits</th>
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<td>English Composition ENC 1101 &amp; 1102</td>
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<td>English Composition ENC 1101 &amp; 1102</td>
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<td>Mathematics: MAC 2311, MAC 2312, MAC 23141, MAP 2302</td>
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</tr>
<tr>
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<td>Physics: PHY 4048, PHY 4048L, PHY 4049 and PHY 4049L</td>
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</tr>
<tr>
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<td>ENC2210 - Technical Writing or ENC3240 - Technical Elective I</td>
<td>3</td>
</tr>
<tr>
<td>CS Courses</td>
<td>18</td>
<td>CS Courses</td>
<td>15</td>
</tr>
<tr>
<td>CDA 3101 – Intro to Computer Organization. (3)</td>
<td></td>
<td>CEN 3031 – Intro to Software Engineering (3)</td>
<td></td>
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<td>CIS 3020 - Introduction to CIS (3)</td>
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<td>CIS 3020 - Introduction to CIS (3)</td>
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<td>COP 3530 – Data Structures and Algorithms (3)</td>
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<td>COP 3530 – Data Structures and Algorithms (4)</td>
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<td>COP 4600 – Operating Systems (3)</td>
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<td>COP 4600 – Operating Systems (3)</td>
<td></td>
<td>COT 3100– Applications of Discrete Structures (3)</td>
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<td>COT 3100– Applications of Discrete Structures (3)</td>
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<td></td>
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</tr>
<tr>
<td>STA 4321 - Mathematical Statistics (3)</td>
<td>3</td>
<td>STA 4321 - Mathematical Statistics (3)</td>
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<tr>
<td>MAS 3105 - Linear Algebra (3)</td>
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<td>EGM 4313 - Intermediate Engineering Analysis (3)</td>
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<td>EGM2500 - Elements of Statics (2)</td>
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<td>EGN 3203 – Software Engineering Tools</td>
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<tr>
<td>Required EEL Courses</td>
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<tr>
<td>EEL 3111C – Circuit 1 (4)</td>
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<td>EEL 3396 – Solid-State Devices (3)</td>
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<td>EEL 3701C – Digital Logic (4)</td>
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<td>EEL 4712C – Digital Design (4)</td>
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<td>EEL 4713C – Digital Architecture (4)</td>
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<td>EEL 4713C – Digital Architecture (4)</td>
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</tr>
<tr>
<td>EEL 4744C- Microprocessor Appls. (4)</td>
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<td>EEL 4834 – C++ for Electrical Engineers (3)</td>
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<td>EEL 4914C – Senior Design (3)</td>
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<td>EGN 4xx1 - Capstone Design 1(1)</td>
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<td>EGN 4xx2 - Capstone Design 1(2)</td>
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<tr>
<td>Electrical Engineering Technical Electives</td>
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<tr>
<td>CS/EEL Electives (3)</td>
<td>3</td>
<td>CS/EEL Electives (3)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>126</strong></td>
<td><strong>Total</strong></td>
<td><strong>129</strong></td>
</tr>
</tbody>
</table>

* Not counted toward an UF degree
5. Faculty

The Department has currently an adequate number of qualified faculty members to support the program. The faculty members hold academic appointments with the University of West Florida. The Director holds a faculty appointment with the ECE Department at UF. Included in Table 4, Appendix I (Section A) is the Faculty Analysis for Fall 2005 and Spring 2006. This table documents research, teaching, and other activities, based on how each person’s time is charged to various activities.

5.1 Number of Faculty and Competencies

There are currently ten full-time faculty members and the Director. The technical expertise of the faculty provides coverage of all core competencies as well as many specialties. The faculty is well qualified, productive, and dedicated to teaching. A terminal degree of Ph.D. is required for a tenured-track faculty position. An ECE faculty for promotion and tenure must teach a board range of courses within the curriculum and demonstrate excellent in teaching. The faculty teaching competencies include the following areas:

- Circuits
- Electronics
- Solid State Devices
- Digital Systems
- Microprocessors
- Signals and System Communications
- Control Systems
- Power Systems
- Power Electronics
- Robotics and Image Processing
- Electromagnetics and Microwaves (That faculty resigned in Spring 2005 and there is completed to full the position in this area. Dr. Ezzat Bakhoum is expected to join in August 8, 2008, see faculty vitae).

The computer science courses which are taught by faculty member of the Computer Science Department includes

- CDA 3101 – Into to Computer Organization
- CEN 3031 – Intro to Software Engineering
- CIS 3020 - Introduction to CIS
- COP 3530 – Data Structures and Algorithms
- COP 4600 – Operating Systems
- COT 3100– Applications of Discrete Structures

Included in Table 3, Appendix I (Section A) is the Faculty Workload Summary for Fall 2005 and Spring 2006. The typical teaching load is three (3) credit courses, or two 3-credit courses and two 3-hour labs. Each faculty load must equal to 1.0 FTE (full-time equivalent). One 3-credit lecture course equals to 0.25 FTE, and one 3-hour lab course equals to 0.167 FTE. The small size of the faculty allows the faculty to give input on the class-schedule and their teaching load within these guidelines. The system is designed to be flexible, accommodating a wide range of individual interests and skills, while maintaining accountability and a reasonable level of equity.

Included in Appendix I (Section C) are the resumes of faculty members who are involved in teaching upper division courses for electrical and computer engineering degrees.

5.2 Fluency of Communication

The Florida Board of Governor’s requires fluent communication in English. The Director/Department Chair is required to report and certify on the English proficiency of all faculty members. Peer judgments from seminars and feedback from students are used in faculty evaluations. The instrument used for evaluating the teaching evaluation by students is elaborate and provides feedback in the area of English communication.

In addition, every new faculty member is required to lecture on a seminar during a search interview
process; the communication skill is considered an important and integral part of the hiring process.

5.3 Student-Faculty Interaction

The courses are taught by regular full-time faculty in a small-size environment (usually less than 30) to allow one-to-one integration between students and faculty. The Department also has an open-door policy. Students have an easy access to the faculty for student-faculty interactions. For answering general questions concerning the profession of electrical/computer engineering, serving as a mentor, and assisting in selecting specific technical elective courses that will meet the student's professional goals and interests, students are advised to see assigned their faculty advisor.

Faculty advisor for Pensacola students with last name beginning with the following:

A-C  Dr. Avant  ebakoum@uwf.edu  850-474-3373  (70/112)
D-G  Dr. Gorman  sgorman@uwf.edu  850-474-2546  (70/134)
H-L  Dr. Khabou  mkhabou@uwf.edu  850-474-6031  (70/135)
M-P  Dr. Bakhoum  ebakoum@uwf.edu  850-474-3373  (70/112)
Q-S  Dr. Manseur  rmanseur@uwf.edu  850-474-3375  (70/140)
T-Z  Dr. Harrell  dharrell@uwf.edu  850-473-7406  (70/141)

(For Pensacola toll free number 866-340-5886)

Faculty advisor for Ft. Walton students with last name beginning with the following:

A-D  Dr Fuchs  afuchs@uwf.edu  850-863-6556  (8/840)
E-M  Dr. Gilbar  tgilbar@uwf.edu  850-863-0716  (8/832)
N-Z  Dr. Shaer  bshaer@uwf.edu  850-863-6556  (8/840)

(For Ft. Walton Beach toll free number 866-701-8096)

Another major opportunity the students have to interact with practitioners is through the IEEE Northwest Florida Branch. Each semester, the department invites the Engineering Advisory Council to the Senior Banquet, which provides opportunities for both students and faculty to interact with successful practitioners. Career Expo is another activity that makes practicing engineers accessible to students.

5.4 Service and Professional Development Activities

The Department and UWF recognize the importance of professional development for faculty and try to provide appropriate financial supports. The faculty members participate in different professional and service activities in the department, University, the local community and their profession. Table 5-1 shows the summary of faculty service activities for the academic year 2004-2005.
Table 5-1 Summary of Faculty Service Activities (for 2004-2005)

<table>
<thead>
<tr>
<th>Faculty</th>
<th>University Service</th>
<th>Community Service</th>
<th>Professional Service</th>
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<td>Chair</td>
<td>Member</td>
<td>Chair</td>
</tr>
<tr>
<td>Mohannad M. Bataineh</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Thomas Gilbar</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Steve Gorman</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Andreas Fuchs</td>
<td></td>
<td>x</td>
<td>N/A</td>
</tr>
<tr>
<td>Dale H. Harrell</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Mohamed A. Khabou</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Rachid Manseur</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Muhammad Rashid</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bassam Shaer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>William J. Weber</td>
<td></td>
<td>x</td>
<td>N/A</td>
</tr>
</tbody>
</table>

5.4.1 Research Support

The department and UWF encourage the ECE faculty to engage in research. Sponsored Research is preferred. It is, however, somewhat difficult to attract sponsored research because the size of the faculty is small, and it lacks experience in obtaining grants. Those who participate receive a reduction in their teaching loads. According to the Bylaws revised in November 2004, one (1) publication per year is expected with a total of five (5) publications over five years at UWF for promotion to associate professor. For promotion to professor, the applicant must demonstrate academic recognition in their field of expertise beyond UWF. All faculty members of the Department are annually evaluated in areas of teaching, research, and service.

The faculty can also apply to UWF for research support during the academic year and summer periods. The department has, in some cases, reduced faculty-teaching loads to allow for course development and research activities. Almost all of the tenure-track faculty members of the ECE Department, who applied for, received a grant of $5,000 for professional development. At one time or another, they received a partial salary to support research during the summer, and grants ranging from $1,000 to $1,500 to support research during the year. All recent new hires receive an equipment support of up to $10,000 to start their research at UWF.

5.4.2 Travel Support

One travel approval is normally granted to those faculty members who want to present papers in meetings of national, regional, state, or local professional societies, or to participate in student’s academic competitions. There is no separate budget for travel. However, if a faculty member is invited to present a paper or to serve as a session chairman, the travel expenses are generally reimbursed from the departmental budget and Dean’s and/or Provost’s office(s). The Dean and/or Provost’s office generally contributes to the travel expenses. Gifts from alumni and industrial donations have also been a source for supplementing the travel budget. Table 5-2 (page # 212) shows the summary of faculty professional development activities form January 2005- December 2005).

Drs. Rachid Manseur and Dale Harrell attended the ABET Faculty Assessment Workshops Version 2.0 in Nashville, TN, October 26, 2004. According to the web page the workshop was to cover:
- Identify key elements of functional assessment plans.
Clarify the similarities and differences between course and program assessment.
Put objectives and outcomes to work for developing performance
Build a robust assessment-planning matrix
Create clear and concise reports on assessment

Drs. Mohamed Khabou, Dale Harrell and Muhammad Rashid attended the ABET Faculty Workshop on Assessing Program Outcomes, Saturday, May 13, 2006: According to the web page the workshop was to cover:

- Identify key elements of a functional assessment plan.
- Clarify the similarities and differences between course and program assessment.
- Put objectives and outcomes to work by developing measurable performance criteria.
- Develop scoring rubrics to assess student learning.
- Understand the pros and cons of various assessment methods.
- Utilize an assessment-planning matrix.
- Create clear and concise reports on assessment and continuous improvement.

Dr. Muhammad Rashid will be attending the ABET Evaluator Training session on June 18, 2006, Chicago.

5.4.3 Sabbatical Leave and Consulting

Faculty members (tenured) are encouraged to request for sabbatical leave after 6 years of service. Consulting is permitted and even encouraged provided that it contributes to the faculty member's professional growth; and it enhances his or her value to the department and UWF. Industrial representatives from the Industrial Advisory Council provide contacts for industrial sponsorship. Consulting is limited to the customary one day per week. Consulting work, which does not interfere with teaching or research, and which involves payment of personal compensation, may be performed upon approval by the President of the University of West Florida. Each faculty member, who desires to engage in this type of activity during the academic year, must submit an Outside Activity form for approval.
Table 5-2 Summary of Faculty Professional Development Activities

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Dates</th>
<th>Purpose</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Mohamed Khabou</td>
<td>11/04/2005 to 11/12/2005</td>
<td>To attend and present a paper to the International Conference on Machine Intelligence</td>
<td>Tozeur, Tunisia</td>
</tr>
<tr>
<td>Dr. Rachid Manseur</td>
<td>5/05/2005 to 5/06/2005</td>
<td>FCRAR 2005 / FCRAR 2006</td>
<td>Gainesville</td>
</tr>
<tr>
<td>Dr. Rachid Manseur</td>
<td>10/18/2005 to 10/22/2005</td>
<td>Present a paper at the Frontiers in Education Conference</td>
<td>Indianapolis</td>
</tr>
<tr>
<td>Dr. Dale Harrell</td>
<td>6/17/2005 to 6/17/2005</td>
<td>Trip to John C. Stennis Space Center</td>
<td>Waveland, Mississippi</td>
</tr>
<tr>
<td>Dr. Dale Harrell</td>
<td>7/03/2005 to 7/04/2005</td>
<td>Present a research paper at 2005 IEEE AP-S/URSI SYMPOSIUM</td>
<td>Washington, DC</td>
</tr>
<tr>
<td>Mr. William Weber</td>
<td>3/14/2005 to 3/15/2005</td>
<td>Attend and represent the ECE Department at the UWF DAY at Tallahassee</td>
<td>Tallahassee</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>3/18/2005 to 3/22/2005</td>
<td>Attend ECEDHA meeting workshop</td>
<td>New Orleans</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>4/19/2005 to 4/24/2005</td>
<td>Lecture at UTM conf.</td>
<td>Merida, Mexico</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>4/25/2005 to 4/26/2005</td>
<td>ABET committee meeting</td>
<td>Gainesville</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>6/20/2005 to 6/21/2005</td>
<td>Meet with ECE faculty/ABET</td>
<td>Gainesville</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>7/21/2005 to 7/22/2005</td>
<td>FEEDS meeting at UCF</td>
<td>Orlando</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>9/01/2005 to 9/05/2005</td>
<td>To present paper at AMSE</td>
<td>Chicago</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>9/31/2005 to 10/07/2005</td>
<td>Program Evaluation</td>
<td>Abu Dhabi</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>10/18/2005 to 10/19/2005</td>
<td>Attend ABET meeting</td>
<td>Gainesville</td>
</tr>
<tr>
<td>Dr. Muhammad Rashid</td>
<td>10/23/2005 to 10/25/2005</td>
<td>Attend NAPS</td>
<td>Ames, IA</td>
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<tr>
<td>Dr. Muhammad Rashid</td>
<td>10/25/2005 to 10/31/2005</td>
<td>Attend annual ABET meeting</td>
<td>San Diego, CA</td>
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<tr>
<td>Dr. Muhammad Rashid</td>
<td>12/03/2005 to 12/12/2005</td>
<td>To present paper to ELECO - International Conference</td>
<td>Bursa, Turkey</td>
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<tr>
<td>Dr. Muhammad Rashid</td>
<td>12/12/2005 to 12/16/2005</td>
<td>Invited to present paper to US-UAE workshop</td>
<td>Sharjah, UAE</td>
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</tbody>
</table>

6. Facilities

The ECE Department has facilities on both the UWF campus in Pensacola, and the Fort Walton Beach campus. Since essentially all engineering courses for the degree programs are offered at both locations, most of the engineering facilities at the Pensacola campus have been replicated at the Fort Walton Beach campus. Facilities at the two locations are described separately in the following paragraphs. The laboratory and computing facilities are adequate to support the educational needs of the programs. As the program grows, the space is becoming a problem for labs requiring more number of lab sections. With the planned new Science and Technology Building (Phase A) under planning stage and scheduled for completion by Fall 2009, the space issue will be resolved and allow for further growth of student population. This building will be occupied by Engineering, Physics, Maths & Statistics, and Computer Science.

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6.1 Pensacola Campus Facilities

Facilities at the Pensacola campus are principally housed in Bldg. 70. Approximately 2,000 sq. ft. in Bldg. 70 is assigned as office space for ECE faculty and staff and, approximately 1700 sq. ft. is allocated for ECE Teaching Laboratories. In addition, ECE has an agreement for joint use of an 800 sq. ft. lab in Bldg. 70. The area is allocated to the Engineering Technology program, which is part of the UWF College of Professional Studies. The Department shares a 570 sq. ft. lab in Bldg. 79 with the Computer Science Department of UWF. Also, the ECE department is the principal user of a 1,200 sq. ft. Lecture/Distance Learning Lab in Bldg. 70 allocated to the UWF Academic Technology Center. Table 6-1 lists the engineering facilities.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pensacola Distance Learning Laboratory (DLL) Classroom, Building 70, Rom 105</td>
<td>Dedicated classroom for engineering, classes run from 8 am to 8 pm, Monday to Friday</td>
</tr>
<tr>
<td>Computer Laboratory, Room 117</td>
<td>Dedicated computer room for engineering</td>
</tr>
<tr>
<td>Senior Design Laboratory, Room 118</td>
<td>EEL 4914C – Senior Design</td>
</tr>
<tr>
<td>Communication and Control Laboratory, Room 119</td>
<td>EEL 4515L – Communication Lab; EEL 4657L – Control Systems labs</td>
</tr>
<tr>
<td>Digital Laboratory, Room 105</td>
<td>EEL 3701L – Digital Logic Design Lab; EEL 4744L – Microprocessors Lab; EEL 4712L – Advanced Digital Lab; EEL 4713L – Computer Architecture Lab</td>
</tr>
<tr>
<td>Circuits and Electronics Laboratory, Room 120</td>
<td>EEL 3303L – Circuits Lab; EEL 4303L – Electronics I Lab; EEL 4306L – Electronics II Lab</td>
</tr>
<tr>
<td>Robotics Laboratory, Room 188, Building 79</td>
<td>EEL 4663 – Elements of Robotics</td>
</tr>
<tr>
<td>UWF Open Computer Laboratory, Bldg. 79</td>
<td>Open lab for all UWF students</td>
</tr>
<tr>
<td>Computer Science (CS) Computer Laboratory, Bldg. 79, Room 175 &amp; 179</td>
<td>Dedicated CS Lab open to engineering students</td>
</tr>
</tbody>
</table>

Department personal computers (PCs) at the Pensacola campus are connected to the campus Argo domain, which provides email service along with private file storage and web-site space for all users. Software applications available to the students include: Microsoft Office Pro (Word, Excel, Access, & Power Point), Logic Aid, Logic Works, Sim11, ASM11, Cyprus Galaxy and ISR, OrCAD Design Lab, Mathcad, MATLAB, Altera Max Plus+, and Microsoft Visual Studio (Visual Basic, Visual C++, & Visual Inter Dev). Internet access is provided along with student printing service via a networked, centrally located HP 4SI, high-speed printer. ECE students are strongly encouraged to buy Tablet Computers. Most software applications used in the ECE curriculum are available for download to student computers. Wireless network access is available in building 70 and most other buildings and outside areas on the Pensacola campus.

6.1.1 Pensacola Classroom Facilities

All engineering courses are taught in building 70 room 106. Room 106 has a student capacity of 48 seats but classes are normally limited to 40 students to insure that all students have a good view of presented course material. Floor space of the room is approximately 1,200 square feet. Room 106 (as shown in Figure 6-1) is a distance learning facility equipped to originate lectures or present lectures from remote sources.
locations and is normally used in conjunction with building 7 room 703 at the UWF Fort Walton Beach campus. The room is equipped with 24 computers for student use.

**Figure 6-1: DLL classroom at PNS (Senior Design Presentation)**

6.1.2 **Computer Laboratory, Room 117**

This is a 470 sq. ft. room (as shown in Figure 6-2), which is equipped with 15 Dell 1GHz computers and 16 seats. All software applications listed in the paragraph above are available to the students. The room is arranged so that it can be used as a classroom; however, classes are not normally scheduled in the interest of maximizing the opportunity for students to use the computers for homework. This room is normally open Monday through Friday from 8:00 AM to 5:00 PM, during evenings when ECE classes are scheduled, and on evenings and weekend days when a tutor is scheduled.
6.1.3 Senior Design Laboratory, Room 118

This 380 sq. ft. lab (as shown in Figure 6-3) is for the exclusive use of students enrolled in EEL 4914C, Electrical Engineering Design, and those working on special projects. Computer assets include four Dell, 500 Mhz. PCs. Software applications installed are determined by requirements for each project. This lab is equipped with a broad range of test equipment and tools to enable students to design and fabricate analog and digital projects. It is available 24 hours a day to authorized students.

6.1.4 Communication and Control Laboratory, Room 119

This is a 380 sq.ft. room. Eight workstations (as shown in Figure 6-4) are installed, each of which includes: 500 MHz Tektronix TDS-3052D O’scope, 1.5GHz Agilent E4411B Spectrum Analyzer, 15 MHz HP 33120A or Agilent 33220A Arbitrary Function Generator, Triple voltage HP E3630A Power Supply, 6.5 digit Keithley 2000 Multimeter, Feedback Inc. 33-100 Controls Mechanical Unit trainer, and Dell 300 Mhz PC (as shown in Figure 6-5). NoiseCom NC6108 Wideband Noise Generators, Krohn-Hite 3550 Filter filters, and ComDyna GP-6 Analog Computers are also available. Each PC is equipped with a data acquisition board. Software applications on each PC include: LabView, MATLAB, MathCAD, MS Office and other common software. Students normally work in teams of two.
Figure 6-3: Senior Design Laboratory at PNS

Figure 6-4: Communication Laboratory at PNS
6.1.5 Digital Laboratory, Room 105

This is a 800 sq. ft. room (joint use with Engineering Technology as shown in Figure 6-6. Sixteen workstations with two seats each are installed, each of which includes the following test equipment: 60 MHz Agilent 54621D 18 channel O’scope/Logic Analyzer, Tektronix CDM250 DMM, CPS250 Power Supply, and CFG250 Function Generator. A 300MHz PC is installed at each workstation. Almost all software applications installed in Rm. 117 are available. A Needhams EMP-21 Device Programmer is installed on four of the workstations and ultraviolet light EPROM erasers are available along with RomEM ROM Emulators.
6.1.6 Circuits and Electronics Laboratory, Room 120

This is a 460 sq. ft. room (as shown in Figure 6-7). Eight workstations with two seats each are installed. Each workstation includes the following test equipment: Tektronix 50 MHz TDS 310 O’scope, CDM250 DMM, CPS280 Power Supply; Wavetek Model 19 Function Generator; HP 33120A 15 MHz Arbitrary Function Generator, and Ohmite Ohm-ranger and Cap-ranger. A Canon BJ-10 printer is connected to each Oscilloscope to print O’scope traces for lab writeups. Four Tektronix 571 Curve Tracer semiconductor testers are installed at half the workstations and these can also print to the Canon printers. No computers are installed or needed.

Figure 6-7: Circuits/Electronics at PNS

6.1.7 Robotics Laboratory, Room 188, Building 79

This is a 570 sq. ft. room in Bldg. 79 (shared with the UWF Computer Science Department). Installed robots include one Unimation Puma 560, one Scorbot ERV Plus, and one Seiko D-Tran RT3200. In addition, five Feedback Inc. Controls Trainer Kits are available. Bench test equipment includes Tektronix 20 MHz 2201 O’scopes, CDM250 DMMs, CPS250 Power Supplies, CFG250 Function Generators and other meters, power supplies, and miscellaneous test equipment. Two Dell 500 Mhz PCs provides Internet access and access to Microsoft Office and most of the applications available in Rm. 117. PCs used for robot control include two 90 MHz Dells.

6.1.8 Research Laboratory

There are no dedicated research labs available to the ECE Program. All on-campus faculty research and student research is accomplished in the teaching laboratories.
6.1.9 UWF Open Computer Laboratory

The UWF Open Computer Lab in Bldg. 79 is managed by Instructional Technology Services. This facility is open 24 hours a day. It includes one hundred and fifty (150) PCs, 2.5GHz or faster, installed with common software to support all the instructional departments on campus. These PCs are loaded with OrCAD Design Lab, and MATLAB with key toolboxes which are of particular interest to engineering students.

6.1.10 Compute Science Computer Laboratory

Bldg. 79, Room 175 & 179, the Computer Laboratory comprises 23 machines housed across two rooms. This lab consists of various Sun workstations running Solaris 2.5 (Sun IPC, Ultrasparc and SparcStations). Students in COP 3530 and COP 4600 use this lab to complete course requirements. All of these machines have compilers, text editors, Netscape, and UNIX mail programs installed.

6.1.11 Modern Engineering Tools

OrCAD Design Lab v.9.2 is used extensively by students to simulate all laboratory circuits before they are constructed and tested in the lab. Altera Max Plus+ and/or Altera Quartus are used in advanced digital courses. Mathlab is used extensively in control and communications courses. Mathcad is used extensively in circuit and basic power courses. The examples of the uses of software tools are as follow:

- In EEL 3111, each student must become proficient in the use of PSpice and Mathcad software. The homework will be exclusively Mathcad and all laboratory pre-labs will utilize PSpice.
- In EEL 3112, Mathcad or Matlab is used extensively for numerical and graphical analysis. Schematics/PSpice is used for circuit analysis and simulation.
- In EEL 3211, each student must become proficient in the use of Power World and Mathcad software. The homework will be exclusively Mathcad and all projects will include Power World and Mathcad.
- In EEL 3303L, each student must become proficient in the use of PSpice and Mathcad software. The pre-lab assignments that consist of equation solving and mathematical calculation will exclusively be made using Mathcad software and all laboratory pre-lab simulations will exclusively utilize PSpice/Orcad simulation software.
- In EEL 3304 and 430IL, PSpice software is used extensively for analysis and design verifications of electronic devices and circuits.
- In EEL 3701 and EEL 3701L, use logic works to simulate logic circuits and design verifications.
- In 4744 and EEL 4744L, use of an assembler (ASM11) and simulator (SIM11) to write and debug HC11 assembly code.
- In EEL 4242, each student must use PSpice and Mathcad software tools to verify the design assignments to evaluate the performance of power electronics circuits in terms of power factor, harmonic factor, distortion factor and switching angles for PWM switching.
- In EEL 4514 and EEL 4515L, Mathcad and MATLAB are used extensively for numerical, symbolic, and graphical analysis. Schematics/PSpice is used for circuit analysis and simulation.
- In EEL 4657 and EEL 4657L, MATLAB with the Controls toolbox and/or Program CC (Controls packages) are used extensively in a variety of analysis and design assignments.
- In Eel 4663, students use (a) MATLAB/Mathcad are used extensively for general computation, (b) Robotdraw, an internet-based robot modeling tool developed by the instructor, (c) KAP- Kinematic Analysis Package (developed by the instructor) or kinematic computation, and (d) Robot programming software.
In EEL 4712 and 4712L, use of MaxPlus II software to design and simulate digital circuits described in VHDL.
In EEL 4713, use of MaxPlus II software to design and simulate datapath and control circuits described in VHDL.

6.2 Fort Walton Beach Campus Facilities

Facilities at the Fort Walton Beach campus are principally housed in Bldg. 8. Approximately 340 sq.ft. in Bldg. 8 are assigned as office space for ECE faculty and approximately 1600 sq. ft. are allocated for ECE Teaching Laboratories. ECE shares an 725 sq. ft. computer lab in Bldg. 7 with the Computer Science Department. Also, the ECE department is the principal user of an 800 sq.ft. Lecture/Distance Learning Lab in Bldg. 7 allocated to the UWF Academic Technology Center. Table 6-2 lists the engineering facilities.

Department personal computers (PCs) at the Fort Walton Beach campus are connected to the campus Argo domain, which provides email service along with private file storage and web-site space for all users. Software applications available to the students include: Microsoft Office Pro (Word, Excel, Access, & Power Point), Logic Aid, Logic Works, Sim11, ASM11, Cyprus Galaxy and ISR, OrCAD Design Lab, Mathcad, MATLAB, Altera Max Plus+ and or Quartus, and Microsoft Visual Studio (Visual Basic, Visual C++, & Visual Inter Dev). Internet access is provided along with student printing service via networked high-speed printers located in each room... ECE students are strongly encouraged to buy Tablet Computers. Most software applications used in the ECE curriculum are available for download to student computers. Wireless network access is available in building 8 on the Fort Walton Beach campus.

Table 6-2: FWB Engineering Facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th>Purpose</th>
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</thead>
<tbody>
<tr>
<td>Fort Walton Beach Distance Learning Laboratory (DLL)</td>
<td>Dedicated classroom for engineering, classes run from 8 am to 8 pm, Monday to Friday</td>
</tr>
<tr>
<td>Classroom</td>
<td></td>
</tr>
<tr>
<td>Computer Laboratory, Room 762</td>
<td>Dedicated computer room for engineering and CS</td>
</tr>
<tr>
<td>Senior Design Laboratory, Room 831B</td>
<td>EEL 4914C – Senior Design</td>
</tr>
<tr>
<td>Communication and Control Laboratory, Room 831A</td>
<td>EEL 4515L – Communication Lab</td>
</tr>
<tr>
<td>Circuits/Electronics/Digital Laboratory, Room 813</td>
<td>EEL 3303L – Circuits Lab</td>
</tr>
<tr>
<td></td>
<td>EEL 4303L – Electronics I Lab</td>
</tr>
<tr>
<td></td>
<td>EEL 4306L – Electronics II Lab</td>
</tr>
<tr>
<td></td>
<td>EEL 3701L – Digital Logic Design Lab</td>
</tr>
<tr>
<td></td>
<td>EEL 4744L – Microprocessors Lab</td>
</tr>
<tr>
<td></td>
<td>EEL 4712L – Advanced Digital lab</td>
</tr>
<tr>
<td></td>
<td>EEL 4713L – Computer Architecture Lab</td>
</tr>
</tbody>
</table>

6.2.1 Fort Walton Beach Classroom Facilities

All engineering courses are taught in building 7 room 703. Room 703 (as shown in Figure 6-8) has a student capacity of 26 seats. Floor space of the room is approximately 900 square feet. Room 703 is a distance learning facility equipped to originate lectures or present lectures from remote locations and is normally used in conjunction with building 70 room 106 at the UWF Pensacola campus. The room is equipped with 26 computers for student use.
6.2.2 Computer Laboratory, Room 762

This is an 830 sq. ft. room, shared with Computer Science. It is equipped with 8 Dell 2GHz ECE computers and a printer. All software applications listed in the paragraph above are available to the students. This room is normally open Monday through Thursday from 8:00 AM to 10:00 PM, Fridays 8:00 AM to 5:00 PM, and week-ends 9:30 AM to 5:00 PM. Table space is available for group study sessions. Computer Science has six UNIX workstations in the room.

6.2.3 FWB Campus Open Computer Laboratory

The Fort Walton Beach Open Computer Lab in room 750 is managed by campus Technology Services. This facility is open the same hours as listed above. It includes 60 PCs, 2GHz or faster, installed with common software to support all the instructional departments on campus.

6.2.4 Senior Design Laboratory, Room 831B

This 340 sq. ft. lab (as shown in Figure 6-9) is for the exclusive use of students enrolled in EEL 4914C, Electrical Engineering Design, and those working on special projects. Computer assets include four Dell, 2.6GHz. PCs. Software applications installed are determined by requirements for each project. This lab is equipped with a broad range of test equipment and tools to enable students to design and fabricate analog and digital projects. It is available Monday to Thursday 8:00 AM to 9:00 PM, Friday 8:00 AM to 5:00 PM, Saturday and Sunday 1:00 to 5:00 PM.
6.2.5 Communication and Control Laboratory, Room 831A

This is a 500 sq.ft. room. Five workstations (as shown in Figure 6-10) are installed, each of which includes: 500 MHz Tektronix TDS-3052D O’scope, 1.5GHz Agilent E4411B Spectrum Analyzer, 15 MHz Agilent 33220A Arbitrary Function Generator, Triple voltage Instek GPC3030D Power Supply, 5 digit Instek GDM 8245 Digital Multimeters, Feedback Inc. 33-100 Controls Mechanical Unit trainer, and Dell 2.6Hz PC (as shown in Figure 6-11). NoiseCom NC6108 Wideband Noise Generators, Krohn-Hite 3362 Filter filters, ComDyna GP-6 Analog Computer are also available. Each PC is equipped with a data acquisition board. Software applications on each PC include: LabView, MATLAB, MathCAD, MS Office and other common software. Students normally work in teams of two.
6.2.6 Circuits/Electronics/Digital Laboratory, Room 813

This is a 790 sq. ft. room. Eight workstations (as shown in Figure 6-12) with two seats each are installed. Each workstation includes the following test equipment: two Tektronix 50 MHz TDS 1002 O’scope, two Agilent E9340A Logic Analyzer; two Dell 2GHz PCs; one CDM250 DMM, one Instek GPC-3030D Power Supply; one Agilent 33120A Arbitrary Function Generator; one Ohmite Ohm-ranger and one Cap-ranger. Four Keithley 2400 based semiconductor analyzers are installed in the room along with one B&K 851 device eraser. Needhams EMP-21 Device Programmers are installed on four of the workstations. The room is configured to accommodate 16 students in all the classes taught in it.

Figure 6-12: Circuits/Electronics/Digital Laboratory at FWB

6.2.7 Research Laboratory

There are no dedicated research labs available to the ECE Program. All on-campus faculty research and student research is accomplished in the teaching laboratories.

6.2.8 Modern Engineering Tools

OrCAD Design Lab v.9.2 is used extensively by students to simulate all laboratory circuits before they are constructed and tested in the lab. Altera Max Plus+ and/or Altera Quartus are used in advanced digital courses. Mathlab is used extensively in control and communications courses. Mathcad is used extensively in circuit and basic power courses. The FWB campus students use the same software tools; see Section 6.1.11 (page # 219) for examples.
7. Institutional Support and Financial Resources

The UWF administration acknowledges the importance of engineering education for the manpower and economic development of the Northwest Florida region. The administration is committed to offering high quality engineering programs and provides adequate institutional support and financial resources for the program including resources for the continued professional development of the faculty. The adequacy of the financial resources to support the faculty professional development is described in Section 5.4 (see page #209).

7.1. Institutional Leadership

The program operates within UWF as the Department of Electrical and Computer Engineering. The Director performs the duties of the Chair of the ECE Department at UWF. Although students receive the degree from the University of Florida, the UWF is fully responsible for funding the operation of the Department and the ECE Department. The UWF reimburses UF for the Director’s salary.

7.2. Budget Processes

Director prepares the departmental budget request based on departmental priorities and sets the priorities. Dean prepares the college request and forwards it to the Vice-President for Academic Affairs and the Provost.

Provost then makes recommendations to the President and the Presidents’ Executive Committee (the President and the Vice President for Academic Affairs are members of the President's Executive Committee).

President makes recommendations to the UWF Board of Trustees and State University System.

7.3. Adequacy of Institutional Support and Financial Resources

The expenditures for support functions of the Department unit for the past three years can be found in Table 5 in Appendix I (Section A), Support Expenditures Program. The categories of expenditures are listed below.

**Supplies and Expenses**

<table>
<thead>
<tr>
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</thead>
<tbody>
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<td>Central Copy</td>
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<td>$ 1,678</td>
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<td>Travel</td>
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</table>
### 7.4. Plan and Sufficiency of Resources

The Department has an on-going program to maintain current software applications for use in the degree programs. The software tools MATLAB, and MathCAD are renewed on an annual schedule and other software is purchased or donated as required. The UWF administration is committed to maintaining the current facilities and lab equipment and expanding the facilities as the engineering degree programs grow. Examples are listed in Table 7-1. The record and plan of updating lab equipment and computing facilities are shown in Table 7-2.

In 2003, University Advancement initiated a fundraising campaign specifically targeted at local area industry, and succeeded in raising approximately $290,000 for the ECE department. Of the $290,000, approximately half was for endowments and half was for general support and scholarships. In 2002 to 2004, UWF spent approximately $248,000 to equip new engineering teaching laboratories at the UWF Fort Walton Beach campus. In 2005, UWF spent approximately $169,000 to replace obsolete logic analyzers in the Pensacola Digital/Computer Engineering lab; to replace obsolete oscilloscopes and spectrum analyzers in the Pensacola Controls/Communications teaching lab; and to add two additional lab workstations to the Controls/Communications lab. Of the $169,000, $81,100 came from the Foundation account and the rest came from Academic Affairs general funds. In 2005, eight old computers in the Pensacola Controls/Communications lab will be replaced with new computers, funded by Academic Affairs.

<table>
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<tr>
<th>Source</th>
<th>Academic Year</th>
<th>Value</th>
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<td>Purchased</td>
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<td><strong>Total Assigned</strong></td>
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</table>

1 As of 5/05/2005
2 Equipment transferred to the ECE Department from the UWF Computer Science Department when the Systems and Control Engineering program was discontinued, and other donations.
3 Fort Walton Beach campus Circuits/Digital and Computer labs.
4 Fort Walton Beach campus Controls/Communications and Senior Design labs.
5 Pensacola campus Controls/Communications and Digital lab upgrades.
<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Support</th>
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<th>Comm &amp; Control Lab</th>
<th>Circuits &amp; Electronics Lab</th>
<th>Senior Design</th>
<th>Digital Lab</th>
<th>Modern Eng Tools</th>
<th>Robotics Lab</th>
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<td>2009-10</td>
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</tr>
</tbody>
</table>
7.5. Adequacy of Support Personnel and Institutional Services

The Department currently has adequate support personnel and hires tutors for all lecture and lab courses. Students have access to all UWF services, such as the library, Advising center, admission office, and Registrar’s office. In Fall 2005, the Department consisted of the following:

<table>
<thead>
<tr>
<th>Title</th>
<th>Number</th>
<th>Full-/Part-Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor and Senior Teaching Lab Specialist</td>
<td>1</td>
<td>full-time</td>
</tr>
<tr>
<td>Senior Teaching Lab Specialist</td>
<td>1</td>
<td>full-time</td>
</tr>
<tr>
<td>Registration and Advising</td>
<td>1</td>
<td>full-time</td>
</tr>
<tr>
<td>Senior Secretary</td>
<td>1</td>
<td>full-time</td>
</tr>
<tr>
<td>OPS office staff and student</td>
<td>1</td>
<td>part-time</td>
</tr>
<tr>
<td>OPS student (for ABET preparation (20 hours/week)</td>
<td>1</td>
<td>part-time</td>
</tr>
<tr>
<td>OPS Student Tutors (total 60 hours)</td>
<td>10</td>
<td>part-time</td>
</tr>
<tr>
<td>OPS Student lab supervisors (total 28 hours)</td>
<td>7</td>
<td>part-time</td>
</tr>
<tr>
<td>DLL Classroom facilitators at PNS (total 86 hours)</td>
<td>7</td>
<td>part-time</td>
</tr>
<tr>
<td>DLL Classroom facilitators at FWB (total 61 hours)</td>
<td>4</td>
<td>part-time</td>
</tr>
</tbody>
</table>

8. Computer Engineering Program Criteria

The Computer Engineering program satisfies the applicable program criteria through curricular requirements. The courses required for the degree are shown in Appendix I, Table 1 for Computer Engineering. Table 3-1 (Page # 92) shows the relationship between courses and the ABET criteria. The How-Tables for Computer Engineering in Appendix IV describes how the program criteria such as the knowledge of advanced mathematics, probability and statistics, and discrete mathematics are met.

8.1 Breadth and Depth

A range of required courses in engineering, computer science (CS) and electrical engineering provides the breadth. The depth is provided by upper-level digital required and elective courses in electrical engineering and CS courses. Table 8-1 shows the depth and breadth for computer engineering.

<table>
<thead>
<tr>
<th>Level</th>
<th>Req’d</th>
<th>Circuits and Systems</th>
<th>Electronics</th>
<th>Digital Systems</th>
<th>Computer Science</th>
<th>EEL</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breath</td>
<td>x</td>
<td>EEL 3111/L, EEL 3135</td>
<td>EEL 3304/L, EEL 3396</td>
<td>EEL 3701/L, EEL 4834</td>
<td>CIS 3020, CDA 3101</td>
<td></td>
<td></td>
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<tr>
<td>Depth</td>
<td>x</td>
<td>EEL 3112</td>
<td>EEL 4306/L, EEL 4712/L, EEL 4713/L</td>
<td>EEL 4744/L, EEL 4712/L, EEL 4713/L</td>
<td>CEN 3031, COP 5530, COT 3100, COP 4600</td>
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<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 Credits</td>
<td>3 Credits</td>
</tr>
</tbody>
</table>
8.1.1 Options for Taking Technical Electives

The computer engineering degree requires 12 elective credit hours of EEL and non-EEL courses. The UWF engineering publishes a tentative schedule of offerings for engineering courses including technical electives for 2-3 years (see Appendix II, Attachment H – Plan for Engineering Course Schedule, page # 87). As the faculty size grows, UWF engineering continues to offer more elective courses each semester. The engineering monitors the student progress towards graduation, identifies the potential graduates at least 3 semesters ahead of graduation and advises students, in advance, of their options in completing technical elective requirements.

Due to the small faculty size, the engineering offers a limited number of EEL electives. Students, however, have the following number of options to satisfy the technical elective requirements.

1. EEL courses taught by the UWF Engineering. The offering and enrollment of EEL courses from Summer 2001 to Fall 2006 year are shown in Table 8-2.
2. CS courses taught by UWF faculty. [http://www.cs.uwf.edu/](http://www.cs.uwf.edu/)
4. EEL courses offered at UF. On petition to the Director, students sometime take courses at UF during the summer. [http://www.ece.ufl.edu/](http://www.ece.ufl.edu/)
5. UF courses offered through Florida Engineering Education Delivery System (FEEDS). [http://oeeep.eng.ufl.edu/](http://oeeep.eng.ufl.edu/)
7. EEL Special Topic Courses at UF- Research and Engineering Education Facility (REEF). To take advantages of the research facilities at GERC, students take a special topic course especially in Electromagnetics and EEL 3473 – Electromagnetic Fields and Applications 2 with Dr. Henry Zmuda (UF faculty).
<table>
<thead>
<tr>
<th>Semester</th>
<th>EEL Course</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2001</td>
<td>EEL 4242C – Power Electronic Circuits</td>
<td>13</td>
</tr>
<tr>
<td>Summer 2001</td>
<td>EEL 4930 – Digital Signal Processing</td>
<td>15</td>
</tr>
<tr>
<td>Fall 2001</td>
<td>EEL 4930 – Robotics</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>EEL 4712 – Digital Design</td>
<td>16</td>
</tr>
<tr>
<td>Spring 2002</td>
<td>EEL 4930 – Digital Communications</td>
<td>9</td>
</tr>
<tr>
<td>Summer 2002</td>
<td>EEL 4242C – Power Electronic Circuits</td>
<td>21</td>
</tr>
<tr>
<td>Summer 2002</td>
<td>EEL 4445 – Optics for Engineers</td>
<td>17</td>
</tr>
<tr>
<td>Fall 2002</td>
<td>EEL 4750C – Introduction to Digital Signal Processing</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>EEL 4712 – Digital Design</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>EIN 4354 – Engineering Economy</td>
<td>20</td>
</tr>
<tr>
<td>Spring 2003</td>
<td>EEL 4663 – Robotics</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>EEL 4713 – Digital Computer Architecture</td>
<td>9</td>
</tr>
<tr>
<td>Summer 2003</td>
<td>EEL 4230 – Elec. Drv. And MTR CTRL</td>
<td>31</td>
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<tr>
<td></td>
<td>EEL 4445 – Optics for Engineers</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>EEL 4930 – Electronic Optics</td>
<td>13</td>
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<tr>
<td>Fall 2003</td>
<td>EEL 4750C – Introduction to Digital Signal Processing</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>EEL 4213 – Electric Energy Systems 1</td>
<td>22</td>
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<tr>
<td></td>
<td>EEL 4712 – Digital Design</td>
<td>12</td>
</tr>
<tr>
<td>Spring 2004</td>
<td>EEL 4930 – Digital Communications</td>
<td>16</td>
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<tr>
<td></td>
<td>EEL 4713 – Digital Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>Summer 2004</td>
<td>EEL 4663 – Robotics</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>EEL 4242C – Power Electronic Circuits</td>
<td>21</td>
</tr>
<tr>
<td>Fall 2004</td>
<td>EIN 4354 – Engineering Economy</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>EEL 3473 – Electromagnetic Fields and Applications</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>EEL 4712 – Digital Design</td>
<td>23</td>
</tr>
<tr>
<td>Spring 2005</td>
<td>EEL 4751 – Introduction to Digital Signal Processing</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>EEL 4713 – Digital Computer Architecture</td>
<td>18</td>
</tr>
<tr>
<td>Summer 2005</td>
<td>EEL 4663 – Robotics</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>EEL 4445 – Optics for Engineers</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>EEL 4242C – Power Electronic Circuits</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>EIN 4354 – Engineering Economy</td>
<td>33</td>
</tr>
<tr>
<td>Fall 2005</td>
<td>EEL 4213 – Electric Energy Systems 1</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>EEL 4635 – Digital Control Systems</td>
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</tr>
<tr>
<td></td>
<td>EIN 4354 - Engineering Economy</td>
<td>33</td>
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<tr>
<td></td>
<td>EEL 4712 – Digital Design</td>
<td>22</td>
</tr>
<tr>
<td>Spring 2006</td>
<td>EEL 4930 – Digital Image Processing</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>EEL 4713 – Digital Computer Architecture</td>
<td>18</td>
</tr>
<tr>
<td>Summer 2006</td>
<td>EEL 4242C – Power Electronic Circuits</td>
<td>19</td>
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<tr>
<td></td>
<td>EEL 4663 – Robotics</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>EEL 4930 – Digital Image Processing</td>
<td>28</td>
</tr>
<tr>
<td>Fall 2006</td>
<td>EEL 4930 State Variables and Control</td>
<td>3 (tentative)</td>
</tr>
<tr>
<td></td>
<td>EEL 4751 – Introduction to Digital Signal Processing</td>
<td>1 (tentative)</td>
</tr>
<tr>
<td></td>
<td>EIN 4354 - Engineering Economy</td>
<td>14 (tentative)</td>
</tr>
</tbody>
</table>
8.2  Probability and Statistics

The requirements for knowledge of probability and statistics, including applications appropriate are satisfied by the following courses into the curriculum:

- **Mathematical Statistics (STA 4321), 3 Credits**: a required course effective all 2001. This course is an introduction to probability. It is more theoretical than a basic probability course and takes a mathematical approach. Some theorems are proved. The topics covered include discrete and continuous probability, conditional probability, independence, random variables, multivariate random variables, and special distributions, such as the Poisson, the exponential, and the normal.

  There are also “real world" applications of the theory. These include application to lifetime distributions, resource allocation, networks and circuits, quality control including operation characteristic curves, occupancy problems, efficient diagnostic testing, and probabilistic model building. The student learning outcomes are an understanding of mathematical probability and its application to a diverse set of topics, preparation for courses in mathematical statistics, operations research, quality control, and queuing theory. Also, the course provides an opportunity to review and to reinforce basic calculus.

- **EEL 3111 Circuits 1 and EEL 3112 Circuits 2**: calculation of average and root mean square voltage and current, evaluation of average power.

- **EEL 3396 Solid State Electronic Devices**: This course covers the Fermi-Dirac distribution function, which estimates the probability of presence of electrons (or holes) at various energy levels. When combined with the density of states function, which gives how many electrons (or holes) are allowed at specific energy, results in what is known as the concentrations of electrons and holes in semiconductors. Students work on multiple problems in homework and tests dealing with what is called Fermi-Dirac statistics which gives the distribution of probability of electrons (or holes) to have specific energy at specific temperature. Students must demonstrate an ability to use Fermi-Dirac statistics in order to determine carrier densities.

- **EEL 4713C Digital Computer Architecture**: design of instruction set for RISC computers based on statistics of usage.

- **COT 3100 Applications of Discrete Structures** (required): Basic discrete probability is introduced and applied to a few simple problems in computer science.

- **COP 3530 Data & Program Structures** (required): Some probability is used in average time complexity analysis of algorithms.

- **COP 4600 System Programming** (required): Probabilistic modeling of the performance of cache and virtual memory systems.

According to the Graduating Senior Self-Assessment (conducted in 2004 – 2005) in section 3.6.1, 90% of graduating seniors agreed that they have the knowledge of probability and statistics, including electrical or computer engineering applications.

According to the summary of class assessments in section 3.5.6 (conducted in fall 2004, see Table 3-32 in page # 158), 100% of students indicated that a number of courses have improved their knowledge of probability and statistics, including electrical and/or computer engineering applications.
8.3 Advanced Mathematics

EEL 3135 - D-T Signals & Systems provides the foundation for the applications of mathematics. Students acquire a strong mathematical background from the four hours of Intermediate Engineering Analysis (EGM 4133) beyond the 15 hours of calculus and differential equations required of all engineering students (MAC 2311, MAC 2312, MAC 2313, and MAP 2302).

Responses to the student course assessments (see Section B in Appendix XI – Student Course Assessments) are:

Question # 20: I used differential equations and/or integral calculus in this course.
100% in EEL 3112, 95% in EEL 3111, 100% in EGM4313

Question # 21: I used linear algebra in this course.
75% in EEL 3112, 100% in EEL 4657, 92% in EEL 4514, 84% in EGM 4313

Question # 22: I used complex variables in this course.
100% in EEL 3112, 100% in EEL 3135, 84% EEL 4514, 100% in EGM 4313

8.4 Discrete Mathematics

The requirements for knowledge of discrete mathematics are satisfied by the following courses into the curriculum:

- EEL3701 - EEL 3701C – Digital Logic Design: Student apply Boolean algebra techniques in the analysis of various digital circuits and applications
- EEL3701L - Digital Logic Design Lab: Students build digital circuits based on TTL technology and learn to program, assemble and simulate microprocessor applications using computer-based tools.
- COT 3100– Applications of Discrete Structures: This course increases the students' knowledge of discrete math through both learning mathematical concepts of basic theoretical computer science and applying these concepts to the analysis and construction of both simple algorithms and simple circuits.

8. 5 Basic Sciences

The curriculum includes two semesters of calculus-based physics and two semesters of chemistry (or one semester of chemistry and one semester of physical or biological science) beyond a high-school level of knowledge in physics and chemistry. Two labs in Physics and one lab in Chemistry are required for all engineering students.

9. Co-operative Education

The Cooperative Education Program offers students an opportunity to integrate classroom instruction with practical work experience. The program gives students the opportunity to verify academic and vocational interests, gain valuable experience in the chosen field prior to graduation, and earn income that can be used to defray college expenses. The job assignment must be related to electrical and computer engineering design. Job assignments as technician, data entry operator, clerical, etc. are not acceptable. Students wishing to participate in the Co-op Program must have completed 45 semester hours and have a grade point average of 2.0 or higher. The Department prefers students to wait until they have completed
some of the major electrical and/or computer engineering courses before participating in co-ops or internships. Students are expected to engage in work experiences that are relevant to their professional discipline and increasingly challenging in each successive term.

Due to the small size in both faculty and student population, all EEL courses are scheduled for offering only in the daytime from 8 a.m. – 5 p.m., as a result, the Co-op Program only has a parallel plan. However, permissions are often granted to students’ requests to work for companies (namely Bell South, Gulf Power), which require an alternating plan. In the alternating plan, the student alternates between a full-time academic schedule of one term and a full-time work assignment the following term. In the parallel plan, the student, while carrying academic course work, is also employed in an appropriate work assignment. In either work plan, the student registers for the Co-op course number.

One needs the Director’s permission to registration for the Co-op course, EEL 4949. Every semester, the student works with the employer to prepare the Semester Work Plan and completes the Data Sheet’ form, which gives the details of the job. These forms can be found in section A of Appendix VII.

The Co-op course only carries the Satisfactory/Unsatisfactory grade option. The UWF Co-operative Education Office of the Career Resource Center manages the Co-operative education experience. The UWF Co-op Program is one of eight nation-wide programs to receive accreditation from the newly formed Accreditation Council for Cooperative Education (ACCE).

Close coordination is maintained between the Department and the UWF Co-op Office. The Co-op employer evaluates the student after each work experience and each Co-op student evaluates employers after each work period. The Director reviews the employer evaluations and the Co-op report each term. The summary of employer evaluations can be found in sections B & C of Appendix VII.

Although the Co-op work experience is not considered as an integral part of the professional component, the participation in the Co-op work experience is strongly encouraged and up to three credits of EEL 4949 are applied to degree requirements as technical electives. One semester credit is given after satisfactory completion of either an alternate or a parallel Co-op assignment.

In addition to the employer evaluation for each Co-op assignment, the Department receives feedback from the employers concerning the engineering Co-op program; how students are performing in industry, and how the students are performing on multi-disciplinary teams. The summary of employer survey can be found in section D of Appendix VII.

The size of the engineering Co-op program is relatively small. Table 9-1 (see page # 232) shows the enrollment record of the Co-op program. The local Co-op employers are involved actively in the success of the UWF Co-op program. Each Co-op student, and his/her employer, and the faculty advisor are invited to a recognition gathering at the end of each semester. The student receives a certificate for successfully completing the Co-op assignment. This gathering provides an opportunity for informal feedback and discussion among the employers, students, and faculty advisors. The list of few co-op employers is included in section E of Appendix VII.
Table 9-1: EEL 4949 Co-op Work Experience Enrollment

<table>
<thead>
<tr>
<th>Term</th>
<th>Electrical Engineering</th>
<th>Computer Engineering</th>
<th>Total</th>
</tr>
</thead>
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<tr>
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<td>0</td>
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<td>0</td>
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<td>Spring 2001</td>
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<tr>
<td>Spring 2004</td>
<td>6</td>
<td>0</td>
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<tr>
<td>Summer 2004</td>
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<td>0</td>
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<td>Fall 2004</td>
<td>6</td>
<td>1</td>
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<td>Spring 2005</td>
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<td>Summer 2005</td>
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<td>Fall 2005</td>
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<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Spring 2006</td>
<td>10</td>
<td>3</td>
<td>13</td>
</tr>
</tbody>
</table>
Appendix I – Program Data

A. Tabular Data for Computer Engineering
<table>
<thead>
<tr>
<th>Year &amp; Semester</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Math &amp; Basic Science</th>
<th>Engineering Topics</th>
<th>General Education</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Year 1 – Fall</td>
<td>ENC 1101</td>
<td>English Composition I*</td>
<td>3*</td>
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<td>Humanities</td>
<td>Literature</td>
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<tr>
<td></td>
<td>MAC 2311</td>
<td>Analytical Geometry &amp; Calculus I</td>
<td>4</td>
<td>4</td>
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<td>CHM 2045</td>
<td>General Chemistry</td>
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<td>*Not counted towards the UF Degree</td>
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<td>*Not counted towards the UF Degree</td>
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<td>Year 2 – Spring</td>
<td>PHY 2049/L</td>
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<td>3</td>
<td>3</td>
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<td>Year 2 – Summer</td>
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<td>EEL 3701C</td>
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(continued on next page)
Table I-1. Basic-Level Curriculum Continued  
(Computer Engineering)

<table>
<thead>
<tr>
<th>Year &amp; Semester</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Category (Credit Hours)</th>
</tr>
</thead>
</table>
| **Year 3 – Spring** | EEL 3135     | D-T Signals & Systems | Math & Basic Science: 3  
Mathematical Statistics: ()         |
|                 | EEL3304       | Electronic Circuits I | Engineering Topics: ()  
Electronic Circuits I Lab: ()         |
|                 | EEL 4304L     | Electronic Circuits I Lab | ()                  |
|                 | CIS 3020      | Introduction to Computer Info. Sys. | ()              |
|                 | EEL 4744C     | Microprocessor Applications I | Other            |
| **Year 3 – Summer** | COT 3100     | EEL Elective** | ()                  |
|                 |               | Applications of Discrete Structures | 3              |
| **Year 4 – Fall** | EEL 3396      | Solid State Electronic Devices | 3              |
|                 | CDA 3101      | Introduction to Computer Organization | 3              |
|                 | EEL 4712/L    | Digital Design | 4              |
|                 | EGN4034       | Professional/Ethics | ()              |
|                 |               | EEL Elective ** | 3              |
| **Year 4 – Spring** | EEL 4713/L    | Digital Computer Architecture | 4              |
|                 | COP 3530      | Data Structures and Algorithms | 3              |
|                 | COP 4600      | Operating Systems | ()              |
|                 |               | EEL Elective ** | ()              |
| **Year 4 – Summer** | CEN 3031     | Intro to Software Engineering | 3              |
|                 |               | CS Elective | ()              |
| **Year 5 – Fall** | EEL 4914C     | Elec. Engr. Design | 3              |
|                 | STA 4321      | Mathematical Statistics | ()              |

**TOTAL ABET BASIC-LEVEL REQUIREMENTS & FOR DEGREE**
36  65  21  10

**OVERALL TOTAL FOR DEGREE**
132

**PERCENTAGE OF TOTAL**
28.03  49.24  15.91  7.58

**Minimum SEMESTER credit hours**
32  48  18

**Minimum percentage**
25%  37.5%

* Not counted towards the UF Degree
** Electrical Engineering Courses- except for EEL 3003 and EEL 4834
*** Any 1000 or higher level course
Note that instructional material and student work verifying course compliance with ABET criteria for the categories indicated above will be required during the campus visit.
<table>
<thead>
<tr>
<th>Course No.</th>
<th>Title</th>
<th>No. of Sections offered in Current Year Fall 2004 - Spring 2005</th>
<th>Avg. Section Enrollment</th>
<th>Type of Class(^1)</th>
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<tbody>
<tr>
<td>EEL 3111</td>
<td>Circuits 1</td>
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<tr>
<td>EEL 3112</td>
<td>Circuits 2</td>
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<tr>
<td>EEL 3135</td>
<td>Discrete-Time Signals and Systems</td>
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<td>13</td>
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<tr>
<td>EEL 3211</td>
<td>Basic Electric Energy Engineering</td>
<td>2</td>
<td>22</td>
<td>100%</td>
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<tr>
<td>EEL 3303L</td>
<td>Electric Circuits Laboratory</td>
<td>16</td>
<td>10</td>
<td>100%</td>
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<tr>
<td>EEL 3304</td>
<td>Electronic Circuits 1</td>
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<td>13</td>
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<tr>
<td>EEL 3396</td>
<td>Solid-State Electronic Devices</td>
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<tr>
<td>EEL 3472</td>
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<td>EEL 3473</td>
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<td>Digital Logic and Computer Systems</td>
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<td>14</td>
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<td>EEL 3701L</td>
<td>Digital Logic and Computer Systems Laboratory</td>
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<td>8</td>
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<td>EEL 4230</td>
<td>Electronic Drives and Motor Control</td>
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<td>EEL 4304L</td>
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<td>EEL 4306C</td>
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<td>EEL 4310</td>
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<td>EEL 4516</td>
<td>Noise in Devices &amp; Communication Systems</td>
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<td>EEL 4657</td>
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<td>Linear Controls Laboratory</td>
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<td>EEL 4663</td>
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<tr>
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<td>Digital Logic</td>
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\(^1\)Note: Enter the appropriate percent for each type of class for each course (e.g., 75% lecture, 25% recitation).
Table I-2. Course and Section Size Summary Continued  
(Electrical and Computer Engineering)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Title</th>
<th>No. of Sections offered in Current Year Fall 2004 - Spring 2005</th>
<th>Avg. Section Enrollment</th>
<th>Type of Class¹</th>
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<tbody>
<tr>
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<td>EEL 4949</td>
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<td>24</td>
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¹ Note: Enter the appropriate percent for each type of class for each course (e.g., 75% lecture, 25% recitation).

Appendix 1 -5
<table>
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<tr>
<th>Faculty Member (Name)</th>
<th>FT or PT</th>
<th>Classes Taught (Course No./Credit Hrs.)</th>
<th>Term and Year</th>
<th>Total Activity Distribution</th>
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<td>Fall 2005 Semester</td>
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<td>Ratha An</td>
<td>PT</td>
<td>EEL4514L (1 Lab), EEL4744L (1 Lab)</td>
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<tr>
<td>Roger Avant</td>
<td>PT</td>
<td>EEL3135 (3 Lec), EEL3303L (1 Lab), EEL4657L (1 Lab), EGM4313 (4 Lec),</td>
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<tr>
<td>Mohannad Bataineh</td>
<td>FT</td>
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</tr>
<tr>
<td>Doyle Dingus</td>
<td>PT</td>
<td>EEL4514L (1)</td>
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<td>25%</td>
</tr>
<tr>
<td>Andreas Fuchs</td>
<td>FT</td>
<td>EEL3112 (3), EEL3303L (1), EEL4657 (3),</td>
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<td>75%</td>
</tr>
<tr>
<td>Tom Gilbar</td>
<td>FT</td>
<td>EEL3701 (3), EEL3701L (1), EEL4744L (1)</td>
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<td>75%</td>
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<tr>
<td>Steve Gorman</td>
<td>FT</td>
<td>EEL3472 (3), EEL4514 (3), EEL4514L (1), EEL4635 (3)</td>
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<td>Dale Harrell</td>
<td>FT</td>
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<tr>
<td>Mohamed Khabou</td>
<td>FT</td>
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<td>Rachid Manseur</td>
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</tr>
<tr>
<td>Muhammad Rashid</td>
<td>FT</td>
<td>EEL4949 (1), EGN4034 (1),</td>
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<tr>
<td>Bassam Shaer</td>
<td>FT</td>
<td>EEL3304 (3), EEL4304L (1), EEL4712L (1)</td>
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</tr>
<tr>
<td>Naveed Siddiqi</td>
<td>PT</td>
<td>EIN4354 (3)</td>
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</tr>
<tr>
<td>William Weber</td>
<td>PT</td>
<td>EEL4304L (1)</td>
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<td>25%</td>
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# Table 3. Faculty Workload Summary

## Electrical and Computer Engineering

<table>
<thead>
<tr>
<th>Faculty Member (Name)</th>
<th>FT or PT</th>
<th>Classes Taught (Course No./Credit Hrs.) Term and Year</th>
<th>Total Activity Distribution</th>
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<tbody>
<tr>
<td></td>
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<td>Spring 2006 Semester</td>
<td>Teaching</td>
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<tr>
<td>Ratha An</td>
<td>PT</td>
<td>EEL3135 (3 Lec.), EEL3303L (1 Lab), EEL3472 (3 Lec), EEL4657L (1 Lab)</td>
<td>100%</td>
</tr>
<tr>
<td>Roger Avant</td>
<td>PT</td>
<td>EEL4304L (1), EEL4514L (1)</td>
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<tr>
<td>Mohannad Bataineh</td>
<td>FT</td>
<td>On medical leave</td>
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<td>Doyle Dingus</td>
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<tr>
<td>Andreas Fuchs</td>
<td>FT</td>
<td>EEL3111 (3), EEL4657 (3), EEL4657L (1)</td>
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<td>FT</td>
<td>EGN3203L (1), EEL3701 (3), EEL4713L (1), EEL4713L (1), EEL4744L (1)</td>
<td>75%</td>
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<tr>
<td>Steve Gorman</td>
<td>FT</td>
<td>EEL4514 (3), EEL4514L (1), EEL 4306L (1 Lab)</td>
<td>75%</td>
</tr>
<tr>
<td>Dale Harrell</td>
<td>FT</td>
<td>EGN1002 ( 1 Lec), EEL3112 (3 Lec.), EEL4304L (1 Lab), EEL4914 (3 Lab)</td>
<td>75%</td>
</tr>
<tr>
<td>Mohamed Khabou</td>
<td>FT</td>
<td>EEL4713L (1), EEL4713L (3), EEL4834 (3), EEL4930 (3)</td>
<td>75%</td>
</tr>
<tr>
<td>Rachid Manseur</td>
<td>FT</td>
<td>EEL4744 (3), EL4744L (1), EEL4744L (1), EEL4744 (3), EEL4744L (1)</td>
<td>75%</td>
</tr>
<tr>
<td>Muhammad Rashid</td>
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<td>EGN4034 (1), EEL4949 (1)</td>
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<tr>
<td>Bassam Shaer</td>
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<td>EEL4306 (3), EEL4713 (3), EEL4713 (3)</td>
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<tr>
<td>William Weber</td>
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<td>EEL4304L (1)</td>
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<tr>
<td>Naveed Siddiqi</td>
<td>PT</td>
<td>EEL3303L (1), EEL3701L (1)</td>
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1.
# Table 3. Faculty Workload Summary
## Computer Science Faculty

<table>
<thead>
<tr>
<th>Faculty Member (Name)</th>
<th>FT or PT</th>
<th>Classes Taught (Course No./Credit Hrs.) Term and Year</th>
<th>Total Activity Distribution</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Spring 2006 Semester</td>
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<td></td>
<td></td>
<td>Teaching</td>
<td>Research</td>
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<tr>
<td>Bagui, Sikha</td>
<td>FT</td>
<td>COP 4710 (3), COP 4173 (3), COP 5713 (3)</td>
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</tr>
<tr>
<td>Bolyard, John</td>
<td>FT</td>
<td>CGS 3559 (3), COP 4020 (3), CGS 2570(3), CGS 3283(3), CGS 3604 (3)</td>
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<tr>
<td>Coffey, John</td>
<td>FT</td>
<td>COP 3530 (3 ), COP 2253 (3), COP 3530 (3)</td>
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<tr>
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<td>Kolen, John</td>
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<td>FT</td>
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## Table 3. Faculty Workload Summary
### Computer Science Faculty

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<th>Faculty Member (Name)</th>
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<th>Classes Taught (Course No./Credit Hrs.) Term and Year</th>
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<td>Teaching</td>
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<tr>
<td>LaForte, Geoffrey</td>
<td>FT</td>
<td>COT 3100 (3), COT 4400 (3), COT 4420 (3)</td>
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<tr>
<td>Lewis, James</td>
<td>FT</td>
<td>CDA 3100 (3), CDA 3101 (3), CGS 3283 (3)</td>
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<tr>
<td>Owsnicki-Klewe Bernd</td>
<td>FT</td>
<td>CIS 3020 (3), COP 3530 (3), CEN 3031 (3), CIS 3021 (3)</td>
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<td>FT</td>
<td>COP 4601 (3), COP 4710 (3), COP 2334 (3)</td>
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<tr>
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<td>FT</td>
<td>CGS 3172 93), CIS 4340 (3), COP 3813 (3)</td>
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<td>Reedy, Stephanie</td>
<td>FT</td>
<td>CGS 3464 (3), CGS 3523 (3)</td>
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<tr>
<td>Simmons, Sharon</td>
<td>FT</td>
<td>CEN 4516 (3), COP 5522 (3), CEN 6930 (3)</td>
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<td>FT</td>
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Table 4. Faculty Analysis
Electrical and Computer Engineering

As of Fall 2005

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<th>Name</th>
<th>Age</th>
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<th>FT or PT</th>
<th>Highest Degree</th>
<th>Inst of Highest Degree &amp; Year</th>
<th>Years of Experience</th>
<th>Professional Registration</th>
<th>Level of Activity (high, medium, low) in:</th>
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<tbody>
<tr>
<td>Roger Avant</td>
<td></td>
<td>Visiting. Prof.</td>
<td>PT</td>
<td>Ph.D.</td>
<td>Michigan State University, 1997</td>
<td>25</td>
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<td>Low Low Medium</td>
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<tr>
<td>Mohammad Bataineh</td>
<td></td>
<td>Assoc. Prof.</td>
<td>FT</td>
<td>Ph.D.</td>
<td>Michigan State University, 1997</td>
<td>8</td>
<td>None</td>
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<tr>
<td>Andreas Fuchs</td>
<td></td>
<td>Asst. Prof.</td>
<td>FT</td>
<td>Ph.D.</td>
<td>Clarkson University, 1991</td>
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<td>None</td>
<td>Medium Low Low</td>
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<tr>
<td>Thomas Gilbar</td>
<td></td>
<td>Lecturer</td>
<td>FT</td>
<td>Ph.D.</td>
<td>Florida Atlantic University, 2002</td>
<td>11</td>
<td>None</td>
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<tr>
<td>Steve Gorman</td>
<td></td>
<td>Assoc. Prof.</td>
<td>FT</td>
<td>Ph.D.</td>
<td>University of Kentucky, 1988</td>
<td>12</td>
<td>Florida</td>
<td>Low Medium High</td>
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<tr>
<td>Dale Harrell</td>
<td>51</td>
<td>Asst. Prof.</td>
<td>FT</td>
<td>Ph.D.</td>
<td>University of New Mexico, 2002</td>
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<td>Mohamed Khabou</td>
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<td>FT</td>
<td>Ph.D.</td>
<td>University of Missouri-Columbia, 1999</td>
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<td>None</td>
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<td>Rachid Manseur</td>
<td>51</td>
<td>Assoc. Prof.</td>
<td>FT</td>
<td>Ph.D.</td>
<td>University of Florida, 1988</td>
<td>3</td>
<td>Florida</td>
<td>Low Medium Low</td>
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<tr>
<td>Muhammad H. Rashid</td>
<td>61</td>
<td>Prof. &amp; Director</td>
<td>FT</td>
<td>Ph.D.</td>
<td>University of Birmingham, U.K., 1976</td>
<td>8</td>
<td>C. Eng. (U.K.)</td>
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<tr>
<td>Bassam Shaer</td>
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<td>FT</td>
<td>Ph.D.</td>
<td>University of South Florida, 1995</td>
<td>None</td>
<td>None</td>
<td>Low Medium Low</td>
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<tr>
<td>Bill Weber</td>
<td>61</td>
<td>Instructor</td>
<td>FT</td>
<td>MS</td>
<td>George Washington University, 1984</td>
<td>10</td>
<td>None</td>
<td>Low Medium Low</td>
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Appendix I-10
# Table 4. Faculty Analysis
## Computer Science Faculty

As of Fall 2005

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>FT or PT</th>
<th>Highest Degree</th>
<th>Inst of Highest Degree &amp; Year</th>
<th>Years of Experience</th>
<th>Professional Registration</th>
<th>Level of Activity (high, medium, low) in:</th>
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<tr>
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<td>Govt/Industry Practice</td>
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<tr>
<td>Bagui, Sikha</td>
<td>Assistant Professor</td>
<td>FT</td>
<td>MS/</td>
<td>University of Toledo, 1986</td>
<td>0</td>
<td>None</td>
<td>Low</td>
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<tr>
<td>Bezdek, James</td>
<td>Professor</td>
<td>FT</td>
<td>MS</td>
<td>UWF, 1992</td>
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<td>None</td>
<td>Medium</td>
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<tr>
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<td>FT</td>
<td>ABD</td>
<td>UWF, 2001</td>
<td>8</td>
<td>Low</td>
<td>Low</td>
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<tr>
<td>Coffey, John</td>
<td>Associate Professor</td>
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<td>EdD</td>
<td>UWF, 2000</td>
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<tr>
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<td>PhD</td>
<td>William &amp; Mary 1999</td>
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<tr>
<td>El-Sheikh, Eman</td>
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<td>FT</td>
<td>PhD</td>
<td>Michigan State U. 2002</td>
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<td>FT</td>
<td>PhD</td>
<td>Old Dominion U. 1997</td>
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<td>PhD</td>
<td>Ohio State U., 1994</td>
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<td>PhD</td>
<td>U. Michigan 1995</td>
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<td>MA</td>
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<td>PhD</td>
<td>U. Hamburg 1984</td>
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<td>MS</td>
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<td>Prayaga, Lakshmi</td>
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<td>FT</td>
<td>MS</td>
<td>UWF, 2001</td>
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<td>Low</td>
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<tr>
<td>Reedy, Stephanie</td>
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<td>MS</td>
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<tr>
<td>Rodgers, Edward</td>
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<td>FT</td>
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## B. Course Syllabi

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<tr>
<td>1. UWF Course Co-ordinators</td>
<td>I-14</td>
</tr>
<tr>
<td>2. Chemistry Courses</td>
<td>I-16</td>
</tr>
<tr>
<td>3. Computer Science Courses</td>
<td>I-24</td>
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<tr>
<td>4. Electrical Engineering Courses</td>
<td>I-46</td>
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<td>5. Engineering Courses</td>
<td>I-132</td>
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<td>6. Mathematics/Statistics Courses</td>
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<tr>
<td>7. Physics Courses</td>
<td>I-154</td>
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<td>8. Technical Writing Course</td>
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## 1. UWF Course Co-ordinators

**DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING**

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<th>Telephone</th>
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<td>CDA3101 Introduction to Computer Organization</td>
<td>James Lewis</td>
<td>Dennis Edwards</td>
<td>CS</td>
<td>474-2542</td>
</tr>
<tr>
<td>CEN3031 Software Engineering I</td>
<td>Laura White</td>
<td>Anthony Pinto</td>
<td>CS</td>
<td>474-2542</td>
</tr>
<tr>
<td>CHM2045C Chemistry I</td>
<td>Leo ter Haar</td>
<td>Michael Huggins</td>
<td>CHM</td>
<td>474-2542</td>
</tr>
<tr>
<td>CHM2046C Chemistry II</td>
<td>Leo ter Haar</td>
<td>Michael Huggins</td>
<td>CHM</td>
<td>474-2542</td>
</tr>
<tr>
<td>CIS3020 Introduction to CIS</td>
<td>Norman Wilde</td>
<td>Laura White</td>
<td>CS</td>
<td>474-2548</td>
</tr>
<tr>
<td>COP4020 Programming Languages</td>
<td>John Coffey</td>
<td>Eman El-Sheikh</td>
<td>CS</td>
<td>474-3183</td>
</tr>
<tr>
<td>COP2253 Introductory Programming:</td>
<td>Eman El Sheik</td>
<td>Geoff LaForte</td>
<td>CS</td>
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<tr>
<td>COP3530 Data Structures and Algorithms</td>
<td>John Coffey</td>
<td>John Kolen</td>
<td>CS</td>
<td>474-3152</td>
</tr>
<tr>
<td>COP4600 Operating Systems</td>
<td>Dennis Edwards</td>
<td>Sharon Simmons</td>
<td>CS</td>
<td>474-2154</td>
</tr>
<tr>
<td>COP4710 Database System</td>
<td>Sikha S. Bagui</td>
<td>Ed Rodgers</td>
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<td>COT3100 Application of Discrete Structures</td>
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<td>Geoffrey LaForte</td>
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<td>COT4400 Analysis of Algorithms</td>
<td>James Bezdek</td>
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<td>Tom Gilbar</td>
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<td>EEL3112 Circuits II</td>
<td>Andreas Fuchs</td>
<td>Rachid Manseur</td>
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<td>EEL3135 Discrete Time Signals and Systems</td>
<td>Roger Avant</td>
<td>Steve Gorman</td>
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<td>EEL3211 Basic Electric Energy Engineering</td>
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<td>Steve Gorman</td>
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<td>EEL3304 Electronic Circuits I</td>
<td>Bassam Shaer</td>
<td>M. Bataineh</td>
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<td>M. Bataineh</td>
<td>Bassam Shaer</td>
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<td>EEL3472 Electromagnetic Fields &amp; Applications I</td>
<td>Dale Harrell</td>
<td>Steve Gorman</td>
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<td>EEL3473 Electromagnetic Fields &amp; Applications II</td>
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<td>EEL4230 Electronic Drives and Motor Control</td>
<td>M. H. Rashid</td>
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<td>Steve Gorman</td>
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<td>EEL4516 Noise in Devices and Comm. Systems</td>
<td>Andreas Fuchs</td>
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<td>C++ Programming for Electrical Engr.</td>
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<td>EEL4905</td>
<td>Individual Problems in Electrical Engr.</td>
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<td>Intermediate Engineering Analysis</td>
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<td>English</td>
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<td>EGM 5000</td>
<td>Engineering Mechanics - Statics</td>
<td>Chandra Prayaga</td>
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<td>Kevin Rigby</td>
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<td>EGN3203</td>
<td>Engineering Software Tools</td>
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<td>Analytic Geometry and Calculus I</td>
<td>Joshphat Uvah</td>
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<td>MAP2302</td>
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<td>Robert Brooks</td>
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<td>Morris Marx</td>
<td>MATH</td>
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Master Course Syllabi for CHM 2045

1. **Department:** Chemistry

2. **Title:** General Chemistry I  
**Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** The main objectives of this course are: to introduce chemical and physical properties; to develop the relationship between observables and concepts; and the development of a theoretical framework.

5. **Prerequisite(s):**  
MAC 1105

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
College level course to prepare students for further study in chemistry and science.

8. **Course Outcomes:**  
The primary goal is the mastery of concepts and principles relating to the topics covered (see below). Students will apply mathematical skills throughout the course to perform calculations involving conservation of mass, measurement and significant figures, chemical formulas, reactions, mass, moles, mass percentage, elemental analysis, empirical and molecular formulas, stoichiometry, limiting reagents, theoretical and percentage yields, concentrations, gravimetric and volumetric analyses, ideal gas law, thermodynamics, and quantum theory.

9. **Topics Covered:**  
1. Basics of Chemistry  
2. Chemistry and Measurement  
3. Atoms, Molecules and Ions  
4. Calculations with Chemical Formulas and Reaction Equations  
5. Chemical Reactions  
6. States of Matter: Solids, Liquids and Gases  
7. Thermochemistry  
8. Atomic and Molecular Structure  
9. Quantum Theory of the Atom  
10. Electronic Configurations, Lewis Electron Dot Structures  
11. Periodicity  
12. Ionic and Covalent Bonding  
13. Molecular Three-Dimensional Geometry  
14. Chemical Bonding Theory  
15. Solutions
16. Materials Chemistry

10. **Class/Laboratory Schedule:**
Three classes of 50 minutes per week.
One laboratory session of 4 hours per week, per section.

11. **Contribution to Meeting Professional Component:**
Develop the fundamental concepts of chemical and physical properties.

12. **Relationship to Program Objectives:**
Serve as the pre-requisites in developing the knowledge of engineering science.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [Web Format] | [PDF Format] | [RTF Format]
Plagiarism Policy: [Word Format] | [PDF Format] | [RTF Format]
Student Handbook: [PDF Format]

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Pamela Tanner  
**Date:** Spring 2005
Master Course Syllabi for CHM 2045L

1. **Department:** Chemistry

2. **Title:** General Chemistry Lab
   **Credits:** 1

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** The main objective of this course is to reinforce chemical principles and concepts introduced in the lecture course. It is hoped that the experiments will be carried out in close sequence with the material being discussed in lecture.

5. **Prerequisite(s):**
   CHM 2045

6. **Textbook(s) and/or Other Required Materials:**
   Students must purchase a duplicate laboratory notebook.
   Experiments will be available on the Desire2Learn Learning Management System.

7. **Course Objectives:**
   College level course to prepare students for further studies in chemistry and science.

8. **Course Outcomes:**
   The student will be introduced to a variety of experimental techniques selected to achieve the above objective. Student confidence in the laboratory is of primary concern since this is an introductory course. Confidence is best obtained by competence in technique and mastery of theory. We hope to insure the success of the student through careful demonstration and lecture and to closely supervise the procedures as the student carries them out. In addition to the primary goal of mastery of concepts and principles, it is hoped that the student will gain an appreciation of what must be done to obtain good scientific data and how the data can be evaluated.

9. **Topics Covered:**
   1. Laboratory Safety
   2. Significant Figures
   3. Graphical Representation of Data
   4. Determination of Water of Hydration
   5. Transformation of Copper
   6. Chemical Reactions on a Microscale
   7. Volumetric Determination of Purity of Acid
   8. Gas Laws: P-V-T Relationship
   9. Heat of Vaporization of Liquid Nitrogen
   10. Paper Chromatography
   11. Atomic Spectroscopy
   12. Ion Exchange Chromatography
   13. Molecular Geometry and Bonding

10. **Class/Laboratory Schedule:**

Appendix I-18
One session 4 hours per week.

11. **Contribution to Meeting Professional Component:**
    Develop the fundamental concepts of chemical and physical properties.

12. **Relationship to Program Objectives:**
    Serves as the pre-requisites in developing the knowledge of engineering science.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    Academic Conduct Policy: [Web Format] | [PDF Format] | [RTF Format]
    Plagiarism Policy: [Word Format] | [PDF Format] | [RTF Format]
    Student Handbook: [PDF Format]

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16. **Prepared by:** Dr. Pamela Tanner                  **Date:** Spring 2005
Master Course Syllabi for CHM 2046

1. **Department:** Chemistry

2. **Title:** General Chemistry II
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:**
   Continuation of CHM2045 with emphasis on chemical calculations and problem solving. Thermodynamics, equilibria, kinetics, and an introduction to transition metal complexes.

5. **Prerequisite(s):**
   CHM 2045
   CHM 2045L

6. **Textbook(s) and/or Other Required Materials:**
   Chemistry, by Raymond Chang, Eighth Edition

7. **Course Objectives:**
   College level course to prepare students for further studies in chemistry and science.

8. **Course Outcomes:**

9. **Topics Covered:**
   1. Chapter 11 - Intermolecular Forces
   2. Chapter 12 - Solutions
   3. Infrared Spectroscopy
   4. Chapter 23 - Nuclear Chemistry
   5. **Test 1**
   6. Chapter 13 - Kinetics
   7. Chapter 22 - Transition metal chemistry
   8. **Test 2**
   9. Chapter 14 - Equilibrium
   10. Chapter 15 - Acids & Bases
   11. Chapter 16 - Buffers, titrations, etc.
   12. **Test 3**
   13. Chapter 18 - Entropy, Free Energy, etc.
   14. Chapter 19 - Electrochemistry
   15. If any time is remaining of the semester, then we will begin covering the following chapters in this order, time permitting: Chapter 17, 20, 21, 24, 25
   16. **Test 4**
   17. **Final Exam** - Comprehensive Final

10. **Class/Laboratory Schedule:**
   Two classes of 75 minutes per week.
   One laboratory session of 4 hours per week, per section.
11. **Contribution to Meeting Professional Component:**
   Develop the fundamental concepts of chemical and physical properties.

12. **Relationship to Program Objectives:**
    Serves as the pre-requisites in developing the knowledge of engineering science.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    Academic Conduct Policy: [Web Format](#) | [PDF Format](#) | [RTF Format](#)
    Plagiarism Policy: [Word Format](#) | [PDF Format](#) | [RTF Format](#)
    Student Handbook: [PDF Format](#)

15. **Assistance:**
    Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Lisa Struck  
    **Date:** Spring 2005
1. **Department:** Chemistry
2. **Title:** General Chemistry II Laboratory  
   **Credits:** 3
3. **Course Designation as Elective or Required:** Elective
4. **Catalog Description:** The main objective of this course is to reinforce chemical principles and concepts introduced in the lecture course. It is hoped that the experiments will be carried out in close sequence with the material being discussed in lecture.
5. **Prerequisite(s):**  
   CHM 2046
6. **Textbook(s) and/or Other Required Materials:**  
   General Chemistry Lecture (CHM 2046) Textbook  
7. **Course Objectives:**
8. **Course Outcomes:**  
   The student will be introduced to a variety of experimental techniques selected to achieve the above objective. Student confidence in the laboratory is of primary concern since this is an introductory course. Confidence is best obtained by competence in technique and mastery of theory. We hope to insure the success of the student through careful demonstration and lecture and to closely supervise the procedures as the student carries them out. In addition to the primary goal of mastery of concepts and principles, it is hoped that the student will gain an appreciation of what must be done to obtain good scientific data and how the data can be evaluated.
9. **Topics Covered:**  
   1. Laboratory Safety  
   2. Freezing Point Depression  
   3. Infrared Spectroscopy  
   4. Radioactivity  
   5. Kinetics  
   6. Weak Acid Titration  
   7. Buffers-Hydrolysis  
   8. Synthesis of a Cobalt Complex and Recrystallization  
   9. Colorimetric Analysis of Cobalt  
   10. Titration of Water and Gravimetric Analysis  
   11. Qualitative Analysis
10. **Class/Laboratory Schedule:**  
    One weekly 4 hour session.
11. **Contribution to Meeting Professional Component:**
12. **Relationship to Program Objectives:**

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   Academic Conduct Policy: [Web Format] | [PDF Format] | [RTF Format]
   Plagiarism Policy: [Word Format] | [PDF Format] | [RTF Format]
   Student Handbook: [PDF Format]

15. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Pamela Tanner  
    **Date:** Spring 2005
3. **Computer Science Courses**

**Master Course Syllabus for CDA 3101**

1. **Department:** COMPUTER SCIENCE

2. **Course Title:** Introduction to Computer Organization

   **Course Credit Hours:** 3.0

3. **Course Designation as Required or Elective:** Required for computer engineering

4. **Catalog Description:** Organization of computing systems. Logical basis of computer structure. Machine representation of instructions and data, flow of control, and basic machine instructions. Assembly language programming.

5. **Prerequisites or Co-requisites:** MAC 2311 or MAC 2233; CDA 3100 or EEL 3701

6. **Textbook(s) and/or Other Required Materials:**


7. **Course Objective(s):**

   - This course is intended to analyze how computers work from various levels of abstraction. The student will gain an understanding of the interdependencies between hardware, machine language, high-level language, software, memory and I/O device performance.

8. **Course Outcomes:** Upon completion of the course, students will be able to:

   1. Analyze and compare performance of computer systems.
   2. Understand the impact of different instruction set architecture designs on system performance.
   3. Understand the components and operation of a modern computer system including the processor, data path, memory, bus and I-O systems.
   4. Read and write assembly language programs.
   5. Understand the relationship between high level language programs and the code generated by translators to control the hardware.
   6. Understand the issues related to improving processor performance, including pipelining and parallel processing.

9. **Topics covered:**

   1. Instruction set architectures.
   2. Assembly and machine language programs.
   3. Design and operation a common microprocessor.
4. The basic machine cycle (fetch-decode-execute).
5. Understanding computer performance.
6. Memory, bus and I-O systems.
7. Alternative architectures.

10. **Class/Laboratory Schedule:**

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<th>TOPIC</th>
<th>PROJECT</th>
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<tbody>
<tr>
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<td>History Ch. 1</td>
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<td>Review Number Systems Ch. 2</td>
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<td>Review Digital Logic (Appendix B)</td>
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<td>MIPS Instruction set Ch. 2 (Basics)</td>
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<td>3</td>
<td>MIPS emulator (Appendix B)</td>
<td>Project 1</td>
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<td>(writing, testing and debugging)</td>
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<td>Project 2</td>
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<td>The ALU and arithmetic Ch. 3</td>
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<td>Floating Point operations Ch. 3</td>
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<td>Analyzing performance Ch. 4</td>
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11. **Contribution to Meeting Professional Component:**
- This course describes the principles of computer architecture using solid computer science fundamentals and quantitative cost/performance tradeoffs. Principles are demonstrated by combining examples and measurements, based on commercial systems, to create realistic design experiences. Scientific methodologies are used to develop and demonstrate the architecture principles. The MIPS 2000 RISC architecture serves as the basis for this course and is demonstrated with a simulator program.

12. **Relationship to Program Objectives:**
- **Apply knowledge:** The course emphasizes general architectural principles, with discussions of parallel and pipelined machines, etc. Students apply design criteria in completing assignments related to understanding computer organization, interfacing, etc.
- **Design meeting needs:** Students learn how to weigh considerations for alternative computer organization designs (e.g., cheapest versus fastest versus “best” design).
- **Solve problems:** Students complete a set of programming assignments using the SPIM simulator program.
• Professionalism and ethical responsibility: Assignments emphasize the importance of professionalism and ethics in designing and programming specifications.

• Communication: Students complete a research paper related to the course objectives.

• Impact of engineering solutions: Students complete mini writing assignments based on the impact, fallacies, and pitfalls of computer organization and design (in addition to a research paper related to the course objectives).

• Life-long learning: The course emphasizes the past, current, and future evolution of computing machinery.

13. **Relationship to Program Outcomes:**
1. To enhance understanding of the relationships among hardware, software and data components in a modern computer system (Outcome 1, Outcome 2).

2. To enable students to better understand the role of computer organization in system performance (Outcome 1, Outcome 2).

3. To familiarize students with the techniques used to enhance performance in modern computer systems (Outcome 1, Outcome 6).

4. To enhance the student’s understanding of program design and data management at the machine level (Outcome 1, Outcome 6).

14. **Expectations for Academic Conduct/Plagarism Policy:**

As members of the University of West Florida, we commit ourselves to honesty. As we strive for excellence in performance, integrity—personal and institutional—is our most precious asset. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others. We pledge to share community resources in ways that are responsible and that comply with established policies of fairness. Cooperation and competition are means to high achievement and are encouraged. Indeed, cooperation is expected unless our directive is to individual performance. We will compete constructively and professionally for the purpose of stimulating high performance standards. Finally, we accept adherence to this set of expectations for academic conduct as a condition of membership in the UWF academic community.

Any occurrence of academic dishonesty, including all forms of cheating and plagiarism, will be punished by a range of punishments from a grade of zero on the assignment to expulsion from the university. For more information, see the UWF Student Handbook (http://www.uwf.edu/uwfmain/stuHandbk/).

15. **Assistance:**

Students with special needs who require specific examination-related or other course-related accommodations should contact the UWF Office of Disabled Students Services (http://www.uwf.edu/DSS/ or tel. 850-474-2387). DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Jim Lewis **Date:** August 20, 2004
Master Course Syllabus for CEN 3031

1. **Department:** COMPUTER SCIENCE

2. **Course Title:** Software Engineering  
   **Credits:** 3

3. **Course Designation as Required or Elective:** Required for computer engineering

4. **Catalog Description:** Software planning, specifications, coding, testing and maintenance. Students gain experience in the team approach to large system development.

5. **Prerequisite(s):**  
   COP 3530  
   ENC 3240

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objective(s):**  
   The main objective of the course is to provide students with a foundation in basic software engineering principles. Students are exposed to the software development life cycle by focusing on the techniques and deliverables associated with each phase of widely used models.

8. **Course Outcomes:**  
   1. Understand the purpose of software engineering  
   2. Become familiar with various software engineering techniques related to development and evolution  
   3. Apply various software engineering techniques to a small individual project  
   4. Work effectively on a team to complete a group project

9. **Topics Covered:**  
   1. Scope of Software Engineering  
   2. The Software Process  
   3. Software Life-Cycle Models  
   4. Software Teams  
   5. Testing  
   6. Cohesion and Coupling  
   7. Requirements  
   8. Specifications  
   9. Design  
   10. Implementation  
   11. Integration

10. **Class/Laboratory Schedule:**  
    Three fifty minute class meetings per week.
11. **Contribution to Meeting Professional Component:**
The course covers classical and object-oriented techniques for developing large-scale software. Students develop a product and its associated documentation. Major milestones for the project and documentation guidelines for each deliverable are provided to the students.

12. **Relationship to Program Objectives:**
- Students acquire experience in working on teams. Writing and oral presentation skills are emphasized throughout the semester. Students learn the phases of the software life cycle by developing a product from the requirements state to implementation. Major deliverables include a prototype or preliminary user manual, specification documents, design documents, and test cases.
- Students apply knowledge of mathematics, science, and engineering in classroom discussions. Assignments on cost estimation require a knowledge of college algebra.
- Students develop test cases and analyze the results from executing code.
- Students develop a product from specification to implementation. Design documents include a specification of the overall architecture as well as interface requirements and algorithms for individual modules.
- Students are assigned to teams based on their previous work experience, personality type, and communication skills. An effort is made to construct teams that will provide students with experience working with individuals with different backgrounds and experience.
- Professional and ethical responsibilities are integrated into classroom discussions.
- Each student is required to participate in all phases of software development. Technical writing skills are emphasized by requiring the students to produce documentation for each of the major phases of the software life cycle model from requirements to implementation.
- The importance of life-long learning is emphasized in the early class discussions. New technologies and techniques are included in class lectures.
- Current software problems and success stories are integrated into the lectures.
- Students are exposed to both the classical and object-oriented paradigms. A knowledge of classical techniques is important as students may have to maintain legacy code during their future careers. Furthermore, the limitations of existing techniques are discussed.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagarism Policy:**
Academic Conduct Policy: [Web Format] | [PDF Format] | [RTF Format]
Plagiarism Policy: [Word Format] | [PDF Format] | [RTF Format]
Student Handbook: [PDF Format]

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared By:** Laura White  
**Date:** Spring 2005
Master Course Syllabus for CIS 3020

1. **Department**: Computer Science

2. **Title**: Introduction to CIS  
   **Credits**: 3

3. **Course Designation as Elective or Required**: Required for computer engineering

4. **Catalog Description**: Introduction to computers and algorithms. Programming in a high level language. Topics include procedural abstraction, data abstraction, and structured/object oriented programming techniques, recursion and manipulating dynamic memory. Students will learn the fundamentals of developing coherent, expressive programs. May not be taken for credit by CS/CIS majors. Permission is required.

5. **Prerequisite(s)**:  
   MAC 2311

6. **Textbook(s) and/or Other Required Materials**:  
   Big Java by Cay Horstmn *Big Java*, by: Horstmann, (2002), Wiley Publishing,  

7. **Course Objective(s)**:  
   The objectives of this course are two fold:

   To learn algorithmic problem solving techniques.

   To learn how to express such algorithmic solutions in a programming language.

   In attaining these objectives students shall learn ways of organizing information in a computer and various ways of processing that information.

8. **Course Outcomes**:  
   1. Understand the relationship between hardware and software in computer systems  
   2. Be able to apply engineering principles to the design of a software system  
   3. Be able to apply procedural abstraction in the development of a software system  
   4. Be able to apply object-oriented principles in the development of a software system  
   5. Be able to use programming techniques to solve problems

9. **Topics Covered**:  
   1. Interfaces and Polymorphism  
   2. Event Handling  
   3. Inheritance  
   4. Graphical User Interfaces  
   5. Array Lists and Arrays  
   6. Exceptions
10. **Class/Laboratory Schedule:**
Three classes of 50 minutes per week.

11. **Contribution to Meeting Professional Component:**
The ability to analyze problems, design and develop software solutions is a vital part in the education of any CS/EE student. This course lays the foundation upon which computer science courses build.

12. **Relationship to Program Objectives:**
Students study number systems and logical operators in this course. Several of the problems which the students address in homework or write programs for are rooted in mathematics.

   Students learn about proper modular design in software.

   Students are exposed to the ideas of requirement analysis in software design.

   Ethics in computing is stressed through the course.

   Class discussions involve the impact of computing in society.

   The fact that programming is a very dynamic subject that keeps evolving and the need to be current is stressed.

   Students learn the rudiments of using the Unix operating system.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagarism Policy:**
Academic Conduct Policy: [Web Format] | [PDF Format] | [RTF Format]
Plagiarism Policy: [Word Format] | [PDF Format] | [RTF Format]
Student Handbook: [PDF Format]

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Laura White

**Date:** Spring 2005
Master Course Syllabus for COP 3530

1. **Department:** COMPUTER SCIENCE

2. **Title:** Data Structures and Algorithms  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required for computer engineering

4. **Catalog Description:** Storage and manipulation of basic data structures such as arrays, linked lists, trees and other multi-linked structures. Algorithms for manipulation of these structures and for sorting, searching, and string processing are developed.

5. **Prerequisite(s):**  
   COT3100 and CIS 3021; either CIS3020 or COP3022; either MAC2233 or MAC 2311  
   **Co-requisites:** MAD3107

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objective(s):**  
   This course provides an overview of data structures (records, arrays, stack, queues, linked lists, trees, etc.) and their implementation. The course also emphasizes good software design principles (data and procedure abstraction, recursive specifications, etc.).

8. **Course Outcomes:**  
   By satisfactory performance on programming assignments and tests, students will demonstrate an understanding of:  
   - Algorithm Analysis and Big O notation  
   - Theory, Design and implementation of:  
     - Arrays  
     - Linked Lists, Stacks and Queues  
     - Trees, Binary Trees, Binary Search Trees, and height-balanced trees  
     - Heaps  
     - Hash Tables  
     - Graphs  
     - Sorting Algorithms  
     - Search Algorithms

9. **Topics Covered:**  
   1. Introduction to the Course  
   2. Algorithm Analysis  
   3. Single and Multi-dimensional Arrays  
   4. Linked Lists  
   5. Stacks and Queues  
   6. Trees, Binary Trees  
   7. Binary Search Trees  
   8. AVL, 2-3, B-trees  
   9. Priority Queues, Heaps

Appendix I-31
10. Sorting  
11. Sets and Hashing  
12. Searching  
13. Graphs  

10. **Class/Laboratory Schedule:**  
Three classes of 50 minutes per week.  

11. **Contribution to Meeting Professional Component:**  
Data structure is the foundational course upon which just about every course a CS/ECE students takes in based upon. On completion of the course, students will be able to design solutions to non-trivial problems. A successful design in real life consists of separating the interface (what?) from the implementation (how?). A major part of the content of the course focuses on this issue.  

12. **Relationship to Program Objectives:**  
Homework problems are often rooted in engineering and mathematics issues. Analysis of algorithms requires application of knowledge in discrete mathematics. Students design data sets to test their algorithms. Design of ADTs is a vital component of the course. Issues of software engineering (modularity, abstraction, etc.) are discussed in the class. Ethics in computing is stressed throughout the course. Modern data structures is a continuously evolving discipling spanning all aspects of computer science. The need to keep current in new developments is discussed. In determining the efficiency of algorithms some amount of discrete mathematics is reviewed.  

13. **Relationship to Program Outcomes:**  

14. **Expectations for Academic Conduct/Plagarism Policy:**  
**Cheating** is an act of academic misconduct. **Cheating** is defined as the unauthorized giving or taking of any information or material on academic work considered in the determination of a grade. All the work you submit in this course is individual work unless explicitly stated otherwise individual. Giving or taking any assignment from someone else is cheating. If you are caught and convicted, you will receive a grade of "F" for the course and an annotation that you have been convicted of cheating will appear on your permanent record. Such an annotation typically means that you automatically become ineligible for financial aid.  

15. **Assistance:**  
Students with special needs who require specific examination-related or other course-related accommodations should contact me as soon as possible. Alternatively, you may contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide you with a letter to me that will specify any recommended accommodations.  

16. **Prepared by:** Dr. John W. Coffey  
**Date:** Spring 2005
Master Course Syllabus for COP 4600

1. **Department**: COMPUTER SCIENCE
2. **Title**: Operating Systems
   **Credits**: 3

3. **Course Designation as Elective or Required**: Required for computer engineering
4. **Catalog Description**: The design and implementation of various components of a modern operating system, including I/O programming, interrupt handling, process and resource management, computer networks and distributed systems. Note: This is a programming intensive course. Students will be expected to spend significant time outside of lecture writing programs utilizing the concepts covered in class.

5. **Prerequisite(s)**:
   COP3530 Data Structures and Algorithms
   CDA3100 Microprocessor Systems

6. **Textbook(s) and/or Other Required Materials**:
   **Recommended texts**:
   Pearson Education ISBN: 0131103628
   Learning the UNIX Operating System: A Concise Guide for the New User
   J. Peek, J. Strang, G. Todino-Gonguet O'Reilly & Associates, Incorporated
   ISBN: 0596002610

7. **Course Objective(s)**:
   • To expose students to the structure, design, and implementation principles of modern operating systems. The course covers the software and hardware architectural design of operating systems.

8. **Course Outcomes**:
   Student who successfully complete this course will be able to:
   • Distinguish between a process and a thread with respect to their application and performance
   • Describe common CPU scheduling algorithms used by modern operating systems
   • Explain the basic synchronization tools available to programmers and how they are implemented in the operating system
   • Describe deadlock and ways of avoiding it
   • Explain the effects of memory management policies on the execution of programs
   • Explain the complexities and strategies of file and I/O system implementation
   • Write programs to demonstrate the use of operating system provided functionality

9. **Topics Covered**:
   1. Ch1-2 Introduction & Overview Ch9 Virtual Memory
   2. Ch3 Processes Ch10 File System Interface
   3. Ch4 Threads Ch11 File System Implementation
   4. Ch5 CPU Scheduling Ch12 Mass Storage Devices
   5. Ch6 Process Synchronization Ch14 Protection
   6. Ch7 Deadlock Ch15 Security
   7. Ch8 Main Memory
10. **Class/Laboratory Schedule:**
Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:**
At the completion of this course, the students should understand the role of the operating system to serve as a resource manager and implementer of security between competing programs.

12. **Relationship to Program Objectives:**
- Students demonstrate an ability to design a system, component, or process to meet desired needs through programming projects. Commencing Spring 2000, students will be required to complete programming exercises that will require the creation of multi-threaded software, the creation and manipulation of kernel objects, and the handling of inter-process communication in a modern operating system (e.g. Windows NT/2000, UNIX, etc.)
- Professional and ethical responsibility are covered throughout the course, but particularly in the sections discussing the security and protection of operating systems.
- Students are introduced to the requirement to engage in life-long learning through the study of the nature in which operating systems continue to change to attempt to satisfy current requirements in science and business.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagarism Policy:**

**Academic Conduct Policy:**
Academic conduct problems will be referred to the Department Chair for disciplinary action as described by the Student Handbook.

**Plagiarism Policy:**
You are responsible for keeping your work secure and not allowing others to copy it. I will use a program called cheat to compare every assignment submitted for grading. Any assignments found to be "too similar" will be questioned. Plagiarism will result in a minimum of a 0 grade for the assignment. Please see the University's Plagiarism Policy for examples of work constituting plagiarism. [http://uwf.edu/StudentAffairs/division/publications/PlagBroch.pdf](http://uwf.edu/StudentAffairs/division/publications/PlagBroch.pdf)

**Student Handbook:**
Please refer to the on-line version of the UWF Student Handbook. [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)
Printed copies are available through the University.

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DDS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared By:** Dennis Edwards  
**Date:** Spring 2005
Master Course Syllabus for COP 4710

1. **Department:** COMPUTER SCIENCE

2. **Title:** Database Systems  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Introduction to database systems and database management system architectures. Various database models are discussed with an emphasis on the relational model and relational database design. Case applications using SQL are included.

5. **Prerequisite(s):**  
   Any programming course

6. **Textbook(s) and/or Other Required Materials:**  
   
   

7. **Course Objective(s):**  
   The goal of the course is to introduce students to the design and use of databases. The relational model is strongly emphasized. The relational algebra is explored and compared to SQL. Correctness of the relational model is pursued via normal forms.

8. **Course Outcomes:**  
   Upon completion of this course the student will be able to:  
   - Understand the uses of using a database system  
   - Understand the differences between relational/hierarchical/network databases  
   - Develop ER models  
   - Develop Enhanced ER models  
   - Map ER and EER to relational tables  
   - Reverse engineering  
   - Use relational algebra and relational calculus  
   - Understand and develop a database using a relational data model  
   - Develop a normalized database  
   - Use SQL proficiently – expressive power of SQL, joins, views, derived tables, sorting, aggregation, nested sub-queries  
   - Query optimization

9. **Topics Covered:**

Appendix I-35
1. Characteristics of the Database approach
2. Database Systems Concepts and Architectures
3. Conceptual Database design
4. Data Modeling Using Entity-Relationship Models
5. Enhanced Entity-Relationship and UML Modeling
6. The Relational Data Model and Relational Database Constraints
7. Relational Algebra and Tuple relational Calculus
8. Relational Database Design by ER and EER-to-Relational Mapping
9. Functional Dependencies
10. Normalization for Relational Databases
11. SQL – expressive power of SQL
12. Joins
13. Views
14. derived tables
15. sorting
16. aggregation
17. nested sub-queries
18. query optimization.

10. **Class/Laboratory Schedule:**
Three classes of 50 minutes per week.

11. **Contribution to Meeting Professional Component:**
The course covers the planning, design, and implementation of databases. Entity relationship models are discussed thoroughly. Relational database theory is covered as well as SQL, the *de facto* query tool for relational database. Students are taught the fundamental of the use of SQL under Oracle 7.3.

12. **Relationship to Program Objectives:**
A goal of the course is to develop student skills in programming (SQL) and in use of query tools for querying databases. The design component comes into play with entity relationship diagrams which are used in the specification and design of databases. There is no teamwork in this course, no presentation component. All work is reflective of current database practice.

Some concepts of relational algebra and functional dependencies are covered.

The SQL query language is used and experimentation is encourage.

Entity relationship models are thoroughly investigated.

Students are aware of versions of Oracle, evolution of ER models and general computing advances.

Issues such as Y2K and the changing computer hardware field are covered.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagarism Policy:**
Academic Conduct Policy: [Web Format] | [PDF Format] | [RTF Format]
Plagiarism Policy: [Word Format] | [PDF Format] | [RTF Format]
Student Handbook: [PDF Format]

Appendix I-36
15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared By:** Dr. Sikha Bagui  
**Date:** Spring 2005
Master Course Syllabus for COT 3100

1. **Department:** COMPUTER SCIENCE

2. **Title:** Applications of Discrete Structures  
   **Credits:** 3

3. **Course Designation as Required or Elective:** Required for computer engineering

4. **Catalog Description:** Sets, relations, functions, and the concept of cardinality. Propositional logic and applications. Predicate logic, induction and recursion. Finite state machines, grammar and languages. Lists, trees, graphs, and boolean algebra. Emphasis is on analyzing programs and developing programming skills.

5. **Prerequisite(s):**  
   Prerequisite: COP 2253, MAC 2311 or MAC 2233.  
   Pre/Corequisite: CIS 3020 or COP 3022

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objective(s):**  
   To provide a theoretical and technical foundation in a range of topics basic to further work in computer science.

8. **Course Outcomes:**  
   1. use the basic tools of discrete mathematics (logic, sets, and functions) to understand and manipulate logic statements  
   2. formulate conjectures and construct proofs (including proof by induction) to determine the validity of the conjectures;  
   3. develop algorithms (including recursive algorithms) to solve general problems.

9. **Topics Covered:**  
   1. Sets and functions  
   2. Algorithms  
   3. Propositional logic  
   4. Boolean functions and logic gates  
   5. Predicate logic  
   6. Methods of proof  
   7. Proof by induction  
   8. Numbers, Sequences and sums  
   9. Recursion  
   10. Recursive algorithms  
   11. Recurrences relations

10. **Class/Laboratory Schedule:**

Appendix I-38
11. **Contribution to Meeting Professional Component:**
At the completion of this course, students should obtain firm understanding of how discrete structures are used in computer science. Students will have studied the mathematical aspects of discrete structures and will know how and what mathematics to use when solving problems in computer science and computer engineering. Additionally, students will complete 2 or 3 small programming assignments to develop an ability to apply the theoretical knowledge gained in the course.

12. **Relationship to Program Objectives:**
Students study a broad range of topics involving discrete mathematics and apply this knowledge to the construction of and analysis of simple algorithms and computationally useful mathematical structures.

Students will complete 2-3 programming projects implementing and illustrating concepts covered in lectures.

This class increases the students’ knowledge of discrete math through both learning mathematical concepts of basic theoretical computer science and applying these concepts of basic theoretical computer science and applying these concepts to the analysis and construction of both simple algorithms and simple circuits.

13. **Relationship to Program Outcomes:**
1. To develop the student’s ability to apply logical thinking (i.e., critical judgment) to issues found in computer science (Outcome 1)
2. To develop the student’s understanding and appreciation for the importance of algorithms in the development of software (Outcome 3).

14. **Expectations for Academic Conduct/Plagiarism Policy:**
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Any occurrence of academic dishonesty, including all forms of cheating and plagiarism, will be punished by a range of punishments from a grade of zero on the assignment to expulsion from the university. For more information, see the UWF Student Handbook (http://www.uwf.edu/uwfmain/stuHandbk/).

15. Assistance:

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16. Prepared by: J.M. Huband  Date: August 17, 2004
Master Course Syllabus for COT 4400

1. **Department:** COMPUTER SCIENCE

2. **Title:** Analysis of Algorithms  
**Credit:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** This course is an introduction to algorithms and computational complexity.

5. **Prerequisite(s):**  
Prerequisites: COP 3530 and MAD 3107

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
Students study a variety of algorithms in order to significantly increase their repertoire of tools for solving computational problems. They are introduced to advanced techniques for designing algorithms. They also learn fundamental mathematical methods for analyzing the efficiency of algorithms. Students also write programs to test algorithms in actual computer systems.

8. **Course Outcomes:**  
Students learn methods for constructing and analyzing fundamental algorithms. They also learn the basics of manipulating the graph data structure.

9. **Topics Covered:**  
1. computational complexity  
2. big-Oh notation  
3. sorting algorithms  
4. divide-and-conquer methods  
5. heap and graph data structures  
6. dynamic programming  
7. greedy algorithms  
8. elementary numerical and matrix algorithms

10. **Class/Laboratory Schedule:**  
Three 50 minutes classes per week.

11. **Contribution to Meeting Professional Component:**  
At the completion of this course, each student should be able to estimate the resource requirements (time and memory) of a wide range of algorithms. They will also be exposed to a variety of advanced algorithmic techniques and data structures that can be generalized and applied to a variety of real world programming problems.

12. **Relationship to Program Objectives:**

Appendix I-41
Students learn mathematical techniques for analyzing the resource requirements and correctness of programs on digital computers. Mathematical structures are used in specifying the algorithms involved.

Students learn how to analyze the average resource requirements of an algorithm, which entails the use of probability.

Students learn the theory of recurrence equations in order to analyze recursive algorithms. Estimating the number of possible inputs to an algorithm requires the use of combinatorics. Combinatorial properties of trees and graphs are covered in order to study correctness and structural properties of searching and sorting algorithms.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagarism Policy:**
   - Academic Conduct Policy: (Web Format) | (PDF Format) | (RTF Format)
   - Plagiarism Policy: (Word Format) | (PDF Format) | (RTF Format)
   - Student Handbook: (PDF Format)

15. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Geoff LaForte  
**Date:** Spring 2005
Master Course Syllabus for COP 4020

1. **Department:** COMPUTER SCIENCE

2. **Title:** Programming Languages  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** An introduction to programming language principles, including language constructs, design goals, run-time structures, implementation techniques, and exposure to a wide variety of programming paradigms.

5. **Prerequisite(s):**  
   COP3530

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
   The goal of this course is to introduce the student to computer programming language design, concepts, and principles. Design, implementation, and understanding of why languages have certain features will help not only the language designer but also the language user more effectively use each language.

8. **Course Outcomes:**  
   1. demonstrate an understanding of the principles upon which good programming language design are based, including a basic understanding of the tradeoffs inherent in programming language design.

   2. understand and describe the role of theory in the design and implementation of programming languages, include the role of formal grammars and corresponding automata

   3. understand and describe the language translation process including lexical, syntax and semantic analysis, compare and contrast compilation and interpretation.

   4. describe the major programming language paradigms including origins, uses, strengths and weaknesses of each.

   5. describe basic features of programming languages including elementary and structured data types, bindings and scope, subprograms and parameters, exception handlers, etc.

9. **Topics Covered:**  
   1. Topics include syntax and semantics  
   2. language design issues  
   3. binding  
   4. scope  
   5. implementation of data types
6. programming language theory, and translation
7. Programming paradigms topics include
   8. Procedural
   9. object-oriented
   10. rule-based
   11. and functional programming

10. **Class/Laboratory Schedule:**
    Three classes of 50 minutes per week.

11. **Contribution to Meeting Professional Component:**
    At the completion of this course, the students should understand various programming languages.

12. **Relationship to Program Objectives:**
    Develop student skills in programming and in use-of-tools for various phases of the software lifecycle. Software is specified and the specification is tested. There is an experimental component in that tests are performed and data is analyzed for all deliverables. Work on teams is stressed as teams must compose specifications and deliver not only written reports, but also must present their work orally in a practiced presentation. All work is reflective of contemporary software engineering using CASE tools where possible and using object-oriented design and programming methodologies.

    Knowledge of core software engineering topics – a major theme is the development of abstract data types and reusable/extensible components as the primitive elements of computer programs. Engineering concerns of reliability in the face of increasing complexity pervade the course.

    Objective #3: Ability to use computer-based tools for analysis and design. The course typically involves use of a procedural language development environment of the student’s choice, the use of J.D.K. 1.2, and the use of the CLIPS development environment.

    Graduate students produce a term paper.

    Need for life long learning – a recurring theme in the course is the rapid evolution of programming language design principles. The need to engage in lifelong learning to keep current is well illustrated by the idea of “deprecated features” – features that are marked for obsolescence in programming languages. It took 41 year for Fortran to have its first deprecated features (COMMON blocks and EQUIVALENCE). It took 3 years for Java to have its entire event handling mechanism change.

13. **Relationship to Program Outcomes:**

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    **Cheating** is an act of academic misconduct. **Cheating** is defined as the unauthorized giving or taking of any information or material on academic work considered in the determination of a grade. All the work you submit in this course is individual work unless explicitly stated otherwise individual. Giving or taking any assignment from someone else is cheating. If you are caught and convicted, you will receive a grade of "F" for the course and an annotation that you have been convicted of cheating will appear on your permanent record. Such an annotation typically means that you automatically become ineligible for financial aid.

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact me as soon as possible. Alternatively, you may contact the UWF Office of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide you with a letter to me that will specify any recommended accommodations.

16. **Prepared By:** John W. Coffey  
**Date:** August 10, 2004
4. Electrical Engineering Courses

Master Course Syllabus for EEL 3111

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** Circuits 1

3. **Credits:** 3 hours (3 hours lecture)

4. **Course Designation as Elective or Required:** Required

5. **Catalog Description:** Basic analysis of dc and ac electric circuits. A grade of 2.0/4.0 or better is required in the prerequisite(s).

6. **Prerequisite(s):** MAC 2313, PHY2049

7. **Corequisite(s):** EEL3303L

8. **Textbook(s) and/or Other Required Materials:**

9. **Course Objectives:**
   - To introduce the student to steady-state and switched DC networks
   - To introduce the student to steady-state AC networks
   - To reinforce mathematical skills of linear algebra, calculus and the setup of differential equations with respect to basic circuits
   - To introduce the student to basic circuit elements, resistors capacitors, inductors, voltages sources and current sources.
   - To expose the student to the basic testing tools utilized in electrical engineering, the proper and responsible use of o-scopes, DMMs, power supplies, function generators and other electronic equipment.
   - To acquaint the student with circuit/ problem solving software such as P-Spice, and Mathcad.
   - To develop a competency in the application, analysis, and design of DC and AC circuits.
   - To offer the student an opportunity to display his/her competency in both course work, laboratory procedures, and problem solving skills by doing in lab demonstrations, and in class testing.

10. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mathcad</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Chapters, 1,2,3</td>
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<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Chapter 6</td>
<td>3</td>
</tr>
</tbody>
</table>
Computer Resources: Each student must become proficient in the use of PSpice and Mathcad software. The homework will be exclusively Mathcad and all laboratory pre-labs will utilize PSpice.

11. Class Schedule:
   Two 75 minute classes per week.

12. Contribution to Meeting Professional Component:
   This course introduces the student to the critical network analysis skills needed to become a successful student and electrical engineer. The student learns via the textbook, class work, handouts, and hands on experience, the theory behind basic DC and AC networks. These concepts lay the ground work for more advanced electrical engineering courses and ultimately to a successful and fulfilling work experience. The student also gains valuable team work experience in a laboratory setting. This course consists of three (3) credits: three (3) credits of engineering topics

Design/Science Content:
   ABET Science: 3 credits 100%
   ABET Design: 0

13. Relationship to Program Objectives:
   Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying their knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be utilized, particularly recognizing the role that computers play in engineering. Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
   Students will obtain an ability to communicate effectively.
   Students obtain an ability to work in a team setting as they work on various lab and project assignments.

14. Relationship to Program Outcomes:
   Program Outcome # 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power

Student Learning Outcomes:
   • Outline basic passive element and operational amplifier circuit design techniques utilizing networks that contain resistors, capacitors, inductors, and various source configurations in both AC and DC circuits.
   • Interpret circuit characteristics, basic circuit analysis techniques and circuit models of passive and basic active networks and devices.
   • Apply basic laws and theorems of electrical engineering to the design, analysis, and operation of passive and active devices and their interaction within network structures.
   • Apply modern simulation tools such as OrCad (or PSpice) for the design, analyses, and performance evaluations of AC and DC networks.
• Apply modern mathematical tools such as MathCAD and/or Matlab in the analysis and design of AC and DC networks.
• Formulate the necessary problem solving skills required for passive/active network design and implementation.
• Optimize and evaluate the design and implementation of passive/active networks to meet desired performance specifications.

15. **Expectations for Academic Conduct/Plagiarism Policy:**
   • Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   • Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   • Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

16. **Assistance:**
   • Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

17. **Prepared by:** Dr. Dale H. Harrell  
    **Date:** August 2004
Master Course Syllabus for EEL 3112

1. **Department:** Electrical and Computer Engineering
2. **Title:** CIRCUITS II
   **Credits:** 3.0 (3 lectures)
3. **Course Designation as Elective or Required:** Required
4. **Catalog Description:** Continuation of EEL3111 with emphasis on circuit applications of convolution, the Fourier series, and the Laplace and Fourier transforms.
5. **Prerequisite(s):**
   1. EEL 3111   Circuits I
   **Co-requisite(s):**
   1. MAS 3105 Linear Algebra OR
   2. EGM 4313 Intermediate Engineering Analysis OR
   3. MAP 4403 Mathematical Methods for Engineers
6. **Textbook(s) and/or Other Required Materials:**
   Reference:
7. **Course Objectives:**
   - To develop the mathematical techniques and skills needed in the analysis of linear time-invariant systems, especially systems modeled by linear constant-coefficient differential equations.
   - To introduce the concepts of time- and frequency-domain analysis of signals and linear systems by means of the Fourier series and the Fourier transform.
   - To introduce the input-output analysis of linear systems by means of the Laplace transform.
   - To apply these tools to the analysis of first- and second-order circuits.
8. **Topics Covered:**
   1. Review of Complex Numbers. 1 classes
   2. Signals transformations and system properties 2 classes
   3. Linear time invariant systems and convolution 4 classes
   4. Periodic signals and Fourier series, frequency response of systems 5 classes
   5. Aperiodic signals and Fourier transform 5 classes
   6. Frequency response of linear systems, Bode plots, 3 classes
   7. 1st and 2nd order circuits 2 classes
   8. Laplace transform 3 classes
   9. Input-output analysis of linear systems, stability 3 classes
   10. In-term exams 2 classes
   **Total:** 30 classes
   Computer Resources: Mathcad or Matlab is used extensively for numerical and graphical analysis. Schematics/PSpice is used for circuit analysis and simulation.
9. **Class/Laboratory Schedule:**
   Two classes of 75 minutes per week. No laboratory.
10. **Contribution to Meeting Professional Component:**
   This course serves primarily as a prerequisite for the courses in communication, control, and electronics, in which the tools developed here, will be applied. It teaches the analytical tools in continuous time signal and system analysis that the students will use in design projects.

**Design/Science Content:**
ABET Science: 3.0 credits or 100%
ABET Design: 0 credits or 0%

11. **Relationship to Program Objectives:**
    Students will be able to:
    - apply basic and engineering sciences and mathematics to the analysis of systems and circuits, and use modern computer tools, such as Mathcad and PSpice, as an aid in numerical and graphical analysis.
    - communicate effectively graphically and in writing by means of exams and homework assignments.

12. **Relationship to program outcomes:**
    - Program Outcome 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power
    - Program Outcome 3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.

**Student Learning Outcomes**
- Upon successful completion of the course, students will be able to:
  - Analyze continuous time systems in the time domain and frequency domain.
  - Evaluate how time constants (first order systems) and damping ratios (second order systems) affect the response of systems in the time and frequency domains.
  - Calculate and plot the frequency response of linear, time-invariant systems and describe how a system alters the spectrum of an input signal.
  - Use the Laplace transform to determine the forced response and natural response of systems

13. **Expectations for Academic Conduct/Plagiarism Policy:**
    - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
    - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Rachid Manseur  
    **Date:** September 2004
Master Course Syllabus for EEL 3135

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** Discrete-Time Signals and Systems  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Difference equations, discrete convolution, the z transform, discrete and fast Fourier transforms. State-space theory of discrete-time systems.

5. **Prerequisite(s):**  
   MAC 2313 (Analytic Geometry and Calculus III), and COP 2334 (programming using C++) or CIS 3020 (Introduction to CIS) or Programming Language 
   **Corequisite:** MAP2302 (Differential equations)

6. **Textbook(s) and/or Other Required Materials:**  
   **REFERENCE:** R. D. Strum and D. E. Kirk, *Contemporary Linear Systems using MATLAB*, Books/Cole

7. **Course Objectives:**  
   • To interpret the fundamental concepts and theory in discrete-time signals and systems.  
   • To apply discrete convolution and z transform to obtain the outputs of discrete time LTI systems  
   • To apply discrete Fourier transform to calculate the spectrum of discrete time signals.  
   • To obtain frequency response and sinusoidal steady state response of discrete time LTI systems  
   • To master MATLAB as a simulation tool for discrete-signals and systems.

8. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review complex numbers and summation of geometrical series</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Continuous- and discrete-time signals</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Properties of discrete-time signals</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Properties of discrete-time systems</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Unit impulse response discrete-time systems and discrete convolution</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Difference equation and discrete-time system</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>The z transform and applications</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>The discrete-time Fourier transform</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Discrete-Fourier transform and fast Fourier transform</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Fourier analysis of discrete-time system</td>
<td>4</td>
</tr>
</tbody>
</table>

Appendix I-51
12 Exams 2
Total 30

Computer Resources: Each student must use MATLAB software tool to illustrate and analyze continuous- and discrete-time signals in time and frequency domain.

9. Class/Laboratory Schedule:
   Two classes of 75 minutes per week. Computer simulation labs are integral parts of the course.

10. Contribution to Meeting Professional Component:
    The course introduces the fundamental concepts and knowledge, and the analysis and design tool (MATLAB) in discrete-time signals and systems. It provides a foundation for communication, digital signal processing and control engineering.

Design/Science Content:
ABET Science: 3.0 credits or 100%
ABET Design: 0 credits or 0%

11. Relationship to Program Objectives:
    • To develop students’ ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.
    • To develop students’ ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design.
    • Students will obtain an ability to communicate effectively

12. Relationship to Program Outcomes:
    • Program Outcome # 1: Recognize and apply concepts, principles and theories of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.
    • Program Outcome # 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.

Student Learning Outcomes
Students who successfully complete this course will be able to:
   o Apply tools such as the Z transform, discrete-time Fourier transform, and discrete Fourier transform to analyze discrete-time signals and systems.
   o Apply frequency domain concepts to tell how a discrete-time system alters the frequency content of an input signal.
   o Design simple digital lowpass, highpass, or bandpass filters.
   o Calculate an appropriate sampling rate for a digital signal processing system and state the resulting relationship between analog and digital frequency variables.
   o Apply the fast Fourier transform to make inferences about the frequency content of a discrete-time signal

13. Expectations for Academic Conduct/Plagiarism Policy:
    • Academic Conduct Policy: http://uwf.edu/cas/aasr/academic_conduct.pdf
    • Plagiarism Policy: http://uwf.edu/cas/aasr/Plagiarism.pdf
    • Student Handbook: http://www.uwf.edu/uwfmain/stuHandbk/
14. **Assistance:**
   - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Dr. Xuemin Millard  
    **Date:** August, 2004
Master Course Syllabus for EEL 3211

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** Basic Electric Energy Engineering  
   **Credits:** 3 hours (3 hours lecture)

3. **Course Designation as Elective or Required:** Required for electrical engineering

4. **Catalog Description:** Analysis and modeling of power system components. Magnetic circuits, energy conservation, transformers, AC and DC rotating machines. A grade of 2.0/4.0 or better is required in the prerequisite(s). A material and supply fee will be assessed.

5. **Prerequisite(s):** EEL3111

6. **Corequisite(s):** EEL3112

7. **Textbook(s) and/or Other Required Materials:**  

   **Reference:**  

8. **Course Objectives:**  
   • Introduce the student to machine mechanics and electromagnetic fundamentals.  
   • Introduce the student to three-phase circuits including delta-wye conversion and network representations and power relationships.  
   • Introduce the student to analysis of balanced systems and one line diagrams.  
   • Introduce the student to single-phase and three-phase transformers, theory of operation of ideal and real transformers, voltage and current ratio techniques, equivalent circuits, per-unit system, and transformer voltage regulation and efficiency calculations.  
   • Introduce the student to AC synchronous motor and generator fundamentals which include schematics with power/torque calculations, equivalent circuit models and phasor diagrams.  
   • Introduce the student to induction motor fundamentals that include basic concepts and construction, equivalent circuit models, and power and torque calculations.  
   • Introduce the student to transmission line fundamentals and how they tie power system(s) together.

9. **Topics Covered:**

<table>
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<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mathcad</td>
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<tr>
<td>2</td>
<td>Power World Software</td>
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<td>3</td>
<td>Single–phase power fundamentals</td>
<td>2</td>
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<tr>
<td>4</td>
<td>Chapter 1 Electromagnetics</td>
<td>3</td>
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<td>5</td>
<td>Chapter 2 Three-phase networks</td>
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<td>6</td>
<td>Chapter 3 Transformers</td>
<td>4</td>
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<tr>
<td>7</td>
<td>Chapter 4 AC machine fundamentals</td>
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</tr>
<tr>
<td>8</td>
<td>Chapter 5 Synchronous machines</td>
<td>3</td>
</tr>
</tbody>
</table>
Computer Resources: Each student must become proficient in the use of Power World and Mathcad software. The homework will be exclusively Mathcad and all projects will include Power World and Mathcad.

10. Class/Laboratory Schedule:
Two classes of 75 minutes per week. Computer simulation projects are integral parts of the course.

11. Contribution to Meeting Professional Component:
This course introduces the student to the critical electrical energy system and machine analysis skills needed to become a successful student and electrical engineer. The student learns via the textbook, class work, handouts, and field trips, the theory and analysis methodologies behind basic electric energy apparatus and systems, and their equivalent networks. These concepts lay the ground work for more advanced electrical energy engineering courses and ultimately to a successful and fulfilling work experience. The student also gains valuable team work experience in design and project management setting. This course consists of three (3) credits: two and one half (2.5) credits of engineering topics and one half (0.5) credit of electric energy system design.

Design/Science Content:
ABET Science: 2.5 credits
ABET Design: 0.5 credits

12. Relationship to Program Objectives:
• Students will obtain an ability to analyze and solve novel electrical energy engineering problems in a practical environment by applying their knowledge of mathematics, science, and basic electrical engineering. Modern engineering techniques, skills, and tools will be utilized, particularly recognizing the role that computers and industry utilized software packages play in engineering.
• Students will obtain the ability to design, analyze, and interpret the resulting data of basic energy systems via projects.
• Students will obtain an ability to communicate effectively through project reports.
• Students obtain an ability to work in a team setting as they work on various project and design assignments.

13. Relationship to Program Outcomes:
• Program Outcome # 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power

Student Learning Outcomes
• Outline basic power system design techniques and analytical skills using various combinations of power apparatus which include transformers, transmission lines and requisite transmission line parameters, per-unit values, synchronous motors and generators, and induction motors that are connected in wye, delta, and
• Describe the characteristics and circuit models of AC machines in both short circuit and steady-state modes of operation.
• Apply basic engineering sciences to the design, analyses and steady-state operation of power apparatus in stable power systems.
• Apply modern simulation (PowerWorld/Windmill) and mathematical (Mathcad and/or Matlab) tools for the design, analyses, and performance of power system networks.
• Formulate the requisite problem solving skills associated with power system analysis and design.
• Design power systems and networks to meet desired operationing conditions and specifications.

14. Expectations for Academic Conduct/Plagiarism Policy:
• Academic Conduct Policy: http://uwf.edu/cas/aasr/academic_conduct.pdf
• Plagiarism Policy: http://uwf.edu/cas/aasr/Plagiarism.pdf
• Student Handbook: http://www.uwf.edu/uwfmain/stuHandbk/

15. Assistance:
• Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Dr. Dale H. Harrell  Date: October 2004
Master Course Syllabus for EEL 3303L

1. **Department**: ELECTRICAL AND COMPUTER ENGINEERING

2. **Title**: Circuits 1 Laboratory  
   **Credits**: One (1) hour (3 hour laboratory)

3. **Course Designation as Elective or Required**: Required

4. **Catalog Description**: Introductory electrical engineering laboratory in electrical instrumentation, devices, and systems. Material and supply fee will be assessed.

5. **Prerequisite(s)**: None

6. **Corequisite(s)**: EEL3111

7. **Textbook(s) and/or Other Required Materials**:  
   Gilbar et. al. *University of West Florida Circuits 1 Laboratory Manual*, UWF Press  
   **Reference**: None

8. **Course Objectives**:  
   - To reinforce classroom theory in steady-state and switched DC networks in a laboratory setting  
   - To reinforce classroom theory in steady-state AC networks  
   - To reinforce mathematical skills of linear algebra, calculus and the setup of differential equations with respect to basic circuits  
   - To reinforce classroom theory in basic circuit elements, resistors capacitors, inductors, voltages sources and current sources in a laboratory setting.  
   - To expose the student to the basic testing tools utilized in electrical engineering, the proper and responsible use of o-scopes, DMMs, power supplies, function generators and other electronic equipment.  
   - To acquaint the student with circuit/ problem solving software such as P-Spice, and Mathcad.  
   - To develop a competency in the application, analysis, and design of DC and AC circuits.  
   - To offer the student an opportunity to display his/her competency in both course work, laboratory procedures, and problem solving skills by doing in lab demonstrations, and in class testing.
9. Topics Covered:

<table>
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<tr>
<th>Experiment</th>
<th>Topics</th>
<th>Week</th>
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<tbody>
<tr>
<td>1</td>
<td>Computer Systems and PSpice</td>
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<tr>
<td>2</td>
<td>Use of Meters and Lab Equipment</td>
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<tr>
<td>3</td>
<td>Series and Parallel Resistance and Node and Mesh analysis</td>
<td>4</td>
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<tr>
<td>4</td>
<td>Theorems and Wheatstone Bridge</td>
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<tr>
<td>5</td>
<td>Oscilloscope Fundamentals</td>
<td>3</td>
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<tr>
<td>6</td>
<td>Oscilloscope Triggering</td>
<td>4</td>
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<tr>
<td>7</td>
<td>Operational Amplifiers</td>
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<tr>
<td>8</td>
<td>Amplifier Characteristics</td>
<td>2</td>
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<tr>
<td>9</td>
<td>Step Measurement Response</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Sinusoidal Steady-State Response of Linear Circuits</td>
<td>4</td>
</tr>
</tbody>
</table>

**Computer Resources:** Each student must become proficient in the use of PSpice and Mathcad software. The pre-lab assignments that consist of equation solving and mathematical calculation will exclusively be made using Mathcad software and all laboratory pre-lab simulations will exclusively utilize PSpice/Orcad simulation software.

10. **Class/Laboratory Schedule:**
(1) One (1) laboratory session of 165 minutes per week. Computer simulation pre-labs and circuit solving skills and calculations are integral parts of the laboratory.

11. **Contribution to Meeting Professional Component:**
This laboratory reinforces classroom theory in a laboratory setting. It is designed to enhance understanding of the critical network analysis skills needed to become a successful student and electrical engineer. The student learns via simulation software and hands-on experiments the theory and practically behind basic DC and AC networks. These concepts lay the ground work for more advanced electrical engineering courses and ultimately to a successful and fulfilling work experience. The student also gains valuable team work experience in a laboratory setting. This course consists of one (1) credit of laboratory.

**Design/Science Content:**
ABET Science: 1 credits 100%
ABET Design: 0

12. **Relationship to Program Objectives:**
- Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying their knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be utilized, particularly recognizing the role that computers play in engineering.
- Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
- Students will obtain an ability to communicate effectively.
- Students obtain an ability to work in a team setting as they work on various pre-laboratory assignments and laboratory experiments.

13. **Relationship to Program Outcomes:**
• Program Outcome # 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power

Student Learning Outcomes
• Apply passive/active circuits design experience in support of the theory taught in the circuits I course.
• Identify the limitations/physical design considerations required in DC and AC circuit design.
• Apply basic engineering sciences to the design, analyses and operation of passive/active devices and circuits.
• Apply modern simulation tools such as PSpice (or Orcad) for the design, analyses, and performance evaluations of AC and DC circuits.
• Formulate requisite problem solving skills of passive/active/ideal circuit elements and their interaction in basic circuit configurations.
• Design and conduct electrical engineering experiments.
• Interpret and analyze scientific data

14. Expectations for Academic Conduct/Plagiarism Policy:
• Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
• Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
• Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

15. Assistance:
• Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Dr. Dale H. Harrell       Date: September 2004
Master Course Syllabus for EEL 3304

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** ELECTRONIC CIRCUITS I  
   **Credits:** 3.0 (3 Lectures)

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Fundamentals of analog electronic circuits and systems.

5. **Prerequisite(s):** EEL 3111 Circuits I

6. **Textbook(s) and/or Other Required Materials:**  
   Sedra/Smith, Microelectronics Circuits, Oxford, 2004

7. **Course Objectives:**  
   Provide basic analog electronic circuit design techniques and analytical skills using diodes, op-amps, MOSFETs, and BJTs.  
   Introduce the characteristics, biasing techniques, and circuit models of semiconductor devices.  
   Develop student ability to: (a) to apply basic engineering sciences to the design, analyses and operation of electronics devices and circuits, (b) to use modern simulation tools such as PSpice (or Electronics Workbench) for the design, analyses, and performance evaluations of electronics circuits, (c) to practice problem solving skills of electronics circuits.  
   Design electronic circuits to meet desired specifications.

8. **Topics Covered:**

   1. Introduction to Electronics Design  
   2. Introduction to Amplifiers  
   3. Introduction to Op-Amps  
   4. Diodes  
   5. Applications of Diodes  
   6. Amplifying Devices (BJTs)  
   7. Amplifying Devices (MOSFETs)  
   8. Active Current Sources  
   9. Differential Amplifiers  
   10. Frequency response of amplifiers  
   11. Exams

   Total: 30 classes

8. **Computer Resources:** The PSpice and/or EWB software is used extensively for analysis and design verifications of electronic devices and circuits.

9. **Class/Laboratory Schedule:** Two classes of 75 minutes per week. Course material coordinated with the electronic circuits lab, EEL 4304L

10. **Contribution to Meeting Professional Component:**

Appendix I-60
The course applies basic circuit analytical techniques and mathematical skills to analyze and design electronic circuits. The analysis and design of electronics circuits are emphasized.

**Design/Science Content:**
- ABET Science: 2.5 credits or 83.4%
- ABET Design: 0.5 credits or 16.6%

11. **Relationship to Program Objectives:**
   - Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering.
   - Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   - Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
   - Students will obtain an ability to communicate effectively -- orally, written, and graphically.

12. **Relationship to Program Outcomes:**
   - Program Outcome # 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power.
   - Program Outcome # 3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.

**Student Learning Outcomes:**
- Outline basic analog electronic circuit design techniques and analytical skills using diodes, op-amps, MOSFETs, and BJTs.
- Describe the characteristics, biasing techniques, and circuit models of semiconductor devices.
- Apply basic engineering sciences to the design, analyses and operation of electronics devices and circuits.
- Apply modern simulation tools such as PSpice (or Electronics Workbench) for the design, analyses, and performance evaluations of electronics circuits.
- Formulate problem solving skills of electronics circuits.
- Design electronic circuits to meet desired specifications.

13. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
   - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Dr. Muhammad H. Rashid  
**Date:** August 2004

**Revised by:** Mohannad M. Bataineh  
**Date:** August 22, 2004

Appendix I-61
Master Course Syllabus for EEL 3396

1. **Department:** Electrical and Computer engineering

2. **Title:** SOLID STATE ELECTRONIC DEVICES  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Introduction to the principles of semiconductor electron device operation.

5. **Prerequisite(s):**  
   EEL 3111 Circuits I

6. **Textbook(s):**  

7. **Course Objectives:**  
   Provide the background on material physics of semiconductors, 
   Develop the fundamental semiconductor equations at equilibrium and non-equilibrium, and to apply 
   these fundamental concepts to basic semiconductor devices to explain the device operation, electrical 
   characteristics and Spice model, and 
   Design semiconductor devices with specified operating parameters

8. **Topics Covered:**

   1. Crystal lattices and periodic structures. Wave motion of electrons in materials 1 class
   2. Electronic models of semiconductors and solids 1 class
   3. Electron and hole concentrations at thermal equilibrium. Fermi energy level 1 class
   4. Drift and electron and hole mobilities. Diffusion in a concentration gradient 1 class
   5. Shockley semiconductor equations 1 class
   6. Generation, recombination, trapping, and tunneling 2 classes
   7. Characteristics of metal-oxide-semiconductor capacitor (MOSC) 1 class
   8. Charge control model of MOSC 3 classes
   9. Energy band diagram of P/N junction. Physics of the Shockley diode equation 1 class
   10. Space-charge-layer current. 1 class
   11. Small-signal characteristics of P/N junction. SPICE model of p/n junction 1 class
   12. Characteristics MOS field-effect transistor (MOST). Energy band diagram of MOST 1 class
   13. Small-signal equivalent circuit model of MOST 2 classes
   14. Switching properties of MOST. SPICE model of MOS transistor 1 class
   15. MOS memory devices 2 classes
   16. Characteristics of bipolar junction transistor (BJT) 2 classes
   17. Small-signal characteristics of BJT. Switching properties of BJT. SPICE model of BJT 1 class
18. Characteristics of photonic devices  2 classes
19. Hourly tests  3 classes
Total: 30 classes

9. **Computer Resources:** The students are required to use Matlab/Mathcad to aid in computations.

10. **Class/Laboratory Schedule:**
Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:**

Solid state semiconductor design is stressed from the beginning of the course, especially how the material properties drive design considerations. Students are informed of the dangers and liabilities of the hazardous chemical environment necessary to manufacture semiconductor devices.

12. **Design/Science Content:**
ABET Science: 2.5 credits or 85%
ABET Design: 0.5 credits or 15%

13. **Relationship to Program Objectives:**
- Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering.
- Students will learn modern engineering techniques & skills, and will use computer-based simulation tools.
- Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
- Students will obtain an ability to communicate effectively.

14. **Relationship to Program Outcomes:**

Program Outcome #2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power

Program Outcome #4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.

Program Outcome #6: Recognize and apply concepts, principles and theories in probability and statistics, including electrical/computer engineering applications.

**Student Learning Outcomes:**
Outline the background on material physics of semiconductors,
Interpret the fundamental semiconductor equations at equilibrium and non-equilibrium.
Apply the fundamental concepts to basic semiconductor devices to explain the device operation, electrical characteristics and Spice model, and Design semiconductor devices with specified operating parameters.
15. Expectations for Academic Conduct/Plagiarism Policy:
   Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

16. Assistance:
   Students with special needs who require specific examination-related or other course-related
   accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS),
   dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for
   the instructor that will specify any recommended accommodations.

17. Prepared by: Douglas M. Jordan  Date: September, 1999
    Revised by: Mohannad M. Bataineh  Date: August 27, 2002
    Revised by: Mohannad M. Bataineh  Date: August 23, 2004
Master Course Syllabus for EEL 3472

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** Electromagnetic Fields and Applications I
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required for electrical engineering

4. **Catalog Description:** Electric and magnetic fields and forces, Maxwell’s equations in point and integral form, plane wave propagation, energy and power.

5. **Prerequisite(s):**
   EEL 3111C: Circuits 1

6. **Textbook(s) and/or Other Required Materials:**

7. **Course Objectives:**
   - To interpret fundamental concepts of fields and waves.
   - To interpret Maxwell’s equations.
   - To explain wave propagations in free space, different dielectric media and transmission lines.
   - To solve the Telegrapher’s equations for transmission lines and explain the reflection and impedance discontinuity of transmission lines in both frequency and time domain.
   - To solve electromagnetic radiation from dipole, monopole and dish antennas.
   - To apply electromagnetic knowledge in designing microelectronic systems.

8. **Topics Covered:**
   1. Vector and fields
   2. Transmission line theory and applications.
   3. Maxwell’s equations and applications
   4. Electromagnetic wave propagating in different media.
   5. Antenna and radiation
   6. Tests
   Total: 30 classes

9. **Class/Laboratory Schedule:**
   Two classes of 75 minutes per week.

10. **Contribution to Meeting Professional Component:**
    The course introduces the fundamental theory and applications of electromagnetics in electronic circuits and systems. It is part of the core knowledge of electrical and computer engineering.

    **Design/Science Content:**
    ABET Science: 3.0 credits

11. **Relationship to Program Objectives:**
    - To develop students’ ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.
• To develop students’ ability to use modern engineering techniques, skills, and tool for analysis and design.
• Students will obtain an ability to communicate effectively

12. **Relationship to Program Outcomes:**
   • Program Outcome # 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.

**Student Learning Outcomes:**
- Interpret the Maxwell’s equations in integral and differential forms;
- Explain electromagnetic wave propagation in different media;
- Apply the transmission line theory in designing interconnects between electronic components, subsystems and systems;
- Apply the concepts of radiation and antenna in designing electronic systems.

13. **Expectations for Academic Conduct/Plagiarism Policy:**
   • Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   • Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   • Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
   • Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Dr. Xuemin Millard  
**Date:** October, 2004
Master Course Syllabus for EEL 3473

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** Electromagnetic Fields and Applications II  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Maxwell’s equations, electromagnetic wave propagation in different media, antenna, waveguide, numerical methods, electromagnetic coupling.

5. **Prerequisite(s):**  
   EEL 3472: Electromagnetic Fields and Applications

6. **Textbook(s) and/or Other Required Materials:**  
   **REFERENCES:** Eric Bogatin, *Signal Integrity-simplified*, Prentice Hall PTR

7. **Course Objectives:**  
   - To master electromagnetic theory.  
   - To apply Smith chart in microwave design and simulation.  
   - To design simple microwave filter.  
   - To solve wave equations for EM waves propagating in waveguide.  
   - To interpret wave propagation through different media.  
   - To apply numerical methods in modeling electromagnetic phenomena in radar technology, high-speed/frequency circuits design (EDA) and EMC/EMI issues.

8. **Topics Covered:**  
   1. Review transmission line theory.  
   2. Smith chart and applications.  
   3. Microwave filter design with microstrip line.  
   4. Review Maxwell’s equations.  
   5. Electromagnetic wave propagating in different media.  
   6. Waveguide theory and applications  
   7. Integral and differential equations  
   8. Method of moments (MoM)  
   9. Finite element method (FEM)  
   10. Finite difference time domain method (FDTD)  
   11. EMC/EMI topics  
   12. Test  
   **Total:** 30 classes  

   **Computer Resources:** Student should write computer programs implementing numerical methods modeling electromagnetic scattering and wave propagation.

9. **Class/Laboratory Schedule:**
(1) Two classes of 75 minutes per week.

10. **Contribution to Meeting Professional Component:**
The course introduces the theory, modeling and modern applications of electromagnetics in microwave circuits, antenna design, high-speed/frequency circuit design and EMC/EMI in electronic systems. It builds a sound foundation for the career of electrical engineers.

**Design/Science Content:**
ABET Science: 3.0 credits

11. **Relationship to Program Objectives:**
- To develop students’ ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems.
- To develop students’ ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design.
- Students will obtain an ability to communicate effectively

12. **Relationship to Program Outcomes:**
- Program Outcome # 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.
- Program Outcome #7: Identify, formulate, and solve novel electrical/computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.

**Student Learning Outcomes:**
- Design basic microwave filter;
- Apply Smith chart in microwave engineering simulation and design ;
- Formulate and solve basic electromagnetic scattering problems with numerical methods.
- Apply electromagnetic compatibility and interference concepts in designing electronic systems

13. **Expectations for Academic Conduct/Plagiarism Policy:**
- Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
- Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
- Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

14. **Assistance:**
- Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Dr. Xuemin Millard  
**Date:** August, 2004
Master Course Syllabus for EEL 3701

1. Department: ELECTRICAL AND COMPUTER ENGINEERING

2. Title: DIGITAL LOGIC AND COMPUTER SYSTEMS
   Credits: 3

3. Course Designation as Elective or Required: Required
   Catalog Description: An introduction to Boolean algebra, logic design, computer organization and assembly language programming, and computer engineering technology

4. Co-requisite(s):
   C++ or high level programming language
   EEL 3701L DIGITAL LOGIC AND COMPUTER SYSTEMS LAB

5. Textbook(s) and/or Other Required Materials:

6. Course Objectives:
   • To provide an overall introduction to computer engineering.
   • To study binary logic, Boolean algebra, and methods of simplification of logic expressions.
   • To study techniques for designing combinatorial circuits using SSI devices.
   • To study MSI devices such as decoders, multiplexers, and adders, and their applications.
   • To study flip-flops and sequential logic circuit design.
   • To analyze binary storage device behavior and applications.
   • To introduce basic assembly language program.

7. Topics Covered:

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number systems &amp; conversions</td>
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</tr>
<tr>
<td>2</td>
<td>Boolean algebra</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Karnaugh maps</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Combinatorial circuit design using gates</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>MSI devices</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Flip flops and latches</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Analysis and design of sequential circuits</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Registers and counters</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Memory devices and programmable logic</td>
<td>3</td>
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<td>11</td>
<td>Hazards</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Intro to assembly programming</td>
<td>1</td>
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<tr>
<td>13</td>
<td>Review for exams</td>
<td>3</td>
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<tr>
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</tr>
</tbody>
</table>

8. Computer Resources: Introduction to logic works

9. Class/Laboratory Schedule:
   (1) Two classes of 75 minutes per week
10. **Contribution to Meeting Professional Component:**
   Students are introduced to the fundamental concepts of combinatorial and sequential digital circuit analysis and design. These concepts will be applied throughout their degree program and into their professional careers.

**Design/Science Content:**
- ABET Science: 1.5 credits or 50%
- ABET Design: 1.5 credits or 50%

11. **Relationship to Program Objectives:**
   - Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   - Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
   - Students will obtain an ability to communicate effectively.
   - Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

12. **Relationship to Program Outcomes:**
   - Program Outcome # 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power

**Student Learning Outcomes:**
- Outline an overall introduction to computer engineering.
- Apply binary logic, Boolean algebra, and methods of simplification of logic expressions to the development of digital circuits.
- Apply flip flops to digital logic design.
- Design and evaluate combinatorial circuits using SSI devices.
- Design sequential logic circuits sequential logic circuit.
- Identify and apply MSI devices such as decoders, multiplexers, and adders.
- Evaluate binary storage device behavior and applications.

13. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
   - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Dr. Thomas Gilbar  
    **Date:** August, 2004
Master Course Syllabus for EEL 3701L

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** DIGITAL LOGIC AND COMPUTER SYSTEMS LAB  
   **Credits:** 1

3. **Course Designation as Elective or Required:** Required
   
   **Catalog Description:** Practical applications of digital logic

4. **Co-requisite(s):**  
   EEL 3701 DIGITAL LOGIC AND COMPUTER SYSTEMS

5. **Textbook(s) and/or Other Required Materials:**  

6. **Course Objectives:**  
   - To supply practical, hands on digital logic design experience to support the theory taught in the Logic Design course.  
   - To introduce students to limitations/physical design considerations required in digital circuit design.  
   - To give students the opportunity to design and conduct engineering experiments.  
   - To teach students how to analyze and interpret data.

7. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Building digital logic circuits on a board</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Physicals aspects of logic gates</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Basic combinatorial circuit design</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>MSI devices design: Multiplexers, decoders, and comparators</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Flip flops</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Counter design</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>EPROM programming</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

8. **Computer Resources:** Introduction to logic works

9. **Class/Laboratory Schedule:**  
   (1) One lab of 165 minutes per week

10. **Contribution to Meeting Professional Component:**  
    Students are introduced to the fundamental concepts of combinatorial and sequential digital circuit analysis and design. These concepts will be applied throughout their degree program and into their professional careers.

Appendix I-71
Design/Science Content:
ABET Design: 1 credit or 100%

11. Relationship to Program Objectives:
   • Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   • Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
   • Students will obtain an ability to communicate effectively.
   • Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

12. Relationship to Program Outcomes:
   • Program Outcome # 5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.

Student Learning Outcomes:
   • Identify limitations/physical design considerations required in digital circuit design.
   • Apply course theory by having practical, hands on digital logic design experience.
   • Design and conduct logic design experiments.
   • Evaluate and interpret logic design data.
   • Optimize digital circuit design by evaluating tradeoffs.

13. Expectations for Academic Conduct/Plagiarism Policy:
   • Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   • Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   • Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

14. Assistance:
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15. Prepared by: Dr. Thomas Gilbar               Date: August, 2004
Master Course Syllabus for EEL 4213

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** Electrical Energy Systems 1  
   **Credits:** 3 hours (3 hours lecture)

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** System Models for generators, transformers, transmission lines and large scale power networks. Matrix formulations, power flow and analysis, symmetrical component theory, balanced and unbalanced fault analysis. A grade of 2.0/4.0 or better is required in the prerequisite(s). Permission is required.

5. **Prerequisite(s):** EEL3211

6. **Corequisite(s):** None

7. **Textbook(s) and/or Other Required Materials:**  
   **Reference:** None

8. **Course Objectives:**  
   • To introduce the student to the history, and present and future trends of electric power systems.  
   • To introduce the student to a review of the fundamentals (power calculations, transformers, per-unit system, etc.) of electric power systems and their equivalent circuits.  
   • To introduce the student to transmission line parameters which includes resistance, capacitance, and inductance, and their requisite calculations, for single and three-phase lines.  
   • To introduce the student to steady-state operation of transmission lines, and short, medium and long line representations, with their ABCD parameters.  
   • To introduce the student to power flow studies with simulation software basics, and the information derived from power flow studies.  
   • To introduce the student to hand-calculations and computer software mechanics of z-bus and y-bus formulation.  
   • To introduce the student to symmetrical faults and transient analysis of power system apparatus, fault current calculations using bus impedance matrix, and simulations using Power World software.

9. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mathcad and Power World Software review</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Machine and Apparatus Fundamentals review</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Chapter 4 Transmission Line Parameters</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Chapter 5 Transmission Lines S-S operation</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Chapter 6 Power Flows</td>
<td>4</td>
</tr>
</tbody>
</table>
Computer Resources: The homework will be exclusively in Mathcad and design project(s) will include the usage of Power World and Mathcad software and a requisite written and oral report.

10. Class/Laboratory Schedule:
   (1) Two classes of 75 minutes per week. Computer simulation projects are integral parts of the course.

11. Contribution to Meeting Professional Component:
This course introduces the student to the critical network analysis skills needed to become a successful student and electrical engineer. The student learns via the textbook, class work, handouts, field trips, design projects, and technical reports and presentations the theory and interaction behind electric energy apparatus and networks. The concepts learned in this course lay the ground work for more advanced electrical energy engineering courses and ultimately to a successful and fulfilling work experience. The student also gains valuable team work experience in a project/presentation setting. This course consists of three (3) credits: two (2.0) credits of engineering topics and one (1.0) credit of electric energy system design.

Design/Science Content:
   ABET Science: 2.0 credits
   ABET Design: 1.0 credits

12. Relationship to Program Objectives:
   • Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying their knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be utilized, particularly recognizing the role that computers play in engineering.
   • Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
   • Students will obtain an ability to communicate effectively.
   • Students obtain an ability to work in a team setting as they work on various lab and project assignments.

13. Relationship to Program Outcomes:
   • Program Outcome # 7: Identify, formulate, and solve novel electrical/computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.
   • Program Outcome #10: Communicate effectively in writing and convey technical material through oral presentation of electrical/computer engineering topic and interaction with an audience.

Student Learning Outcomes:
   • Outline advanced power system design techniques and analytical skills using various combinations of power apparatus and interconnecting network configurations.
- Describe the characteristics, steady state and fault model parameters, and sequence network models of various power system components and interconnecting networks.
- Apply advanced engineering sciences to the design, analyses and performance requirements of large scale power systems operation.
- Apply modern simulation (PowerWorld/Windmill) and mathematical (Mathcad and/or Matlab) tools for the design, analyses, and performance of power system networks.
- Formulate the requisite problem solving skills associated with advanced power system analysis and design.
- Design power systems and networks to meet desired operationing conditions and specifications

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   - Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   - Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

15. **Assistance:**
   - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Dale H. Harrell  
    **Date:** November 2004
Master Course Syllabus for EEL 4230

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** ELECTRONIC DEVICES AND MOTOR CONTROL
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Analysis and design of AC and DC motor controls with semiconductor converter drives. Controlled rectifier and chopper drives for DC motors; cyclo-converter and inverter drives for AC motors

5. **Prerequisite(s):**
   1. EEL3112 Circuits II
   2. EEL3211 Basic Electric Energy Engineering

6. **Textbook(s) and/or Other Required Materials:**

   **Reference:**

7. **Course Objectives:**
   - To introduce the application of semiconductor devices in the operation and control of electric motors.
   - To study analysis and design techniques for modern electric drive systems.
   - Computer-aided analysis and design of power electronic circuit will be emphasized.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:
   - Describe the operating characteristics of electrical motor drives
   - Identify and classify the types of electrical motor drives.
   - Identify the operating blocks of an electrical motor drive.
   - Select the type of power converter needed for an electrical motor drive.
   - Apply magnetic elements to analyze a drive system.
   - Operating characteristics of electrical motor drives.
   - Explain the control requirements of an electrical motor drive.
   - Derive the relationship between the control signal and the control output variable.
   - Design a simple electrical motor drive to perform simple tasks.
   - Evaluate the operating performance of a simple drive.
   - Apply PSpice and/or Mathcad software tools to verify the design assignments to evaluate the performance of an electrical motor drive.
   - Describe the formation of a team to function effectively to complete a group assignment.
9. **Topics Covered:**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Drive Systems</td>
<td>1 class</td>
</tr>
<tr>
<td>2</td>
<td>Basic Electric Circuits</td>
<td>1 class</td>
</tr>
<tr>
<td>3</td>
<td>Mechanical Requirements</td>
<td>1 class</td>
</tr>
<tr>
<td>4</td>
<td>Magnetic Circuits</td>
<td>2 classes</td>
</tr>
<tr>
<td>5</td>
<td>Electromechanical Energy Conversion</td>
<td>2 classes</td>
</tr>
<tr>
<td>6</td>
<td>DC Machines and Characteristics</td>
<td>2 classes</td>
</tr>
<tr>
<td>7</td>
<td>Power Converters and DC Drives</td>
<td>4 classes</td>
</tr>
<tr>
<td>8</td>
<td>Control of DC Drives</td>
<td>2 classes</td>
</tr>
<tr>
<td>9</td>
<td>AC Machines and Characteristics</td>
<td>4 classes</td>
</tr>
<tr>
<td>10</td>
<td>Power Converters and AC Drives</td>
<td>5 classes</td>
</tr>
<tr>
<td>11</td>
<td>Control of AC Drives</td>
<td>2 classes</td>
</tr>
<tr>
<td>12</td>
<td>Synchronous Motor Drives</td>
<td>2 classes</td>
</tr>
<tr>
<td>13</td>
<td>Exams</td>
<td>2 classes</td>
</tr>
</tbody>
</table>

Total 30 classes

**Computer Resources:** Each student must use PSpice software to verify the design assignments to evaluate the performance of magnetic circuits, electromechanical devices, power converters and electric motors drives.

10. **Class/Laboratory Schedule:**

Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:**

The course applies basic circuit analytical techniques to magnetic components, electro-mechanical energy conversion, power electronics circuits, power semiconductor devices, and mathematical skills to analyze and design power-converter fed motor drives. Students are required to design at least two (2) design projects to meet certain specifications including worst-case analysis.

**Design/Science Content:**

- ABET Science: 1.5 credits or 50%
- ABET Design: 1.5 credits or 50%

12. **Relationship to Program Objectives:**

- To develop student ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
- To develop student ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems
- To develop student ability to function on multi-disciplinary teams
- To develop student ability to communicate effectively in writing through written reports
To provide a theoretical and practical background in power electronic circuits, electro-mechanical devices, and magnetic circuits, along with the engineering analysis, and design skills.

13. **Relationship to Program Outcomes:**
   - Program Outcome # 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.
   - Program Outcome # 8: Function effectively on multi-disciplinary teams.

**Student Learning Outcomes:**
- Describe the operating characteristics of electrical motor drives
- Identify and classify the types of electrical motor drives
- Identify the operating blocks of an electrical motor drive.
- Select the type of power converter needed for an electrical motor drive.
- Apply magnetic elements to analyze a drive system.
- Explain the control requirements of an electrical motor drive.
- Derive the relationship between the control signal and the control output variable.
- Design a simple electrical motor drive to perform simple tasks.
- Evaluate the operating performance of a simple drive.
- Apply PSpice and/or Mathcad software tools to verify the design assignments to evaluate the performance of an electrical motor drive.
- Describe the formation of a team to function effectively to complete a group assignment

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu , (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Muhammad H. Rashid  
**Date:** July 2003
Master Course Syllabus for EEL 4242C

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** POWER ELECTRONICS CIRCUITS  
   **Credits:** 3 (2 lecture, 1 lab)

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** The main objective of this course is to study the principles of static power conversions, PWM techniques for voltage and frequency control, circuit design considerations, and applications of power electronics. Computer-aided analysis and design of power electronic circuit will be emphasized.

5. **Prerequisite(s):**  
   EEL 3304 - Electronic Circuits

6. **Textbook(s) and/or Other Required Materials:**  
   Reference:  

7. **Course Objectives:**  
   - To provide a theoretical and practical background in power electronic devices and circuits, long with the engineering analysis, design, and laboratory skills.  
   - To study the principles of static power conversions, PWM techniques for voltage and frequency control, circuit design considerations, and applications of power electronics.  
   - Computer-aided analysis and design of power electronic circuit will be emphasized.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:
   - Describe the operating characteristics of electrical motor drives  
   - Identify and classify the types of electrical motor drives.  
   - Identify the operating blocks of an electrical motor drive.  
   - Select the type of power converter needed for an electrical motor drive.  
   - Apply magnetic elements to analyze a drive system.  
   - Operating characteristics of electrical motor drives.  
   - Explain the control requirements of an electrical motor drive.  
   - Derive the relationship between the control signal and the control output variable.  
   - Design a simple electrical motor drive to perform simple tasks.  
   - Evaluate the operating performance of a simple drive.  
   - Apply PSpice and/or Mathcad software tools to verify the design assignments to evaluate the performance of an electrical motor drive.  
   - Describe the formation of a team to function effectively to complete a group assignment.

9. **Topics Covered:**
<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Power Electronics</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Diodes</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Diode Rectifiers</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Power Transistors</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>DC-DC Converters</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>PWM Inverters</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Thyristors</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Resonant Pulse inverters</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Controlled Rectifiers</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>AC voltage Controllers</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>DC Drives</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>AC Drives</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Exams</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

Computer Resources: Each student must use PSpice and Mathcad software tools to verify the design assignments to evaluate the performance of power electronics circuits in terms of power factor, harmonic factor, distortion factor and switching angles for PWM switching.

10. Class/Laboratory Schedule:
   (1) Two classes of 75 minutes per week. Computer simulation labs are integral parts of the course.

11. Contribution to Meeting Professional Component:
The course applies basic circuit analytical techniques, power semiconductor devices, and mathematical skills to analyze and design power electronic circuits. Students are required to design at least two (2) design projects to meet certain specifications including worst-case analysis.

Design/Science Content:
   ABET Science: 1.5 credits or 50%
   ABET Design: 1.5 credits or 50%

12. Relationship to Program Objectives:
   • Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   • Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
   • Students will obtain an ability to communicate effectively.

13. Relationship to Program Outcomes:
   • Program Outcome # 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.
   • Program Outcome # 8: Function effectively on multi-disciplinary teams.

Student Learning Outcomes:
   • Describe the operation of dc-dc, dc-ac, ac-dc and ac-ac power converters.
• Explain the control characteristics of power semiconductor switching devices.
• Describe the formation of a team to function effectively to complete a group assignment in electrical/computer engineering.
• Calculate the values of circuit parameters to limit output ripple voltages and currents of a converter with certain specified values.
• Evaluate the effects of various modulation techniques on the quality of input and output waveforms.
• Analyze and evaluate the performance of a simple power circuit.
• Apply PSpice and Mathcad software tools to verify the design assignments to evaluate the performance of power electronics circuits in terms of power factor, harmonic factor, distortion factor and switching angles for PWM switching

14. Expectations for Academic Conduct/Plagiarism Policy:
   • Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   • Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   • Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

15. Assistance:
   • Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Dr. Muhammad H. Rashid       Date: June, 2004
Master Course Syllabus for EEL 4304L

1. **Department**: ELECTRICAL AND COMPUTER ENGINEERING

2. **Title**: ELECTRONICS I LABORATORY  
   **Credits**: 1

3. **Course Designation as Elective or Required**: Required

4. **Catalog Description**: Electronic instrumentation devices and systems

5. **Co-requisite(s)**:  
   EEL 3304 Electronics I

6. **Textbook(s) and/or Other Required Materials**:  
   Sedra and Smith, Microelectronic Circuits, Oxford (University Press), Fifth Edition  
   Kenneth C. Smith, Laboratory Explorations for Microelectronic Circuits, Oxford (University Press), Fifth Edition

7. **Course Objectives**:
   - To supply practical, hands on electronic circuits design experience to support the theory taught in the electronics I course.
   - To introduce students to limitations/physical design considerations required in electronic circuit design.
   - Develop student ability to: (a) to apply basic engineering sciences to the design, analyses and operation of electronics devices and circuits, (b) to use modern simulation tools such as PSpice (or Electronics Workbench) for the design, analyses, and performance evaluations of electronics circuits, (c) to practice problem solving skills of electronics circuits.
   - To give students the opportunity to design and conduct engineering experiments.
   - To teach students how to analyze and interpret data.

8. **Topics Covered**:
   - Operational Amplifier-Based Integrator
   - Design of an Instrumentation Amplifier
   - Diode Characteristics
   - Diode Applications
   - Regulated DC Power Supplies
• Bipolar-Transistor Basics
• Bipolar-Transistor Biasing and Small-Signal Behavior
• MOSFET Measurement and Applications

9. **Computer Resources:** Introduction to PSpice (or Engineering Workbench)

10. **Class/Laboratory Schedule:**

    One lab of 2 hours’ 45 minutes per week.

11. **Contribution to Meeting Professional Component:**

    Students are introduced to the basic analog electronic circuit design techniques and analytical skills using diodes, op-amps, MOSFETs, and BJTs. These concepts will be applied throughout their degree program and into their professional careers.

12. **Design/Science Content:**

    ABET Design: 1 credit or 100%

13. **Relationship to Program Objectives:**

    • Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering.

    • Students will learn modern engineering techniques & skills, and will use computer-based simulation tools.

    • Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.

    • Students will obtain an ability to communicate effectively.

14. **Relationship to Program Outcomes:**

    • Program Outcome #2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power

    • Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
Student Learning Outcomes:

- Apply the theory to design electronic circuits.
- Identify the limitations/physical design considerations required in electronic circuit design.
- Apply basic engineering sciences to the design, analyses and operation of electronics devices and circuits.
- Apply modern simulation tools such as PSpice (or Electronics Workbench) for the design, analyses, and performance evaluations of electronics circuits.
- Formulate problem solving skills of electronics circuits.
- Design and conduct electrical engineering experiments.
- Interpret and analyze electrical engineering data

15. Expectations for Academic Conduct/Plagiarism Policy:

Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>

Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>

Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

16. Assistance:

Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

17. Prepared by: Mohannad Bataineh  

Date: August, 2004
Master Course Syllabus for EEL 4306C

1. **Title:** Electronics II with lab

2. **Credits:** 3

3. **Catalog Description:** Continuation of Electronics I. Multiple transistor circuits, Op amp circuits, frequency response, amplifier feedback, and electronic filters are covered.

4. **Course Designation as Elective or Required:** Required for electrical engineering

5. **Prerequisite(s):**
   - EEL 3112, EEL 3304, EEL 4304L

6. **Textbook(s) and/or Other Required Materials:**
   - Sedra and Smith. 5th ed. *Microelectronic Circuits*, Oxford University Press
   - Smith, 5th ed. Laboratory Explorations

7. **Reference:** None

8. **Course Objectives:**
   Goal is to each senior electrical engineering students design-oriented analysis, elements of electronics using realistic specifications. To design with commonly used components and integrated circuits.

9. **Topics Covered:**
   1. Review of transistor circuits, biasing and small signal models.
   2. Multiple transistor circuits.
   3. Frequency response of linear amplifiers.
   4. Introduction to Feedback.
   5. Op amp architecture and open-loop response.
   6. Op amp applications
   7. Power Amplifiers.
   8. Active filter design
   9. Passive LC filter design

10. **Computer Resources:** Mathcad and MATLAB are used extensively for numerical, symbolic, and graphical analysis. Schematics/PSpice is used for circuit analysis and simulation.

11. **Class/Laboratory Schedule:**
    Two classes of 75 minutes per week. The laboratory course component is closely coordinated with this course. The lab meets approximately 3 hours per week.

12. **Contribution to Meeting Professional Component:**
    The course applies iterative circuit design techniques and mathematical modeling and simulation to electronic circuit design. Students are exposed to typical engineering scenarios through project reviews and presentations. Economics and manufacturing/servicing requirements are emphasized throughout the course.
13. **Design/Science Content:**
   ABET Science: 1.0 credits or 33%
   ABET Design: 2.0 credits or 67%

14. **Relationship to Program Objectives:**

   Objective 2: This course develops the students' abilities to apply basic and engineering sciences and mathematics to the analysis of electronics, and to use modern computer tools, such as Mathcad, MATLAB, and PSpice, as an aid in numerical and graphical analysis.
   Objective 3: In this course students solve problems involving the design, implementation, and operation of electronic systems and components that meet performance requirements.
   Objective 6: This course helps to develop the students' abilities to communicate effectively graphically and in writing by means of exams and homework assignments.

15. **Relationship to Program outcomes:**

   - Outcome Number 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.

   **Student Learning Outcomes:**
   - Outline advanced analog electronic circuit design techniques and analytical skills using op-amps, MOSFETs, and BJTs.
   - Describe the characteristics, biasing techniques, and circuit models of semiconductor devices and filters.
   - Apply basic engineering sciences to the design, analyses and operation of electronics devices and circuits.
   - Apply modern simulation tools such as PSpice (or Electronics Workbench) for the design, analyses, and performance evaluations of electronics circuits.
   - Formulate problem solving skills of electronics circuits.
   - Design electronic circuits to meet desired specifications

16. **Expectations for Academic Conduct/Plagiarism Policy:**

   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

17. **Assistance:**

   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

18. **Prepared by:** Steve Gorman  
    **Date:** November, 2004
Master Course Syllabus for EEL 4445

1. **Department:** Electrical and Computer engineering

2. **Title:** OPTICS FOR ENGINEERS
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Nature of light; laser basics; interferometry; holography coherence; polarization; diffraction; fiber optics; Fourier optics

5. **Prerequisite(s):**
   EEL 3472 Electromagnetic I

6. **Textbook(s):**
   Elements of Optoelectronics and Fiber Optics; Chin-Lin Chen; McGraw-Hill Primis Custom Publishing 2001

7. **Course Objectives:**
   Understand the operational theory and characteristics of optical sources, optical detectors, and optical waveguides.
   Understand the operational principles, characteristics, and basic design principles of lasers.
   Be able to investigate and analyze the applications of LEDs, lasers, photodetectors, and fiber optics

8. **Topics Covered:**

<table>
<thead>
<tr>
<th>Introduction &amp; Light Measurements</th>
<th>3 classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Beams, Optical Components, ABCD Matrices</td>
<td>4 classes</td>
</tr>
<tr>
<td>Gaussian Beams</td>
<td>4 classes</td>
</tr>
<tr>
<td>Laser Basics, Laser Systems</td>
<td>6 classes</td>
</tr>
<tr>
<td>Semiconductor Diodes, Semiconductor Lasers, LEDs</td>
<td>6 classes</td>
</tr>
<tr>
<td>Optical Detection &amp; Modulation</td>
<td>4 classes</td>
</tr>
<tr>
<td>Deflection of Optical Beams</td>
<td>6 classes</td>
</tr>
<tr>
<td>Integrated Optics</td>
<td>3 classes</td>
</tr>
<tr>
<td>Step Index Waveguide</td>
<td>3 classes</td>
</tr>
</tbody>
</table>

   **Total:** 30 classes

9. **Computer Resources:** The students are required to use Matlab/Mathcad to aid in computations.

10. **Class/Laboratory Schedule:**
    75 minutes class, twice per week.

11. **Contribution to Meeting Professional Component:**
Optics emphasizes the theory and applications of optical components and devices. It also deals with the applications of optics in lasers and fiber optics.

12. Design/Science Content:
   ABET Science: 3.0 credits or 100%

13. Relationship to Program Objectives:
   - Acquire an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering.
   - Develop an ability to self learn modern engineering techniques & skills, and the use computer-based tools.

14. Relationship to Program Outcomes:
   - Outcome #2: Knowledge of core electrical and computer engineering.
   - Outcome $4: An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems.

Student Learning Outcomes:
   - Outline the operational theory and characteristics of optical sources, optical detectors, and optical waveguides.
   - Interpret the operational principles, characteristics, and basic design principles of lasers.
   - Evaluate and analyze the applications of LEDs, lasers, photodetectors, and fiber optics.

15. Expectations for Academic Conduct/Plagiarism Policy:
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

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17. Prepared by: Douglas M. Jordan   Date: September, 1999
    Revised by: Mohannad M. Bataineh   Date: August 27, 2002
    Revised by: Mohannad M. Bataineh   Date: August 23, 2004
    Revised by: Mohannad M. Bataineh   Date: November 21, 2005

Appendix I-88
Master Course Syllabus for EEL 4514

1. **Title:** COMMUNICATION SYSTEMS COMPONENTS

2. **Credits:** 3

3. **Catalog Description:** Theory of communication, and applications to radio, television, telephone, satellite, cellular telephone, spread spectrum and computer communication systems. Prerequisite: EEL 3112, EEL 3135, and permission of program director.

4. **Course Designation as Elective or Required:** Required for electrical engineering

5. **Prerequisite(s):**
   - EEL 3112 Analysis of continuous-time signals and linear systems
   - EEL 3135 Analysis of discrete-time signals and linear systems

6. **Textbook(s) and/or Other Required Materials:**

7. **Reference:** None

8. **Course Objectives:**
   - To develop the signal processing theory involved in the analysis and design of analog and digital communication systems
   - To analyze basic analog and digital modulation signals and systems, and their bandwidth requirements and signal-to-noise ratio performance
   - To analyze common communication system components, especially mixers and phase-locked loops
   - To discuss applications to radio, television, etc.

9. **Topics Covered:**
   1. Introduction: the communication problem 1 class
   2. Signal analysis: review of Fourier analysis, power spectral density, linear systems, signal distortion 3 classes
   3. Sampling theory and practice, the DFT 3 classes
   4. Baseband signaling: PAM, PCM, DPCM, line codes and their spectra, inter symbol interference 4 classes
   5. Analog bandpass signals: mathematics of bandpass signals 2 classes
   6. Analog bandpass systems: linear modulation 2 classes
7. Analog bandpass systems: angle modulation 3 classes
8. Components: mixers 2 classes
9. Components: envelope detectors, slope detectors 1 class
10. Components: phase-locked loop 2 classes
11. Digital bandpass signals and systems: PSK, FSK, QAM 2 classes
12. Applications 3 classes
13. In-term exams 2 classes
Total: 30 classes

10. **Computer Resources:** Mathcad and MATLAB are used extensively for numerical, symbolic, and graphical analysis. Schematics/PSpice is used for circuit analysis and simulation.

11. **Class/Laboratory Schedule:**
   Two classes of 75 minutes per week. The separate laboratory course EEL 4514L is closely coordinated with this course.

12. **Contribution to Meeting Professional Component:**
    This course applies signal and system analysis techniques to the analysis and design of communication systems. The students are made to consider the cost, performance, and societal impact of various system designs. They are introduced to the regulatory and standards functions of the FCC and the CCITT.

13. **Design/Science Content:**
    ABET Science: 2.5 credits or 83% ABET
    Design: 0.5 credit or 17%

14. **Relationship to Program Objectives:**
    Objective 2: This course develops the students' abilities to apply basic and engineering sciences and mathematics to the analysis of communication systems, and to use modern computer tools, such as Mathcad, MATLAB, and PSpice, as an aid in numerical and graphical analysis.

    Objective 3: In this course students solve problems involving the design, implementation, and operation of systems and components that meet performance requirements.

    Objective 6: This course helps to develop the students' abilities to communicate effectively graphically and in writing by means of exams and homework assignments.

15. **Relation to Program outcomes:**
    Outcome Number 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.

**Student Learning Outcomes:**
Analyze communications systems in the time and frequency domains using tools such as the z transform, Fourier transform, Discrete Fourier transform.

Design basic communications systems at a top level to meet prescribed specifications.

Apply the software package MATLAB to simulate communications systems. In this course students solve problems involving the design, implementation, and operation of communications systems and components that meet performance requirements.

16. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

17. **Assistance:**

   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

18. **Prepared by:** Steve Gorman

    **Date:** August, 2004

**Error! Bookmark not defined.**
Master Course Syllabus for EEL 4514L

1. **Title:** COMMUNICATION LABORATORY  
   **Credits:** 1

2. **Catalog Description:** Communication circuits and radio frequency instruments, devices and measurements

3. **Course Designation as Elective or Required:** Required for electrical engineering

4. **Prerequisite(s):**
   1. EEL 4304L Electronics Laboratory AND  
   2. Permission of Program Director

5. **Co-requisite:**  
   EEL 4514 Communication Systems and Components

6. **Textbook(s) and/or Other Required Materials:**  
   None

7. **Reference:**  

8. **Course Objectives:**
   - To introduce the students to the correct use of the equipment used in communication system measurement, particularly the digital storage oscilloscope and the spectrum analyzer.
   - To teach the students correct experimental and measurement procedures, and accurate record keeping.
   - To reinforce the topics discussed in the co-requisite class EEL 4514

9. **Topics Covered:**
   1. Introduction to the digital storage oscilloscope  
   2. Introduction to the spectrum analyzer  
   3. Measuring the frequency response of linear systems  
   4. Sinusoidal oscillators  
   5. Sampling and PAM  
   6. Delta Modulation  
   7. RF Mixers and Amplifiers  
   8. Amplitude modulation and demodulation

Appendix I-92
9. Frequency modulation and demodulation - Part I
10. Frequency modulation and demodulation - Part II

10. **Computer Resources:** Mathcad and MATLAB are used extensively for numerical, symbolic, and graphical analysis. Schematics/PSpice is used for circuit analysis and simulation.

11. **Class/Laboratory Schedule:**

One 3-hour laboratory per week. This lab course is closely coordinated with EEL 4514.

12. **Contribution to Meeting Professional Component:**

This lab course emphasizes the experimental procedures and techniques that the students need during their design experience. During each laboratory experiment, they are aware of the capabilities and limitations of their test equipment. The students also keep a patent-style notebook during this course, in order to help prepare them for work in industrial design.

**Design/Science Content:**
ABET Science: 0.5 credits or 50%
ABET Design: 0.5 credit or 50%

13. **Relationship to Program Objectives:**

- This course develops the students' abilities to apply basic and engineering sciences and mathematics to the analysis of communication systems through the pre-lab component of the experiments. The pre-labs consist of mathematical analysis and numerical and graphical analysis and simulation.
- In this course, students conduct engineering experiments and analyze and interpret their data. They compare expected theoretical results, computer simulations, and measured data.
- This course helps to develop the students' abilities to communicate effectively graphically and in writing by means of written lab reports and by the keeping of a lab notebook.

14. **Relationship to Program outcomes:**

Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.

**Student Learning Outcomes:**
- Apply communications design experience in support of the theory taught in the communications course.
- Identify the limitations/physical design considerations required in communications circuit design.
- Apply basic engineering sciences to the design, analyses, and operation of communications devices and circuits.
- Apply modern simulation tools such as Matlab/Mathcad for the design, analyses, and performance evaluations of communications circuits.
- Formulate problem solving skills of communications circuits.
- Design and conduct advanced engineering experiments.
- Interpret and analyze scientific data.
15. **Expectations for Academic Conduct/Plagiarism Policy:**
   Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

16. **Assistance:**
    Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

17. **Prepared by:** Steve Gorman  
    **Date:** August, 2004
Master Course Syllabus for EEL 4515

1. **Title:** DIGITAL COMMUNICATIONS  
   **Credits:** 3

2. **Catalog Description:**  
   A Study of Digital Communications Systems

3. **Course Designation as Elective or Required:** Elective

4. **Prerequisite(s):**  
   EEL 3112, EEL 3135

5. **Textbook(s) and/or Other Required Materials:**  
   *Communications Systems Engineering*, John Proakis, Masoud Salehi, Second edition

6. **Course Objectives:**
   - To introduce students to the basic components of digital communications systems
   - To introduce the probability and random process mathematics necessary for analysis and design of digital communications systems
   - To teach students the various tradeoffs in the design of digital communications systems
   - To teach students the necessary mathematical analysis tools needed to model, simulate and design a digital communications system
   - To introduce students to modeling and simulation of digital communications systems

7. **Topics Covered:**
   1. Review of signals, Fourier methods, sampling, etc.
   2. Probability and random processes
   3. Quantization
   4. Baseband digital signaling formats
   5. Digital transmission through AWGN channels
   6. Baseband digital signaling through band limited channels
   7. Digital bandpass signaling and common formats
   8. Block and convolutional coding
   9. Viterbi algorithm
   10. Trellis coded modulation
   11. System simulation

8. **Computer Resources:** Each student must use Matlab, Mathcad, and SystemView software for various modeling and design assignments.

9. **Class:**  
   Two 75 minute classes each week.

10. **Contribution to Meeting Professional Component:**  
    The course applies basic analytical techniques, and mathematical skills to analyze and design digital communications systems. Students are required to do design projects to meet certain system performance specifications.
11. Design/Science Content:
   ABET Science: 1.5 credits or 50%
   ABET Design: 1.5 credits or 50%

12. Relationship to Program Objectives:
   - To develop student ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
   - To develop student ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems
   - To develop student ability to design as well as to analyze and interpret data
   - To develop student ability to communicate effectively in writing through written reports.

13. Relationship to Program outcomes:
   • Program Outcome Number 6: Recognize and apply concepts, principles and theories in probability and statistics, including electrical/computer engineering applications.
   • Program Outcome Number 9: Describe the ethical and professional responsibilities of the electrical/computer engineer. Make and defend ethical judgments in keeping with professional standards.

   Student Learning Outcomes:
   • Analyze digital communications systems in the time and frequency domains using tools such as the z transform, Fourier transform, Discrete Fourier transform.
   • Analyze digital communications systems at a top level and design parameters to meet prescribed specifications.
   • Apply the software package MATLAB to simulate digital communications systems. In this course students solve problems involving the design, implementation, and operation of digital communications systems and components that meet performance requirements.

14. Expectations for Academic Conduct/Plagiarism Policy:
   • Academic Conduct Policy: <http://uwf.edu/cas/aaar/academic_conduct.pdf>
   • Plagiarism Policy: <http://uwf.edu/cas/aaar/Plagiarism.pdf>
   • Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

15. Assistance:

   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Steve Gorman Date: October 5, 2001
    Revised by: Steve Gorman Date: August 2004
Master Course Syllabus for EEL 4635

1. Title: DIGITAL CONTROL SYSTEMS
   Credits: 3

2. Catalog Description:
   A study of the digital computer as a control element, classical sampled data control theory, and application with microcomputers.

3. Course Designation as Elective or Required: Elective

4. Prerequisite(s):
   EEL 3701C, EEL 3135, EEL 4657

5. Textbook(s) and/or Other Required Materials:

6. Course Objectives:
   To introduce the students to the basic concepts of digital control of mostly continuous processes
   To instruct the students in the analysis techniques of discrete time closed loop linear control systems.
   To have the students learn how to develop control models for mixed discrete / continuous time closed loop control systems.
   To instruct the students in digital controller design.
   To have students use computer software tools for the analysis, design, and simulation of systems controlled by a digital processor.

7. Topics Covered:
   1. Overview of basic control concepts 2 classes
   2. Review of classical continuous time control 1 class
   3. Review of discrete time systems and z – transform 3 classes
   4. Signal sampling and reconstruction 2 classes
   5. Open loop discrete time systems 3 classes
   6. Closed loop discrete time systems 3 classes
   7. System time response 2 class
   8. Introduction to state space methods 4 classes
   9. Frequency domain stability analysis 3 classes
   10. Digital controller design 3 classes
   11. Control using microprocessors 2 classes
   12. Class exams 2 classes

   Total: 30 classes

8. Computer Resources: Each student must use Matlab software for various modeling and design assignments.

9. Class:
   Two classes of 75 minutes each per week.
10. Contribution to Meeting Professional Component:
The course applies basic analytical techniques, and mathematical skills to analyze and design digital control systems. Students are required to do (3) design projects to meet certain system performance specifications as well as analyze system stability margins.

11. Design/Science Content:
ABET Science: 1.5 credits or 50%
ABET Design: 1.5 credits or 50%

12. Relationship to Program Objectives:
- To develop student ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design
- To develop student ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical or computer engineering problems
- To develop student ability to design as well as to analyze and interpret data
- To develop student ability to communicate effectively in writing through written reports.

13. Relationship to Program outcomes:
Program Outcome Number 4: Apply knowledge of mathematics, science, and engineering to the analysis of electrical/computer engineering problems.

Student Learning Outcomes:
Apply mathematics and engineering in the analysis and design of digital control systems.
Use modern hardware and software tools in the analysis and design of real world digital control systems.
Communicate effectively in writing and graphically

14. Expectations for Academic Conduct/Plagiarism Policy:
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. Assistance:
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Steve Gorman Date: September 20, 2000
Updated by: Steve Gorman Date: August 2004
Master Course Syllabus for EEL 4657

1. **Department:** Electrical and Computer Engineering

2. **Title:** LINEAR CONTROL SYSTEMS
   **Credits:** 3.0 (3 Lectures)

3. **Course Designation as Elective or Required:** Required for electrical engineering

4. **Catalog Description:** Theory and design of linear control systems.

5. **Prerequisite(s):**
   1. EEL3112 Circuits II
   2. EEL3135 Discrete-Time Signals and Systems AND
   3. Permission of Program Director

6. **Textbook(s) and/or Other Required Materials:**

   **Reference(s):**

7. **Course Objectives:**
   To give students the knowledge and ability to analyze and design feedback control systems using techniques of classical control theory. Particular emphasis is placed on stability and frequency domain analysis and design.

8. **Topics Covered:**
   1. Introduction to control systems 2 classes
   2. Characteristics of feedback control systems 3 classes
   3. Time domain specification performance 3 classes
   4. Stability of feedback systems using Routh-Hurwitz technique 3 classes
   5. Root locus method for control systems analysis and design 3 classes
   6. Frequency domain analysis and design 3 classes
   7. Stability analysis in the frequency domain using Nyquist criterion 3 classes
   8. Lead-lag and PID controller design 6 classes
   9. Exams and Reviews 4 classes

   **Total:** 30 classes

   **Computer Resources:** MATLAB with the Controls toolbox and/or Program CC (Controls packages) are used extensively in a variety of analysis and design assignments.

9. **Class/Laboratory Schedule:**
   Two classes of 75 minutes per week
   Course material is coordinated with the co-requisite Controls Laboratory, EEL4657L

10. **Contribution to meeting Professional Component:**
    This course introduces students to the analytical and qualitative aspects of control systems including the mathematical tools necessary to the analysis and design of such systems. The knowledge and skills
required for the understanding and design of linear control systems are emphasized. Several assignments require use of mathematics and software packages for the analysis and design of systems to meet realistic specifications of control systems.

**Design/Science Content:**
ABET Science: 1.5 credits or 50%
ABET Design: 1.5 credits or 50%

11. **Relationship to Program Objectives**
   Students will be able to:
   - Apply mathematics and engineering in the analysis and design of control systems.
   - Use modern engineering tools such as computers with software tools like Matlab or MathCad and a controls system software package, CC, in the analysis and design of real world control problems.
   - Communicate effectively in writing and graphically.

12. **Relationship to Program Outcomes:**
    - Program Outcome 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power
    - Program Outcome 3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.

**Student Learning Outcomes:**
- Apply mathematics and engineering in the analysis and design of control systems.
- Use modern hardware and software tools in the analysis and design of real world control systems.
- Communicate effectively in writing and graphically

13. **Expectations for Academic Conduct/Plagiarism Policy:**
    - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
    - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Rachid Manseur  
    **Date:** October, 2004
Master Course Syllabus for EEL 4657L

1. Department: ELECTRICAL AND COMPUTER ENGINEERING

2. Title: LINEAR CONTROLS LABORATORY
   Credits: 1.0 (1 Laboratory)

3. Course Designation as Elective or Required: Required for electrical engineering

4. Catalog Description: Practical applications of linear control theory.

5. Prerequisite(s): Permission of program director
   Co-requisite(s): EEL4657  Linear Control Systems

6. Textbook(s) and/or Other Required Materials:
   Laboratory hand-outs
   Reference(s):

7. Course Objectives:
   • Develop the ability to analyze and measure important parameters of a practical control system.
   • Learn to apply classical analog and digital control theory to simple dynamic systems.
   • To use computer-based tools in the analysis and design of control systems.

8. Topics Covered:
   1. Analog computer simulation of systems 1 week
   2. Closed-loop control - Part I 1 week
   3. Closed-loop control - Part II 1 week
   4. System simulation using Matlab with Simulink. 2 week
   5. DC-motor position control 2 weeks
   6. DC-motor speed control 1 week
   7. Data acquisition and computer-based control using Labview 2 weeks
   8. Control of an unstable system - Part I 1 week
   9. Control of an unstable system - Part II 2 weeks

   Total: 13 weeks

9. Computer Resources: Matlab, Simulink, and Program CC are used to analyze, simulate and design practical control systems. A data acquisition card and Labview software are used to introduce and implement digital system control using a computer.

10. Class/Laboratory Schedule: One lab session of 165 minutes per week

11. Contribution to Meeting Professional Component:
    Students are introduced to practical aspects of control systems and learn to use computer tools in the analysis and design of electromechanical dynamic systems.

Appendix I-101
12. **Design/Science Content:**
   - ABET Science: 0.5 credit or 50%
   - ABET Design: 0.5 credit or 50%

13. **Relationship to Program Objectives:**

   Students will be able to:
   - analyze, design, and implement systems that meet performance, safety, and quality requirements, and analyze and interpret resulting data.
   - use modern engineering techniques and tools, including computer tools in the analysis and design of engineering systems.
   - work in teams.
   - communicate in writing and graphically.

14. **Relationship to Program Outcomes:**

   - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   - Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.
   - Program Outcome #10: Communicate effectively in writing and convey technical material through oral presentation of electrical/computer engineering topic and interaction with an audience.

**Student Learning Outcomes:**

   - Analyze, design, and implement systems that meet performance, safety, and quality requirements, and analyze and interpret resulting data.
   - Use modern engineering techniques and tools, including computer tools in the analysis and design of engineering systems.
   - Work in teams.
   - Communicate in writing, orally, and graphically

15. **Expectations for Academic Conduct/Plagiarism Policy:**

   - Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   - Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   - Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

16. **Assistance:**

   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

17. **Prepared by:** Dr. Rachid Manseur          **Date:** September 2004
Master Course Syllabus for EEL 4663

1. **Department:** Electrical and Computer Engineering

2. **Title:** Elements of Robotics  
   **Credits:** 3.0 (3 Lectures)

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** An introductory course in the multidisciplinary field of robotics with analysis and design of robots and robotic tasks. Includes class projects in robot programming and design.

5. **Prerequisite(s):**  
   1. EEL3112.  
   2. Permission of Program Director

6. **Textbook(s) and/or Other Required Materials:**  
   **Instructor Notes:** Elements of Robotics  
   **Reference(s):**  

7. **Course Objectives:**  
   Students are introduced to the mathematical representation of objects’ location in 3D space, robot modeling, and kinematic analysis of robot manipulators. Programming and design of robot mechanisms, trajectory and task planning, and robot building techniques are also presented.

8. **Topics Covered:**  
   1. review of mathematical tools for robotics  
   2. Introduction to robotic systems  
   3. Object location, position and orientation  
   4. Robot modeling, the Denavit-Hartenberg method  
   5. Kinematics Equations and analysis  
   6. Inverse kinematics methods  
   7. Manipulator Jacobian and velocity kinematics  
   8. Trajectory planning and generation  
   9. Mobile robot building techniques  
   10. Robot sensors  
   11. Robot building project  
   12. Tests  
   **Total:** 30 classes

**Computer Resources:** Students use the following computer resources:

a. MATLAB/Mathcad are used extensively for general computation.  
b. Robotdraw, an internet-based robot modeling tool developed by the instructor  
c. KAP- KinematicAnalysis Package (developed by the instructor) or kinematic computation
d. Robot programming software

9. **Class/Laboratory Schedule:**
Two classes of 75 minutes per week
A lecture session may be replaced by a laboratory session as needed

10. **Contribution to meeting Professional Component:**
This course introduces students to the analytical and qualitative aspects of robotic systems including the mathematical tools necessary for the analysis and design of such systems. Students use a variety of software and programming tools.

   **Design/Science Content:**
   ABET Science: 2 credits or 66%
   ABET Design: 1 credits or 34%

11. **Relationship to Program Objectives**
Students will be able to:
   - Apply mathematics and engineering in the analysis and design of robotic systems.
   - Use modern engineering tools such as computers with software tools like Matlab or MathCad and robotics software for modeling, analysis and programming of robots.
   - Communicate effectively in writing and graphically.

12. **Relationship to Program Outcomes:**
   - Program Outcome 2: Recognize and apply concepts, principles and theories of core electrical/computer engineering topics: basic circuit analysis, signals and systems, electronics, digital logic, microprocessors, control systems, communications, electromagnetics, and electric power
   - Program Outcome 3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.

**Student Learning Outcomes:**
   - Representation and computate the position and orientation of an object in space.
   - Determine the mathematical model of a robotic arm and develop the robot's kinematic equations.
   - Program a robot to accomplish a given task

13. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasl/academic_conduct.pdf](http://uwf.edu/cas/aasl/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasl/Plagiarism.pdf](http://uwf.edu/cas/aasl/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
   - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Rachid Manseur  **Date:** February, 2005
Master Course Syllabus for EEL 4712

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING
2. **Title:** DIGITAL DESIGN
   Credits: 3.0

3. **Course Designation as Elective or Required:** Required for computer engineering

4. **Catalog Description:** Advanced modular logic design, design languages, finite state machines and binary logic

5. **Prerequisites:** EEL 3701 and EEL 3701L, **Co-requisite:** EEL 4712L.

6. **Textbook(s) and/or Other Required Materials:**
   - K. Skahill, *VHDL for Programmable Logic*, Addison-Wesley (supplied by ECE Dept)

7. **Course Objectives:**
   - Learn to use modern engineering techniques, skills, and tools, including computer-based tools for design and analysis of digital circuits
   - Develop an ability to design and conduct engineering experiments, as well as analyze and interpret data
   - Develop an ability to communicate effectively in writing and to convey technical material
   - Design multi-component combinational and sequential circuits
   - Learn to write functionally correct and well-documented VHDL code, intended for either simulation or synthesis, of a combinational or sequential logic design
   - Define and use the three major styles of writing VHDL code (structural, dataflow, and behavioral)
   - Learn to write VHDL code that can be implemented efficiently in a given technology device
   - Learn to test and debug VHDL code, containing syntax and/or semantic errors, until it performs according to desired specifications

8. **Topics Covered:**
   - Review of combinational and sequential circuit design
   - Introduction to Programmable Logic Devices
   - Top-level VHDL: Entities and Architectures
   - Study of commonly-used combinational networks
   - VHDL Combinational and Sequential Logic Design
   - Design Methods for Synchronous Finite State Machines
   - Design Methods for Asynchronous Finite State Machines
   - Finite State Machine Design Examples
   - Circuit Testing

   **Computer Resources:** Use of MaxPlus II software to design and simulate digital circuits described in VHDL.

9. **Class/Laboratory Schedule:** Two classes of 75 minutes per week

10. **Contribution to Meeting Professional Component:**

Appendix I-105
Students are introduced to the design and testing of advanced modular digital circuits using a hardware description language (VHDL). Design concepts learned in this class and the gained knowledge of VHDL can be applied throughout their degree program and into their professional careers.

11. **Design/Science Content:**
   - ABET Science: 1.5 credits or 50%
   - ABET Design: 1.5 credits or 50%

12. **Relationship to Program Objectives:**
   - Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   - Students will obtain an ability to identify, formulate, and solve novel electrical engineering problems. This includes the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.
   - Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.

13. **Relationship to Program Outcomes:**
   - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   - Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.

**Student Learning Outcomes:**
- Identify the different types of programmable logic devices
- Describe an FSM using an ASM chart
- Design and simulate a digital circuit using VHDL
- Evaluate the performance (e.g. propagation delay) of a digital circuit
- Optimize the hardware necessary to build a digital circuit
- Create a test set for a digital circuit

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Mohamed Khabou  
    **Date:** September 2004
Master Course Syllabus for EEL 4712L

1. Department: ELECTRICAL AND COMPUTER ENGINEERING

2. Title: DIGITAL DESIGN LABORATORY
   Credits: 1.0

3. Course Designation as Elective or Required: Required for computer engineering

4. Catalog Description: Design and applications of advanced digital logic using VHDL

5. Prerequisites: EEL 3701 and EEL 3701L, Co-requisite: EEL 4712.

6. Textbook(s) and/or Other Required Materials:
   - K. Skahill, *VHDL for Programmable Logic*, Addison-Wesley (supplied by ECE Dept)
   - Altera Educational Development CPLD Kit

7. Course Objectives:
   - Learn to use modern engineering techniques, skills, and tools, including computer-based tools for design and analysis of digital circuits
   - Develop an ability to design and conduct engineering experiments, as well as analyze and interpret data
   - Develop an ability to communicate effectively in writing and to convey technical material
   - Design multi-component combinational and sequential circuits
   - Learn to write functionally correct and well-documented VHDL code, intended for either simulation or synthesis, of a combinational or sequential logic design
   - Define and use the three major styles of writing VHDL code (structural, dataflow, and behavioral)
   - Learn to write VHDL code that can be implemented efficiently in a given technology device
   - Learn to test and debug VHDL code, containing syntax and/or semantic errors, until it performs according to desired specifications

8. Topics Covered
   - VHDL tutorial using MaxPlus II software
   - Building a word generator to be used later in the testing of circuits. This also serves as an introduction to the use of the logic analyzer
   - VHDL combinational logic design example
   - VHDL sequential logic design example
   - VHDL code of multi-component digital design
   - Comparing propagation delays in different designs
   - Digital design with ASM charts
   - Circuit Testing

9. Computer Resources: Use of MaxPlus II software to design and simulate digital circuits described in VHDL.

10. Class/Laboratory Schedule: One lab of 165 minutes per week

Appendix I-107
11. **Contribution to Meeting Professional Component:**
   Students are introduced to the design and testing of advanced modular digital circuits using a hardware description language (VHDL). Design concepts learned in this class and the gained knowledge of VHDL can be applied throughout their degree program and into their professional careers.

12. **Design/Science Content:**
   ABET Design: 1.0 credit or 100%

13. **Relationship to Program Objectives:**
   - Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   - Students will obtain an ability to identify, formulate, and solve novel electrical engineering problems. This includes the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.
   - Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.

14. **Relationship to Program Outcomes:**
   - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   - Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.

**Student Learning Outcomes:**
   - Identify the characteristics of a programmable logic device
   - Describe an FSM using an ASM chart
   - Design and simulate a digital circuit using VHDL
   - Evaluate the performance (e.g. propagation delay) of a digital circuit
   - Interpret data obtained from a logic analyzer
   - Design a testing strategy for designed circuits

15. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

16. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

17. **Prepared by:** Dr. Mohamed Khabou  
    **Date:** September 2004
Master Course Syllabus for EEL 4713

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING  
   **Title:** COMPUTER ARCHITECTURE

2. **Credits:** 3.0

3. **Course Designation as Elective or Required:** Required for computer engineering

4. **Catalog Description:** The use of electronic digital modules to design computers. Organization and operation of computers. Hardware/software trade-offs. Design of computer interfacing.

5. **Prerequisites:** EEL 3701 and EEL 3701L, **Co-requisite:** EEL 4713L.

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
   - Learn to use modern engineering techniques, skills, and tools, including computer-based tools for design and analysis of computational machines  
   - Understand the issues involved in the design of an instruction set architecture including hardware/software tradeoffs  
   - Understand the issues involved in measuring and improving computer performance  
   - Develop an ability to communicate effectively in writing and to convey technical material  
   - Learn to write functionally correct and well-documented VHDL code, intended for either simulation or synthesis, of a simple datapath and control circuit  
   - Study the implementation of a Reduced Instruction Set Computer (RISC) using micro-programmed state machine platform to show the interplay between algorithms and the architectures on which they run

8. **Topics Covered:**  
   - Fundamentals of computer design  
   - Introduction to VHDL  
   - Computer performance measures  
   - Instruction Set Architecture  
   - Arithmetic for computers  
   - Datapath and control  
   - Pipelining  
   - Memory hierarchy  
   - Interfacing and peripherals  

   **Computer Resources:** Use of MaxPlus II software to design and simulate datapath and control circuits described in VHDL.

9. **Class/Laboratory Schedule:** Two classes of 75 minutes per week

10. **Contribution to Meeting Professional Component:**  
    Digital computer architecture exposes students to the basics of processor and memory system design. The projects consist of ever increasingly complex designs implemented in VHDL. The intent of the
assignments is to increase the students experience in creating, implementing, and testing complex designs.

11. **Design/Science Content:**
   - ABET Science: 1.5 credits or 50%
   - ABET Design: 1.5 credits or 50%

12. **Relationship to Program Objectives:**
   - Students will have the knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.
   - Students will obtain an ability to understand all the elements required to design a complete computer system (hardware and software).
   - Students will obtain an ability to understand the interaction between hardware and software.
   - Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

13. **Relationship to Program Outcomes:**
   - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   - Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.
   - Program Outcome #14: Recognize and apply concepts, fundamental theory and practice of computer science and electrical/computer engineering, as it applies to computer hardware and software, and identify the interaction between hardware and software
   - Program Outcome #15: Describe and apply all the elements required to design a complete computer system (hardware and software)

**Student Learning Outcomes:**
- Identify the different components of a CPU
- Evaluate the performance of a computer
- Design and simulate the control unit and the datapath of a simple computer using VHDL
- Identify ways to improve the performance of a computer
- Explain how pipelining and memory cache improve computer performance

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Mohamed Khabou  
    **Date:** November 2004
Master Course Syllabus for EEL 4713L

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING  
   **Title:** COMPUTER ARCHITECTURE LABORATORY
2. **Credits:** 1.0
3. **Course Designation as Elective or Required:** Required for computer engineering
4. **Catalog Description:** Computer design and organization.
5. **Prerequisites:** EEL 3701 and EEL 3701L, **Co-requisite:** EEL 4713.
6. **Textbook(s) and/or Other Required Materials:**  
   - K. Skahill, VHDL for Programmable Logic, Addison-Wesley (supplied by ECE Dept)  
   - J. Hamblen and M. Furman, Rapid Prototyping of Digital Systems (supplied by ECE Dept)  
   - Altera Educational Development CPLD Kit (supplied by ECE Dept)
7. **Course Objectives:**  
   - Learn to use modern engineering techniques, skills, and tools, including computer-based tools for design and analysis of computational machines  
   - Understand the issues involved in the design of an instruction set architecture including hardware/software tradeoffs  
   - Understand the issues involved in measuring and improving computer performance  
   - Develop an ability to communicate effectively in writing and to convey technical material  
   - Learn to write functionally correct and well-documented VHDL code, intended for either simulation or synthesis, of a simple datapath and control circuit  
   - Study the implementation of a Reduced Instruction Set Computer (RISC) using micro-programmed state machine platform to show the interplay between algorithms and the architectures on which they run
8. **Topics Covered:**  
   - Introduction to VHDL and MaxPlus II  
   - VHDL Structural Models  
   - Register Arithmetic-Logic Unit  
   - Register-Based State Machine Controller  
   - Machine Controller and Micro-programmed State Machine Controller  
   - Construction of CPU in terms of Components  
   - Instruction Execution Sequence  
   **Computer Resources:** Use of MaxPlus II software for design in VHDL.
9. **Class/Laboratory Schedule:** One lab of 165 minutes per week
10. **Contribution to Meeting Professional Component:**  
    Digital computer architecture exposes students to the basics of processor and memory system design. The projects consist of ever increasingly complex designs implemented in VHDL. The intent of the assignments is to increase the students experience in creating, implementing, and testing complex designs.
11. Design/Science Content:
   ABET Design: 1.0 credit or 100%

12. Relationship to Program Objectives:
   - Students will have the knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.
   - Students will obtain an ability to understand all the elements required to design a complete computer system (hardware and software).
   - Students will obtain an ability to understand the interaction between hardware and software.
   - Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

13. Relationship to Program Outcomes:
   - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   - Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.
   - Program Outcome #14: Recognize and apply concepts, fundamental theory and practice of computer science and electrical/computer engineering, as it applies to computer hardware and software, and identify the interaction between hardware and software.
   - Program Outcome #15: Describe and apply all the elements required to design a complete computer system (hardware and software).

Student Learning Outcomes:
   - Design and simulate the control unit and the datapath of a simple computer using VHDL.
   - Identify ways to improve the performance of a computer.
   - Explain how pipelining and memory cache improve computer performance.
   - Explain how an instruction set architecture influences hardware design.
   - Evaluate and optimize VHDL code.

14. Expectations for Academic Conduct/Plagiarism Policy:
   - Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   - Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   - Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

15. Assistance:
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Dr. Mohamed Khabou

Date: November 2004
Master Course Syllabus for EEL 4744

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING  
   **Title:** MICROPROCESSOR APPLICATIONS

2. **Credits:** 3.0

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Elements of microprocessor-based systems; hardware interfacing and software design for their application

5. **Prerequisites:** EEL 3701 and EEL 3701L, **Co-requisite:** EEL 4744L.

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
   - Develop an ability to design and conduct engineering experiments, as well as analyze and interpret data  
   - Develop an ability to communicate effectively in writing and to convey technical material  
   - Develop an understanding of all elements required to design a complete computer system (hardware and software)  
   - Learn the necessary knowledge to apply digital electronics and microprocessors and to combine digital and analog electronics in the analysis and design of electrical engineering systems  
   - Learn to plan, analyze, describe, and compare solutions to engineering practical problems using microprocessors as a powerful component in their work  
   - Learn novel ways to design experiments to validate and verify their designs  
   - Learn to write well-commented assembly language programs, schematics, and graphs

8. **Topics Covered:**  
   - Introduction to microprocessors, hardware/software  
   - Assembly language programming and simulation  
   - Memory, Interfacing, Machine cycles  
   - Interrupts and stacks  
   - Timer functions  
   - Serial communications, synchronous and asynchronous  
   - Analog/Digital conversion  
   - Analog Interfacing, sensors, signal conditioning  
   - Comparative micro-controllers  

   **Computer Resources:** Use of an assembler (ASM11) and simulator (SIM11) to write and debug HC11 assembly code.

9. **Class/Laboratory Schedule:** Two classes of 75 minutes per week

10. **Contribution to Meeting Professional Component:**  
    Students are introduced to microprocessors and how they can be interfaced/used with other digital
systems. Knowledge learned in this class can be applied throughout their degree program and into their professional careers.

11. **Design/Science Content:**
   - ABET Science: 1.5 credits or 50%
   - ABET Design: 1.5 credits or 50%

12. **Relationship to Program Objectives:**
   - Students will have the knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.
   - Students will obtain an ability to understand all the elements required to design a complete computer system (hardware and software).
   - Students will obtain an ability to understand the interaction between hardware and software.
   - Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

13. **Relationship to Program Outcomes:**
   - Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.
   - Outcome #14: Recognize and apply concepts, fundamental theory and practice of computer science and electrical/computer engineering, as it applies to computer hardware and software, and identify the interaction between hardware and software
   - Outcome #15: Describe and apply all the elements required to design a complete computer system (hardware and software)

**Student Learning Outcomes:**
   - Identify the different components of a microcontroller
   - Evaluate the performance and correctness of an assembly program
   - Explain how interrupts, parallel and serial I/O, AD, and timer functions of a microcontroller work
   - Design correct and efficient assembly code for HC11

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   - Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   - Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

15. **Assistance:**
    Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Mohamed Khabou  
    **Date:** September 2004
Master Course Syllabus for EEL 4744L

1. Department: ELECTRICAL AND COMPUTER ENGINEERING
   Title: MICROPROCESSOR APPLICATIONS LABORATORY
2. Credits: 1.0

3. Course Designation as Elective or Required: Required

4. Catalog Description: Practical applications of microprocessor-based systems, software and hardware interface

5. Prerequisites: EEL 3701 and EEL 3701L, Co-requisite: EEL 4744.

6. Textbook(s) and/or Other Required Materials:
   - Axiom HC11E9 Evaluation Board

7. Course Objectives:
   - Develop an ability to design and conduct engineering experiments, as well as analyze and interpret data
   - Develop an ability to communicate effectively in writing and to convey technical material
   - Develop an understanding of all elements required to design a complete computer system (hardware and software)
   - Learn the necessary knowledge to apply digital electronics and microprocessors and to combine digital and analog electronics in the analysis and design of electrical engineering systems
   - Learn to plan, analyze, describe, and compare solutions to engineering practical problems using microprocessors as a powerful component in their work
   - Learn novel ways to design experiments to validate and verify their designs
   - Learn to write well-commented assembly language programs, schematics, and graphs

8. Topics Covered:
   - Introduction to the Axiom HC11E9 evaluation board and the Buffalo monitor
   - Assembly directive and simple assembly program writing
   - Writing assembly subroutines
   - Memory, interfacing, machine cycles
   - Interrupts and stacks
   - Timer functions
   - Synchronous serial communications
   - Asynchronous serial communications
   - Analog/Digital conversion
   - Analog Interfacing, sensors, signal conditioning

   Computer Resources: Use of an assembler (ASM11) and simulator (SIM11) to write and debug HC11 assembly code.

9. Class/Laboratory Schedule: One lab of 165 minutes per week

10. Contribution to Meeting Professional Component:
Students are introduced to microprocessors and how they can be interfaced/used with other digital systems. Knowledge learned in this class can be applied throughout their degree program and into their professional careers.

11. **Design/Science Content:**
   ABET Design: 1.0 credit or 100%

12. **Relationship to Program Objectives:**
   - Students will have the knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.
   - Students will obtain an ability to understand all the elements required to design a complete computer system (hardware and software).
   - Students will obtain an ability to understand the interaction between hardware and software.
   - Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

13. **Relationship to Program Outcomes:**
   - Program Outcome #5: Design and conduct scientific and electrical/computer engineering experiments, as well as to analyze and interpret data.
   - Program Outcome #14: Recognize and apply concepts, fundamental theory and practice of computer science and electrical/computer engineering, as it applies to computer hardware and software, and identify the interaction between hardware and software
   - Program Outcome #15: Describe and apply all the elements required to design a complete computer system (hardware and software)

**Student Learning Outcomes:**
- List the different components/ports of the HC11
- Evaluate the performance and correctness of an assembly program
- Explain how interrupts, parallel and serial I/O, AD, and timer functions of the HC11 work
- Design correct and efficient assembly code
- Interpret logic analyzer data
- Outline and describe the components of a relatively complex assembly program

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
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16. **Prepared by:** Dr. Mohamed Khabou
   **Date:** September 2004

 Appendix I-116
Master Course Syllabus for EEL 4750C

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** INTRODUCTION TO DIGITAL SIGNAL PROCESSING
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Fundamentals of filter design and Fourier transforms. Hardware implementation of filters. Simulation of signal processing systems using MATLAB.

5. **Prerequisite(s):**
   Prerequisite: EEL 3135, EEL4744

6. **Textbook(s) and/or Other Required Materials:**
   **Reference:**

7. **Course Objectives:**
   - To introduce students to the theory and practice of digital signal processing, emphasizing filter design and implementation.
   - To introduce students to DSP processors and to teach real-time algorithm implementation using the Texas Instruments TMS320C30 floating point DSP processor. To introduce the programming tools for the C3X series and to teach programming in C and assembly language.
   - To introduce students to filter design methods and implementation. To use MATLAB to aid in filter design.

8. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview of real-time signal processing.</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Review of Fourier transforms and Fourier series, sampling theorem</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Discrete time systems: classification, time domain analysis, implementation (direct form I &amp; II)</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Z transforms, system frequency response, filter design by pole zero placement, use of the Matlab sptool utility.</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Analysis of discrete time signals: Fourier series, Fourier transforms, Discrete Fourier transforms, correlation</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Spectrum analysis using the DFT, windows</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>FIR filters: properties, implementation, and design</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>IIR filters: properties, implementation, and design</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>DSP application examples, simulation of DSP systems</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Exams</td>
<td>1</td>
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<tr>
<td></td>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>
**Computer Resources:** Matlab is used extensively for the analysis, design, and simulation of signal processing systems.

9. **Class/Laboratory Schedule:**
   Two classes of 50 minutes per week.
   One laboratory session of 165 minutes per week

10. **Contribution to Meeting Professional Component:**
   The course develops tools for the analysis and design of linear, discrete-time systems. The tools are used to analyze systems and to design filters to meet prescribed specifications. Filter design and implementation is practiced in a laboratory setting.

   **Design/Science Content:**
   - ABET Science: 1 credits or 33.3%
   - ABET Design: 2 credits or 66.7%

11. **Relationship to Program Objectives:**
   - Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   - Students will recognize their need for and gain ability to engage in lifelong learning.
   - Students will obtain an ability to communicate effectively -- orally, written, and graphically.

12. **Relationship to Program Outcomes:**
   - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   - Program Outcome #12: Justify the need for engaging in life-long learning in electrical/computer engineering.

**Student Learning Outcomes:**
- Analyze discrete-time signals and systems in the time and frequency domains using tools such as the z transform, Fourier transform, Discrete Fourier transform.
- Design digital filters (FIR and IIR filters) to meet prescribed specifications.
- Use the software package MATLAB to design digital filters and simulate signal processing systems.

13. **Expectations for Academic Conduct/Plagiarism Policy:**
- Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
- Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
- Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
- Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS),
DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. Prepared by: Dr. Cherian P. Mathews

Date: August 2004
Master Course Syllabus for EEL 4751

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** INTRODUCTION TO DIGITAL SIGNAL PROCESSING  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Fundamentals of filter design and Fourier transforms. Hardware implementation of filters. Simulation of signal processing systems using MATLAB.

5. **Prerequisite(s):**  
   Prerequisite: EEL 3135, EEL4744

6. **Textbook(s) and/or Other Required Materials:**  
   **Reference:**  

7. **Course Objectives:**  
   - To introduce students to the theory and practice of digital signal processing, emphasizing filter design and implementation.  
   - To introduce students to filter design methods and implementation. To use MATLAB to aid in filter design and simulation of digital signal processing systems.

8. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
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<th>Classes</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>4</td>
<td>Z transforms, system frequency response, filter design by pole zero</td>
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</tr>
<tr>
<td></td>
<td>placement, use of the Matlab sptool utility.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Analysis of discrete time signals: Fourier series, Fourier transforms,</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Discrete Fourier transforms, correlation</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spectrum analysis using the DFT, windows</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>FIR filters: properties, implementation, and design</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>IIR filters: properties, implementation, and design</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>DSP application examples, simulation of DSP systems</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Exams</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>30</td>
</tr>
</tbody>
</table>

**Computer Resources:** Matlab is used extensively for the analysis, design, and simulation of signal processing systems.
9. **Class/Laboratory Schedule:**
   Two classes of 50 minutes per week.
   One laboratory session of 165 minutes per week

10. **Contribution to Meeting Professional Component:**
    The course develops tools for the analysis and design of linear, discrete-time systems. The tools are used to analyze systems and to design filters to meet prescribed specifications. Filter design and implementation is practiced in a laboratory setting.

    **Design/Science Content:**
    - ABET Science: 1 credits or 33.3%
    - ABET Design: 2 credits or 66.7%

11. **Relationship to Program Objectives:**
    - Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
    - Students will recognize their need for and gain ability to engage in lifelong learning.
    - Students will obtain an ability to communicate effectively -- orally, written, and graphically.

12. **Relationship to Program Outcomes:**
    - Program Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
    - Program Outcome #12: Justify the need for engaging in life-long learning in electrical/computer engineering.

13. **Student Learning Outcomes:**
    - Analyze discrete-time signals and systems in the time and frequency domains using tools such as the z transform, Fourier transform, Discrete Fourier transform.
    - Design digital filters (FIR and IIR filters) to meet prescribed specifications.
    - Apply the software package MATLAB to design digital filters and simulate signal processing systems

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    - Academic Conduct Policy: [Link](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    - Plagiarism Policy: [Link](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    - Student Handbook: [Link](http://www.uwf.edu/uwffmain/stuHandbk/)

15. **Assistance:**
    - Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Cherian P. Mathews  
    **Date:** August 2004

Appendix I-121
Master Course Syllabus for EEL 4834

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING
2. **Title:** C++ for Engineers
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required
   **Catalog Description:**
   Develop computer skills and art of writing good computer programs using C and C++ languages. Examples and exercises relevant to Electrical Engineering are used.

4. **Prerequisite(s):**
   MAC 2311 Calculus I

5. **Textbook(s) and/or Other Required Materials:**

6. **Course Objectives:**
   - To teach the student basics of C++ and object oriented programming.
   - To give practical examples of using C++ programming to solve modern engineering problems.
   - To give students the opportunity to design and conduct engineering experiments.
   - To teach students how to analyze and interpret data.

7. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to computers and software</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Intro to writing programs/C++</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Program structure and variables</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Modularity and functions</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Data Structures (arrays, etc)</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Classes</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Pointers</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Other topics in C++</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Intro to Java</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Tests and review</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

   **Computer Resources:** Introduction to logic works

8. **Class/Laboratory Schedule:**
   (1) One lab of 165 minutes per week.

9. **Contribution to Meeting Professional Component:**
   Students are introduced to the fundamental concepts of programming. They will learn how to apply programming as a possible solution to engineering problems, and see the pros and cons of software solutions versus hardware solutions. This introductory course will also give computer engineering students the basic knowledge they need to excel in the computer science side of the curriculum.

   **Design/Science Content:**
   ABET Science: 3 credit or 100%
10. Relationship to Program Objectives:
   • Students will obtain an ability to analyze and solve electrical engineering problems in practice by applying knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
   • Students will have the knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software.
   • Students will obtain an ability to understand the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.
   • Students will obtain the analysis, design, and implementation skills necessary to solve problems using computer engineering principles and techniques.

11. Relationship to Program Outcomes:
   • Program Outcome # 3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical/computer engineering problems.
   • Program Outcome # 11: Describe the interrelatedness of contemporary issues in a global and society context with electrical/computer engineering solutions.

Student Learning Outcomes:
   • Outline the basic rules and format of good C++ and object oriented programming.
   • Identify the ethical, legal, and social issues in the computing discipline and in the engineering discipline in general.
   • Apply the fundamental theory and practice of computer science to solving engineering problems.
   • Formulate software solutions to common engineering problems.
   • Determine the tradeoffs of various programming techniques.
   • Optimize programming code design.
   • Evaluate and interpret programming instructions or data.

12. Expectations for Academic Conduct/Plagiarism Policy:
   • Academic Conduct Policy: <http://uwf.edu/cas/aasr/academic_conduct.pdf>
   • Plagiarism Policy: <http://uwf.edu/cas/aasr/Plagiarism.pdf>
   • Student Handbook: <http://www.uwf.edu/uwfmain/stuHandbk/>

13. Assistance:
   • Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu <mailto:dss@uwf.edu>, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

14. Prepared by: Dr. Thomas Gilbar          Date: August 2004
Master Course Syllabus for EEL 4914C

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** ELECTRICAL ENGINEERING DESIGN  
   **Credits:** 3.0 (3 labs)

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Selected design projects involving engineering applications in the various areas of electrical engineering. Must be taken prior to the semester of graduation. Laboratory

5. **Prerequisite(s):** Senior standing and instructor's approval.

6. **Textbook(s) and/or Other Required Materials:** None

7. **Course Objectives:**

   - To have the students plan, specify, design, and implement an electrical engineering project.
   - To present the students with a realistic industrial design experience, including a timetable, design reviews, oral presentations, a written final report, and the keeping of a patent-style notebook.

8. **Topics Covered:**

   This course does not have regular class meetings; rather, the students are given a timetable of significant tasks, and this timetable is strictly enforced. Each project has at least two faculty supervisors: the mentor, who is the main technical advisor to the team, and the course coordinator.

1. Orientation meeting with the course coordinator (1st week)
2. Preliminary design review: The teams submit written proposals for their projects and make a short presentation of their proposals before an audience of faculty and students. (3rd week)
3. Critical design review: The teams submit documentation and make a presentation before a faculty audience. The documentation and presentation must convince the faculty that the project's design specifications can be met. The project’s supervisory committee must approve any later deviations from the design specifications. (6th week)
4. Final acceptance test: Each team presents its project to its supervisory committee. The committee fills out a punch list of deficiencies that must be corrected before final acceptance of the project. (14th week)
5. Final acceptance: Each team makes a final presentation of its project, and the course coordinator verifies whether the punch list items have been corrected or not. (15th week)
6. Submission of final written report: Each team must submit a written project report in hard copy and also submit an electronic copy. (Final exam week)
7. Submission of self outcome-assessment report: Each team must submit a written self-assessment report in hard copy and also submit an electronic copy. (Final exam week)

**Computer Resources:** The computer requirements vary among projects. The ECE Department's computer resources are adequate.
9. **Class/Laboratory Schedule:** Five scheduled meetings for design reviews and presentations.

10. **Contribution to Meeting Professional Component:**

    In this course the students draw on their math, science, and engineering courses in planning, specification, design, and implementation of an engineering project. The design experience is realistic in the following ways: (1) A strict timetable is followed, (2) oral and written presentations are required at the design reviews where appropriate, the students must address the economic, societal, and safety implications of their designs, and (4) in this course a grade penalty substitutes for the monetary penalty that would normally be incurred in industry for failure to meet the design specifications or to deliver on time.

    **Design/Science Content:**
    - ABET Science: 0 credits or 0%
    - ABET Design: 3.0 credits or 100%

11. **Relationship to Program Objectives:**

    - Students will obtain an ability to identify, formulate, and solve novel electrical or computer engineering problems. This includes the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.
    - Students will obtain the ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data.
    - Students will obtain a solid understanding of professional and ethical responsibility and recognition of the need for and ability to engage in perpetual learning.
    - Students will obtain an ability to communicate effectively -- orally, written, and graphically.
    - Team projects are encouraged, but not required.

12. **Relationship to Program Outcomes:**

    - Program Outcome # 7: Identify, formulate, and solve novel electrical/computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.
    - Program Outcome # 8: Function effectively on multi-disciplinary teams.
    - Program Outcome # 10: Communicate effectively in writing and convey technical material through oral presentation of electrical/computer engineering topic and interaction with an audience.
    - Program Outcome # 12: Justify the need for engaging in life-long learning in electrical/computer engineering.

**Student Learning Outcomes:**

- Apply theoretical and practical knowledge learned in other courses to solve an engineering project.
- Identify and formulate an electrical and/or computer engineering problem including the planning and specification.
- Design, implementation, and operation of a system that meets performance, cost, time, safety, and quality requirements.
- Apply social and ethical considerations in solving and analyzing an engineering project.

Appendix I-125
• Evaluate an engineering project with reference of certain specifications.
• Create, build and test an engineering project from the start to a working model.
• Apply computer technology and software tools to make an oral and a written presentation of an engineering project.
• Describe the formation of a team to function effectively to complete a group project.
• Describe the importance of life-long learning while keeping up the technology

13. **Expectations for Academic Conduct/Plagiarism Policy:**
   • Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   • Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   • Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
   • Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

15. **Prepared by:** Dr. Muhammad H. Rashid  
    **Date:** August 2004
Master Course Syllabus for EGN 3203

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** ENGINEERING SOFTWARE TOOLS  
**Credits:** 1 (1 lab)

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Gives students an introduction to important Engineering software tools such as MATLAB, Labview, MATHCAD, and PSPICE.

5. **Prerequisite(s):**  
MAC2312 – Calculus 2

6. **Textbook(s) and/or Other Required Materials:**  
R. Larsen, Intro to Mathcad 11, Prentice Hall, 2004  

7. **Course Objectives:**  
- To introduce the student to circuit design and simulation using PSPICE  
- To introduce the student to using MATLAB as a means to evaluate and solve engineering problems  
- To introduce the student to using MathCAD as a means to evaluate and solve engineering problems

8. **Topics Covered:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to PSPICE</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Designing using basic circuit elements</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Electronic analog and digital circuit design and simulation</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Varying parameters</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Introduction to MATLAB &amp; MATLAB functions</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Plotting in MATLAB</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Programming in MATLAB</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Matrices and other Numerical Techniques using MATLAB</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Introduction to Mathcad</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Mathcad functions</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Working with Matrices and other numerical techniques</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Programming in Mathcad</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
**Computer Resources:** Each student will be taught the use of PSpice, MATLAB, and Mathcad software tools.

9. **Class/Laboratory Schedule:**
   1. One class of 75 minutes per week.

10. **Contribution to Meeting Professional Component:**
    The course supplies an introduction to important software tools that will help the student in his/her future courses and beyond.

**Design/Science Content:**
   ABET Science: 1.0, or 100%

11. **Relationship to Program Objectives:**
    • Students will obtain the ability to apply important software tools to analyzing and solving engineering problems

12. **Relationship to Program Outcomes:**
    • Outcome #3: Use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design of electrical engineering problems.

13. **Expectations for Academic Conduct/Plagiarism Policy:**
    • Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    • Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    • Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

14. **Assistance:**
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15. **Prepared by:** Dr. Thomas C. Gilbar        Date: January, 2006
Master Course Syllabus for EGN 4034

1. **Department:** ELECTRICAL AND COMPUTER ENGINEERING

2. **Title:** PROFESSIONAL ETHICS  
   **Credits:** 1.0 (1 Lab)

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Provides students with an interactive study of ethical, theory and the development of professionalism. Students review case studies of ethical conflicts in engineering practice. Course covers engineering codes of ethics and requires students to resolve theoretical situations through application of ethical codes. Material and supply fee will be assessed.

5. **Prerequisite(s):** Junior standing

6. **Textbook(s) and/or Other Required Materials:**  

   **Reference:**  

7. **Course Objectives:**  
   - To develop understanding of the contemporary ethical issues that engineers often face in professional practice  
   - To develop the appreciation and the ability to more clearly and deeply about ethical issues  
   - To explore resources for dealing with professional and personal conflicts.  
   - To develop the need for underrating health and safety in the workplace.  
   - To develop the need for professional registration and practice.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

   - Explain the importance of professional ethics as an engineer.  
   - Describe a clear definition of engineering ethics.  
   - Explain at least one ethical framework.  
   - List the fundamental canons of the code of ethics for professional engineers.  
   - Identify the steps for facilitating solutions to ethical dilemmas in Professional practice.  
   - Apply different ethical frameworks to analyze an ethical problem.  
   - Apply an engineering code of ethics to analyze an ethical problem.  
   - Describe the importance of life-long learning  
   - Apply computer technology and software tools to make an oral and a written presentation of an ethical case-study.  
   - Describe the formation of a team to function effectively to complete a group assignment.

9. **Topics Covered:**
<table>
<thead>
<tr>
<th>Item</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Ethical Dilemma of Engineers</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Safety and Health in the Workplace (OSHA)</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Professional Ethics</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Responsibility in Engineering</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Computers, Individual Mortality and Social Policy</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Honesty, Integrity and Reliability</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Safety, Risk and Liability in Engineering</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Engineers as Employees</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Engineers and Environment</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Professional Engineer Registration</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>International Engineering Professionalism</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Student Presentations of Contemporary Issues</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Engineering Professionalism and Ethics</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Exams/Quizzes</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

**Computer Resources:** None

10. **Class/Laboratory Schedule:** One class of 120 minutes per week.

11. **Contribution to Meeting Professional Component:**

   **Design/Science Content:**
   - ABET Science: 1.0 credits or 100%
   - ABET Design: 0 credits or 0%

12. **Relationship to Program Objectives:**
   - Students will obtain a broad education necessary to understand the impact of electrical engineering solutions in a global and societal context consistent with the principles of sustainable development.
   - Students will obtain an understanding of professional and ethical responsibility and recognition of the need for and ability to engage in perpetual learning.
   - Students will obtain an ability to communicate effectively.

13. **Relationship to Program Outcomes:**
   - Program Outcome # 9: Describe the ethical and professional responsibilities of the electrical/computer engineer. Make and defend ethical judgments in keeping with professional standards.
   - Program Outcome # 10: Communicate effectively in writing and convey technical material through oral presentation of electrical/computer engineering topic and interaction with an audience.
   - Program Outcome # 11: Describe the interrelatedness of contemporary issues in a global and society context with electrical/computer engineering solutions.
   - Program Outcome # 12: Justify the need for engaging in life-long learning in electrical/computer engineering.

**Student Learning Outcomes:**
   - Outline the importance of professional ethics as an engineer.
• Describe a clear definition of engineering ethics.
• Explain at least one ethical framework for engineers.
• List the fundamental canons of the code of ethics for professional engineers.
• Identify the steps for facilitating solutions to ethical dilemmas in engineering practice.
• Apply different ethical frameworks to analyze an engineering ethical problem.
• Apply an engineering code of ethics to analyze an ethical problem.
• Describe the importance of life-long learning in engineering.
• Apply computer technology and software tools to make an oral and a written presentation of an ethical case-study.
• Describe the formation of a team to function effectively to complete an engineering project.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   • Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   • Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   • Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
   • Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. Muhammad H. Rashid  
    **Date:** August 2004
Master Course Syllabus for EGM2500

1. **Department:** PHYSICS
2. **Title:** ENGINEERING MECHANICS STATISTICS
   **Credits:** 2
3. **Course Designation as Elective or Required:** Required
4. **Catalog Description:** Statics and dynamics of particles and rigid bodies using vector analysis. General rigid body motion. Free body diagrams. Application to structures and mechanics.
5. **Prerequisite(s):**
   PHY 2048 University Physics I
6. **Co-requisite(s):**
   1. MAC2313 Analytical Geometry & Calculus III AND
   2. MAP2302 Differential Equations OR
   3. Permission of instructor
7. **Textbook(s) and/or Other Required Materials:**
8. **Course Objectives:**
   To provide basic skills in the analysis of statics of particles, rigid bodies and structures, and dynamics of particles and rigid bodies, using vector methods.
9. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:
10. **Topics Covered:**
   1. Static of particles 2 classes
   2. Forces on rigid bodies 2 classes
   3. Equilibrium of rigid bodies 2 classes
   4. Centroids 1 class
   5. Analysis of structures 1 class
   6. Friction 1 class
   7. Moments of inertia 1 class
   8. Kinematics of particles 2 classes
   9. Newton’s laws 2 classes
   10. Energy and momentum methods 2 classes
   11. Systems of particles 2 classes
   12. Kinematics of rigid bodies 3 classes
   13. Motion of rigid bodies 2 classes
   14. Mechanical vibration 2 classes
15. Exams

2 classes

Total: 28 classes

10. **Class/Laboratory Schedule:**
Two classes of 1 hour 45 minutes per week.

11. **Contribution to Meeting Professional Component:**
The course applies basic mathematical techniques, particularly vector methods, and skills to analyze problems in engineering mechanics. The analysis of problems from a mathematical point of view is emphasized.

12. **Relationship to Program Objectives:**
Students will obtain an ability to analyze and solve problems of engineering structures by applying knowledge of mathematics, and physics.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Chandra S. Prayaga  
**Date:** March 9, 2005
Master Course Syllabus for EGM3401

1. **Department:** PHYSICS

2. **Title:** Engineering Mechanics - Dynamics  
   **Credits:** 4

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Statics and dynamics of particles and rigid bodies using vector analysis. General rigid body motion. Free body diagrams. Application to structures and mechanics.

5. **Prerequisite(s):**  
   PHY 2048 University Physics I

   **Co-requisite(s):**  
   1. MAC2313 Analytical Geometry & Calculus III AND  
   2. MAP2302 Differential Equations OR  
   3. Permission of instructor

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
   To provide basic skills in the analysis of statics of particles, rigid bodies and structures, and dynamics of particles and rigid bodies, using vector methods.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**  
   1. Static of particles                        2 classes  
   2. Forces on rigid bodies                   2 classes  
   3. Equilibrium of rigid bodies              2 classes  
   4. Centroids                               1 class  
   5. Analysis of structures                  1 class  
   6. Friction                                1 class  
   7. Moments of inertia                      1 class  
   8. Kinematics of particles                 2 classes  
   9. Newton’s laws                           3 classes  
  10. Energy and momentum methods             2 classes  
  11. Systems of particles                    2 classes  
  12. Kinematics of rigid bodies              3 classes  
  13. Motion of rigid bodies                  2 classes  
  14. Mechanical vibration                    2 classes  
  15. Exams                                  2 classes  
   **Total:** 28 classes
10. **Class/Laboratory Schedule:**

   Two classes of 1 hour 45 minutes per week.

11. **Contribution to Meeting Professional Component:**
    The course applies basic mathematical techniques, particularly vector methods, and skills to analyze problems in engineering mechanics. The analysis of problems from a mathematical point of view is emphasized.

12. **Relationship to Program Objectives:**
    Students will obtain an ability to analyze and solve problems of engineering structures by applying knowledge of mathematics, and physics.

13. **Relationship to Program Outcomes:**
    Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
    Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Chandra S. Prayaga       **Date:** March 9, 2005
Master Course Syllabus for EGM3512

1. **Department:** PHYSICS

2. **Title:** ENGINEERING MECHANICS  
   **Credits:** 4

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Statics and dynamics of particles and rigid bodies using vector analysis. General rigid body motion. Free body diagrams. Application to structures and mechanics.

5. **Prerequisite(s):**  
   PHY 2048 University Physics I

**Co-requisite(s):**  
1. MAC2313 Analytical Geometry & Calculus III **AND**  
2. MAP2302 Differential Equations **OR**  
3. Permission of instructor

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:**  
   To provide basic skills in the analysis of statics of particles, rigid bodies and structures, and dynamics of particles and rigid bodies, using vector methods.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**  
   1. Static of particles  
   2. Forces on rigid bodies  
   3. Equilibrium of rigid bodies  
   4. Centroids  
   5. Analysis of structures  
   6. Friction  
   7. Moments of inertia  
   8. Kinematics of particles  
   9. Newton’s laws  
   10. Energy and momentum methods  
   11. Systems of particles  
   12. Kinematics of rigid bodies  
   13. Motion of rigid bodies  
   14. Mechanical vibration  
   15. Exams  

   Total: 28 classes
10. **Class/Laboratory Schedule:**
   Two classes of 1 hour 45 minutes per week.

11. **Contribution to Meeting Professional Component:**
    The course applies basic mathematical techniques, particularly vector methods, and skills to analyze problems in engineering mechanics. The analysis of problems from a mathematical point of view is emphasized.

12. **Relationship to Program Objectives:**
    Students will obtain an ability to analyze and solve problems of engineering structures by applying knowledge of mathematics, and physics.

13. **Relationship to Program Outcomes:**
    Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

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16. **Prepared by:** Chandra S. Prayaga    **Date:** March 9, 2005
Master Course Syllabus for EGM 4313

1. Department: ELECTRICAL AND COMPUTER ENGINEERING

2. Course Title: INTERMEDIATE ENGINEERING ANALYSIS
   Credits: # 4 (4 Lecture)

3. Course Designation as Elective or Required: Required. (The course is recommended to be taken in the junior year).


5. Prerequisite(s): EGM 3311 or MAP 2302; A grade of “C” or better is required in the prerequisite(s).

6. Textbook(s) and/or Other Required Materials:

7. Course Objectives/Student Learning Outcomes:
   • Ability to perform mathematical operations with complex variables and understanding of mappings induced by a function of a complex variable.
   • Ability to obtain the Fourier series representation of periodic signals and ability to use Fourier series in the solution of the linear ordinary differential equations.
   • A working knowledge of vector calculus. The ability to evaluate the gradient of a scalar field and the divergence and curl of a vector field.
   • Ability to evaluate line, surface, and volume integrals. An understanding of Green’s, Stoke’s and divergence theorems.

8. Topics Covered:

<table>
<thead>
<tr>
<th>Items</th>
<th>Topics</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Complex numbers, Euler’s identity, nth roots of a complex number, sets of points in the complex plane, Functions of a complex variable, Cauchy Reimann equations, Integration in the Complex Plane(Contour Integrals, Cauchy’s Integral Formula)</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Fourier analysis: Orthogonal functions; Fourier Series; Fourier Cosine and Sine Series (Solutions to systems defined by LODE’s); Complex Fourier Series. Demonstration with oscilloscope &amp; ORCAD</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Vectors properties and mathematical operations, Vector functions, lines and planes, parametric equations, derivative of vector function, space curves, tangent-vectors / tangent-lines , level curves and level surfaces, gradient, directional derivative, properties of the gradient. Divergence of</td>
<td>6</td>
</tr>
</tbody>
</table>
9. **Computer Resources:** The software package Matlab and/or Mathcad will be used to reinforce understanding of the material presented in class.

10. **Class/Laboratory Schedule:** Two classes of 105 minutes each per week. Computer simulations are integral parts of the course.

11. **Contribution to Meeting Professional Component:** Students’ mathematical analysis skills are developed to an intermediate level necessary to the fundamental electrical and computer engineering analysis and design courses.

12. **Design/Science Content:**
   - ABET Science: 3 credits or 75%
   - ABET Design: 1 credits or 25%

13. **Relationship to Program Objectives:** This course relates to the Electrical and Computer Engineering Program Objectives #1 and #2 that students gain abilities to:
   - Develop electrical engineering solutions either individually or through interdisciplinary teams within a global and societal context.
   - Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.

14. **Relationship to Program Outcomes:** This course contributes to The Electrical Engineering Program Outcome #1:
   - Recognize and apply concepts, principles and theories of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, and complex variables.

15. **Expectations for Academic Conduct/Plagiarism Policy:**
   - Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   - Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   - Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

16. **Assistance:**
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   Prepared by: Roger Avant

   **Date:** Nov, 2005
Master Course Syllabus for MAC 2311

1. **Department:** MATHEMATICS AND STATISTICS

2. **Title:** ANALYTICAL GEOMETRY AND CALCULUS I  
   **Credits:** 4 Credits

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Differential and Integral Calculus of Algebraic, Trigonometric, and Transcendental functions of single variables. Related applications.

5. **Prerequisite(s):**
   1. MAC 1114 Trigonometry AND  
   2. MAC 1140 Pre-Calculus Algebra

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:** To introduce Differential and Integral Calculus using Algebraic Transcendental and Trigonometric Functions of one independent variable.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   1. Functions (review)  
   2. Limits and Continuity  
   3. The Derivative  
   4. Logarithmic and Exponential Functions  
   5. Implicit Differentiation  
   6. L’Hopital’s Rule; Indeterminate Forms  
   7. Analysis of Functions and Their Graphs  
   8. Applications of the Derivative  
   9. Integration  
   10. Review  
   11. Examinations  

   Total: 30 classes

**Computer Resources:** None

10. **Class/Laboratory Schedule:** Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:** Several developments in engineering use the elementary calculus as a tool. Consequently, a thorough understanding of the concepts and methods of Calculus prepare the student for subsequent success in their professional courses.
12. **Relationship to Program Objectives:**
Ability to apply knowledge of mathematical concepts to simply problems of engineering.

An ability to identify and solve engineering problems that lend themselves to methods of differential calculus.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
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16. **Prepared by:** Franco Fedele  
**Date:** February, 2005
Master Course Syllabus for MAC 2312

1. **Department:** MATHEMATICS AND STATISTICS

2. **Title:** ANALYTICAL GEOMETRY AND CALCULUS II  
   **Credits:** 4 Credits

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Continuation of MAC 2311. Application of the Definite Integral. Hyperbolic and Inverse Trigonometric Functions. Methods of Integration. Sequences and Infinite Series.

5. **Prerequisite(s):**  
   MAC 2311 Analytic Geometry and Calculus I

6. **Textbook(s) and/or Other Required Materials:**  

7. **Course Objectives:** To introduce methods of Integral Evaluations and Principles of Infinite Series Analysis.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   1. Applications of the Definite Integral in Science and Engineering  
   2. Inverse and Hyperbolic Trigonometric Functions  
   3. L’Hopital’s Rule; Indeterminate Forms  
   4. Principles of Integral Evaluation  
   5. Infinite Series  
   6. Review  
   7. Tests  
   **Total:** 30 classes

10. **Class/Laboratory Schedule:** Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:** Several developments in engineering use the elementary calculus as a tool. Consequently, a thorough understanding of the concepts and methods of calculus prepares the student for subsequent success in their professional courses in engineering.

12. **Relationship to Program Objectives:**  
   Develop ability to apply knowledge of mathematical concepts to simple problems of engineering. 
   An ability to identify and solve engineering problems that lend themselves to methods of differential and integral calculus.
13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
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16. **Prepared by:** Franco Fedele  
**Date:** February, 2005
Master Course Syllabus for MAC 2313

1. **Department:** MATHEMATICS AND STATISTICS

2. **Title:** ANALYTICAL GEOMETRY AND CALCULUS III
   **Credits:** 4 Credits

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Analytic Geometry and Calculus. Vectors and Vector-Valued Functions. Partial Differentiation. Multiple Integration.

5. **Prerequisite(s):**
   MAC 2312 Analytic Geometry and Calculus II

6. **Textbook(s) and/or Other Required Materials:**

7. **Course Objectives:** To Introduce elementary Vector Analysis and Differential and Integral Calculus of Functions of Vectored Variables.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   1. Polar Coordinates 6 classes
   2. Three Dimensional Space; Vectors 6 classes
   3. Vector-Valued Functions 6 classes
   4. Partial Derivatives 7 classes
   5. Multiple Integrals 6 classes
   6. Review 3 classes
   7. Exams 3 classes
   Total: 31 classes

10. **Class/Laboratory Schedule:** Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:** Several developments in engineering use the elementary calculus as a tool. Consequently, a thorough understanding of the concepts and methods of calculus prepare the student for subsequent success in their professional courses.

12. **Relationship to Program Objectives:**
    Ability to apply knowledge of mathematical concepts to simple problems of engineering.
    An ability to identify and solve engineering problems that lend themselves to methods of differential and integral calculus.

13. **Relationship to Program Outcomes:**

Appendix I-144
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
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16. **Prepared by:** Franco Fedele  
    **Date:** February, 2005
Master Course Syllabus for MAP 2302

1. **Department:** MATHEMATICS AND STATISTICS

2. **Title:** DIFFERENTIAL EQUATIONS
   Credits: 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Introduction to ordinary differential equations; emphasis on linear equations, operator methods, systems of equations. Applications.

5. **Prerequisite(s):**
   MAC 2313  Analytic Geometry and Calculus III

6. **Textbook(s) and/or Other Required Materials**

   **Reference:**

7. **Course Objectives:** To introduce students to the area of differential equations as a natural extension of elementary calculus. While a few applications will be treated to provide motivation, the thrust of our development will be on methods of solution.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   1. First Order Equations 7 classes
   2. Second Order Linear Equations 5 classes
   3. Higher Order Linear Equations 4 classes
   4. Applications 6 classes
   5. Laplace Transform Method 6 classes
   6. Systems of Linear Equations. 4 classes
   7. Review 2 classes
   8. Exams 3 classes
   Total : 30 classes

10. **Class/Laboratory Schedule:** Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:** Electrical Engineering models such as currentflow are mathematically describable in the continuous medium. Frequently, the first
approximations are ordinary differential. The course, Differential Equations, exposes the student to formulation of problems as differential equations and methods of solution for such problems. Specialized engineering examples in the form of impulses and unit-step functions are discussed and do provide motivation for the Laplace transform method. Topics such as systems of differential equations also introduce engineering students to elements of their professional component.

12. **Relationship to Program Objectives:**
Students learn to apply knowledge of mathematics, science, and engineering from problem formulation to method of solution and interpretation of results. They also gain an ability to identify, formulate, and solve some engineering problems mathematically.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
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15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Josaphat A. Uvah  **Date:** February, 2005
Master Course Syllabus for MAP 4403

1. **Department:** MATHEMATICS AND STATISTICS

2. **Title:** MATHEMATICAL METHODS FOR ENGINEERS
   **Credits:** 3

3. **Course Designation as Elective or Required:** Elective

4. **Catalog Description:** Complex variables, including derivatives and integrals, singularities, Taylor-Laurent series and residues, Linear Algebra including Gaussian elimination, determinants, matrix inversion, linear independence, norms, inner products, orthogonality, Gram-Schmidt process, eigenvalues and eigenvectors, systems of differential equations.

5. **Prerequisite(s):**
   1. MAP 2302 Differential Equations
   2. Knowledge of one variable and multivariable Calculus including knowledge of 2 and 3 dimensional vectors, vector operations and their geometrical interpretations; sequences and series; partial derivatives and line integrals. Basic knowledge of matrices and matrix operations. Complex numbers and their arithmetic.

6. **Textbook(s) and/or Other Required Materials:**
   **Reference:** None

7. **Course Objectives:** To provide a strong grounding in the theory and methods of linear algebra and complex variables that are relevant to the electrical engineering program curriculum; to enhance students’ ability to understand, mathematically formulate and derive the mathematical solutions for problems encountered in electrical engineering.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   1. Linear Algebra
      a. The algebra and geometry of vectors in 2 and 3 dimensional space; the dot product and the cross product.
      b. The vector space Rn and some fundamental concepts: linear combinations, the span of a set of vectors, linear independence and linear dependence.
      c. The scalar product in Rn, orthonormal bases, the Gram-Schmidt Process
      d. Matrices and matrix algebra
      e. Elementary row operations and solving systems of linear equations by row equations by row reduction, to least square solutions.
      f. Matrix inverses and determinants
      g. Eigenvalues and Eigenvectors.
      h. Diagonalization
      i. Special types of matrices: Orthogonal Unitary, Symmetric Hermitan matrices

Appendix I-148
2. Complex Variables
   a. Complex Numbers, their representation and the Argand diagram. Geometrical 1 class representation of complex numbers and their arithmetic.
   b. Loci and sets of points on the complex plane, roots of unity. 1 class
   c. Complex functions, limits, continuity and derivatives. 2 classes
   d. Power Series, the Exponential and Trigonometric functions, the Complex Logarithm, arbitrary exponents. 2 classes
   e. The complex line integral 2 classes
   f. The Cauchy integral Formulae and their consequences. 3 classes
   g. Series representation of functions. 2 classes
   h. Singularities and the Residue Theorem 2 classes
   i. Review 3 classes
   j. Tests 2 classes
   Total: 32 classes

10. Class/Laboratory Schedule: Two classes of 75 minutes, per week

11. Contribution to Meeting Professional Component: Concepts, terminology and techniques of Linear Algebra and Complex Variables are extensively utilized in the mathematical formulation, analysis, and solution of many problems arising in various areas of electrical engineering; for example control theory, signals and systems, circuits. At the completion of the course Mathematical Methods for Engineers, students will possess the necessary mathematical background and preparation to understand and master the material necessary for taking the electrical engineering courses.

12. Relationship to Program Objectives:
Knowledge of mathematics through differential and integral calculus, and advanced topics in linear algebra, complex variables, differential equations.
An ability to apply knowledge of mathematics, science and engineering to the analysis of electrical engineering problems.

13. Relationship to Program Outcomes:
Knowledge of mathematics through differential and integral calculus.

14. Expectations for Academic Conduct/Plagiarism Policy:
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. Assistance:
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16. Prepared by: Rohan Hemasinha Date: 2005
Master Course Syllabus for MAS 3105

1. **Department:** MATHEMATICS AND STATISTICS
2. **Title:** LINEAR ALGEBRA
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required for computer engineering

4. **Catalog Description:** Vectors and Vector Spaces, linear transformations, matrices, determinants.

5. **Prerequisite(s):**
   1. MAC 2312, Analytical Geometry & Calculus II AND
   2. Basic knowledge of complex numbers.

6. **Textbooks and/or Other Required Materials:**

7. **Course Objectives:** Develop students ability (a) to use linear algebra and discrete mathematics to design and conduct experiments and analyze data, (b) to enhance their ability to identify, formulate, and solve problems related to electrical engineering, (c) to help students realize the need to engage in life-long learning.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   1. Matrices and systems of equations
      a. System of Linear Equations 1 class
      b. Row Echelon Form 1 class
      c. Matrix Algebra 1 class
      d. Special Matrices 1 class
      e. Partitioned Matrices 1 class
   2. Determinants.
      a. The Determinant of a Matrix 1 class
      b. Properties of Determinants 1 class
      c. Cramer’s Rule 1 class
   3. Vector spaces
      a. Definition and Examples 1 class
      b. Subspaces 1 class
      c. Linear Independence 2 classes
      d. Basic and Dimension 1 class
      e. Row Space and Column Space 2 classes
   4. Linear transformations
      a. Definitions and Examples 1 class
      b. Matrix Representations of Linear Transformations 1 class
   5. Orthogonality
      a. The Scalar Product 1 class
b. Orthogonal Subspaces                             2 classes
    c. Inner product                                   1 class
    d. Least Squares Problems                         1 class
    e. Orthonormal Sets                                1 class
    f. The Gram-Schmidt Process                       2 classes
    a. Eigenvalues and Eigenvectors                  2 classes
    b. System of Linear Differential Equations       1 class
    c. Diagonalization                               2 classes
       Total:                                         30 classes

Computer Resources: Students will be required to do exercises and projects using MATLAB. Learning to use MATLAB is an integral part of the course.

10. Class/Laboratory Schedule: Two classes of 75 minutes per week. Two to three periods can be used in the Mathematics Computer Lab to introduce the students to MATLAB.

11. Contribution to Meeting Professional Component: This course provides a basic knowledge of the concepts, computational techniques and applications of vector spaces and matrices. The concepts and terminology of abstract vector spaces are introduced and utilized to motivate and elucidate techniques and results of matrix computations. Students are shown how linear algebra can be used to mathematically formulate problems arising in applications and how matrix methods can be used to solve these problems.

12. Relationship to Program Objectives:
    An ability to apply knowledge of mathematics, science, and engineering
    An ability to design a system, component, or process to meet desired needs
    An ability to function on multi-disciplinary teams, where possible
    An ability to identify, formulate, and solve engineering problems.
    An ability to communicate effectively
    Knowledge of probability and statistics, including computer engineering applications
    Knowledge of discrete mathematics

13. Relationship to Program Outcomes:
    Knowledge of mathematics through differential and integral calculus.

14. Expectations for Academic Conduct/Plagiarism Policy:
    Academic Conduct Policy: http://uwf.edu/cas/aasr/academic_conduct.pdf
    Plagiarism Policy: http://uwf.edu/cas/aasr/Plagiarism.pdf
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    Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. Prepared by: Zohra Manseur

                   Date:  February, 2005
Master Course Syllabus for STA4321

1. **Department:** MATHEMATICS AND STATISTICS

2. **Title:** INTRODUCTION to MATHEMATICAL STATISTICS I  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Probability, distributions of random variables, conditional probability and stochastic independence, distribution of functions of random variables, limiting distributions, multivariate probability distributions. Prerequisite: MAC 2313 (Analytic Geometry and Calculus III) or equivalent.

5. **Prerequisites:**
   MAC 2313 Analytic Geometry and Calculus III or Differential and integral calculus; multivariable calculus; partial derivatives; integration over regions in dimension two or greater; infinite series; permutations and combinations, sets and set notation.

6. **Textbook(s) and/or Other Required Materials:**

   **References:**

7. **Course Objectives:** The objective of the course is to introduce students to the rigorous mathematical foundations of statistical theory and methods with applications. Precise definitions of various concepts are introduced and students are shown how statistical results are derived or proved.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   What is statistics? A brief discussion on the practical and theoretical underpinnings of statistics 1 class
   Probability: Sample space, events, mutually exclusive, & independent events 1 class
   Finite sample spaces and counting rules 1 class
   Some probability laws and inequalities 1 class
   Conditional Probability & Bayes Rule 1 class
   The notion of a random variable 1 class
   Discrete/continuous random variables & their probability distributions: The probability distribution of a discrete/continuous random variable 1 class
   Expected value and variance 1 class
   The moment generating function 1 class
   Some important discrete/continuous random variables 1 class
   Tchebycheff's theorem 1 class

Appendix I-152
Multivariate Probability Distributions: Bi-variate and multivariate probability distributions
Jointly distributed random variables
Marginal and conditional probability distributions
Independent random variables
Covariance and correlation
Conditional expectation, conditional variance
Functions of random variables: Finding the probability distribution of a function of a random variable
Method of distribution functions
Method of transformations
Method of moment generating functions
The central limit theorem
The t, x² and F distributions
Order statistics
Review
Exams
Total: 28 classes

10. **Class Schedule:** Two classes of 115 minutes per week

11. **Contribution to Meeting Professional Component:** This course covers probability theory with emphasis on distribution theory and statistical methods. The techniques of reliability theory are also covered. Statistical methods are provided for reliability data also.

12. **Relationship to Program Objectives:**
Objective #5: An ability to identify, formulates, and solves engineering problems. Knowledge of probability and statistics, including computer engineering applications.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Subhash Bagui **Date:** February, 2005
Master Course Syllabus for PHY2048

1. **Department:** PHYSICS

2. **Title:** UNIVERSITY PHYSICS I  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Linear and rotational motion of objects in 1, 2, and 3 dimensions, concepts of work and energy, oscillations and waves, heat and thermodynamics

5. **Prerequisite(s):**  
   MAC2311 Analytical Geometry and Calculus I.

6. **Textbook(s) and/or Other Required Materials:**  
   Randall D Knight 2004 *Physics for Scientists and Engineers* Pearson-Addison Wesley

7. **Course Objectives:**  
   To provide basic skills in the analysis of motion of particles and rigid bodies, using Newton’s law, laws and the concepts of work and energy, law of gravitation, oscillations and waves, and in the study of fluids, heat and thermodynamics

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**

   1. Linear motion  
   2. Vectors  
   3. Motion in a plane  
   4. Newton’s laws  
   5. Work and energy  
   6. Systems of particles, collisions  
   7. Rotational motion  
   8. Oscillations  
   9. Gravitation  
   10. Fluids  
   11. Waves  
   12. Kinetic theory  
   13. Thermodynamics  
   14. Exams

   **Total:** 28 classes
10. **Class/Laboratory Schedule:**
Two classes of 75 minutes per week.

11. **Contribution to Meeting Professional Component:**
The course applies basic mathematical techniques and skills to analyze problems in mechanics, wave motion, and thermodynamics. The analysis of problems from a mathematical point of view is emphasized.

12. **Relationship to Program Objectives:**
Objective #2: Students will obtain an ability to analyze and solve problems in practice by applying knowledge of mathematics, and physics.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Chandra S. Prayaga  
**Date:** March 9, 2005
Master Course Syllabus for PHY 2048L

1. **Department:** PHYSICS

2. **Title:** UNIVERSITY PHYSICS I LABORATORY
   **Credits:** 1

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Selected experiments in mechanics, oscillatory motion, and heat.

5. **Prerequisite(s):**
   PHY 2048 University Physics I

6. **Textbook(s) and /or Other Required Materials**
   None required. Instructor will distribute handouts for each lab exercise.

7. **Course Objective(s):**
   To acquaint students with the natural laws of the universe, and the technique of performing an experiment, gathering and analyzing data, and reaching some conclusions based on results.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   **Laboratory:** Weekly laboratory

   1. General Information/Computer Familiarization 1 week
   2. Graphical Analysis 1 week
   3. Newton's 2nd Law I 1 week
   4. Newton's 2nd Law II 1 week
   5. Conservation of Mechanical Energy 1 week
   6. Collisions 1 week
   7. Static Equilibrium 1 week
   8. Rotational Motion 1 week
   9. Archimedes' Principle 1 week
   10. Thermal Physics 1 week
   11. Gas Laws 1 week
   12. Waves 1 week
   13. Final Exam 1 week
   Total: 13 weeks

10. **Class/Laboratory Schedule:**
    One laboratory session of 3 hrs per week.

11. **Contribution to Meeting Professional Component:**
    The course applies basic mathematical techniques and skills to analyze problem in mechanics, wave motion, and thermodynamics. The analysis of problems from a mathematical point of view is emphasized.
12. **Relationship to Program Objectives:**
   Students will obtain ability to conduct scientific and experiments, and to analyze and interpret the resulting data, and to prepare lab reports.

13. **Relationship to Program Outcomes:**
   Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Chandra S. Prayaga  
    **Date:** March 9, 2005
Master Course Syllabus for PHY2049

1. **Department**: PHYSICS

2. **Title**: UNIVERSITY PHYSICS II  
   **Credits**: 3

3. **Course Designation as Elective or Required**: Required

4. **Catalog Description**: Continuation of PHY 2048. Electrostatics and magnetism; basic electric circuits; optics; selected topics in modern physics.

5. **Prerequisite(s)**:  
   PHY 2048 University Physics I  
   MAC2312 Analytical Geometry and Calculus II

6. **Textbook(s) and/or Other Required Materials**:  

7. **Course Objectives**:  
   To provide basic skills in the analysis of electric and magnetic fields, electric circuits, problems in optics, and modern physics

8. **Course Outcomes**: After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered**:  
   1. Electric charges and fields  
   2. Electric potential  
   3. Capacitors and dielectrics  
   4. Current and resistance  
   5. DC circuits  
   6. Magnetic field  
   7. Induction and inductance  
   8. AC circuits  
   9. Electromagnetic waves  
   10. Geometrical optics  
   11. Interference  
   12. Diffraction  
   13. Quantum nature of light  
   14. Wave nature of matter  
   15. Structure of atoms  
   16. Exams  
   
   Total: 28 classes

10. **Class/Laboratory Schedule**:  
    Two classes of 75 minutes per week.
11. **Contribution to Meeting Professional Component:**
The course applies basic mathematical techniques and skills to analyze problems in electricity, magnetism, and optics. The analysis of problems from a mathematical point of view is emphasized.

12. **Relationship to Program Objectives:**
Students will obtain an ability to analyze and solve problems in practice by applying knowledge of mathematics, and physics.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
   Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
   Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
   Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Chandra S. Prayaga  
**Date:** March 9, 2005
Master Course Syllabus for PHY 2049L

1. **Department:** Physics

2. **Title:** UNIVERSITY PHYSICS II LABORATORY
   **Credits:** 1

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** Selected experiments in optics, electricity, and magnetism.

5. **Prerequisite(s):**
   1. PHY2048 University Physics I
   2. PHY2048L University Physics I Laboratory
   **Co-requisite:**
   PHY2049 University Physics II

6. **Textbook(s) and /or Other Required Materials**
   None required. Instructor will distribute handouts for each lab exercise.

7. **Course Objective(s):**
   To acquaint students with the natural laws of the universe, and the technique of performing an experiment, gathering and analyzing data, and reaching some conclusions based on results.

8. **Course Outcomes:** After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:

9. **Topics Covered:**
   **Laboratory:** Weekly laboratory

   1. Introductory Meeting; Reflection, Refraction, and Dispersion 1 week
   2. Microscopes, and Telescopes 1 week
   3. Interference & Diffraction 1 week
   4. Basic Electrical Circuits 1 week
   5. Ohms Law & Resistance; Wheatstone’s Bridge 1 week
   6. Electrolysis - The Charge of the Electron 1 week
   7. Joules Law - Mechanical Equivalent of Heat 1 week
   8. Magnetic Forces 1 week
   9. Familiarization Oscilloscopes 1 week
   10. RC and LR Circuits - Time Constants 1 week
   11. AC Circuits and Resonance 1 week
   12. The Bohr Atom 1 week
   13. Final Exam 1 week

   **Total:** 13 weeks

10. **Class/Laboratory Schedule:**
    One laboratory session of 3 hours per week.
11. **Contribution to Meeting Professional Component:**
The course applies basic mathematical techniques and skills to analyze problems in electricity, magnetism, and optics. The analysis of problems from a mathematical point of view is emphasized.

12. **Relationship to Program Objectives:**
Students will obtain ability to conduct scientific and experiments, and to analyze and interpret the resulting data, and to prepare lab reports.

13. **Relationship to Program Outcomes:**
Knowledge of mathematics through differential and integral calculus.

14. **Expectations for Academic Conduct/Plagiarism Policy:**
Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Chandra S. Prayaga  
**Date:** March 9, 2005
Master Course Syllabus for ENC 1101

1. **Department:** ENGLISH

2. **Title:** ENGLISH COMPOSITION I  
   **Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** In Composition I, the focus will be on building the skills necessary for academic research and writing, and introducing the student to the relationships between academic and public writing.

5. **Prerequisite(s):**  
   Students whose placement scores are in one of the following categories must enroll in ENC 0002C College Prep Writing, provided by Pensacola Junior College at UWF’s main campus:
   - ACT English Usage score below 17
   - or SAT-Verbal score below 440
   - CPT sentence skills score below 83

   Students scoring in these ranges must pass ENC 0002C before enrolling in ENC 1101 English Composition I and ENC 1101L English Composition Lab.

   Students whose ACT English Usage score is between 17 and 19 or whose SAT-Verbal score is between 440-500 (or whose CPT score is between 83-93) are strongly advised to take ENC1101L English Composition Lab (a one-hour course) in addition to ENC 1101 English Composition. In addition, some students will be advised to add ENC 1101L because of weaknesses identified in their diagnostic essays completed in the first week of Composition I.

6. **Textbook(s) and/or Other Required Materials:**  
   Texts vary based on the theme of the course, but all students are required to have a handbook, which, like the texts, are chosen by the faculty.

7. **Course Objectives:**  
   Because there is no such thing as a uniform academic paper, but rather a range of kinds of academic papers whose requirements and goals are determined by each discipline, students will learn not how to write that non-existent academic paper, but rather the conventions of engagement in critical discourse for academic purposes and genres. Our focus will be on teaching research methods, engagement with sources, and what we think of as preparatory writing, leading to a researched argument.

   Next, students will study the relationships between academic and public writing—particularly the importance of sound research to all good writing, whether academic or public—and will begin the practice of using their research to produce public genres, related to but clearly differing from academic genres.
Meanwhile, students begin to develop cultural and media literacies, particularly with respect to how we are all shaped as political and social subjects by the texts that constitute the environment in which we are all necessarily immersed.

8. **Course Outcomes:**
Students should be able to identify and define key terms and concepts in an argument and recognize which terms and concepts are being contested.

Students should be able to recognize, summarize, and analyze an argument, and critically evaluate it according to a set of rhetorical criteria that take into account the argument’s genre and context.

Students should understand that research is a process of inquiry through which a critical mind evaluates the truth-value of arguments and reaches conclusions based on the understanding that arguments have consequences.

Students should understand that when they construct arguments they should use rhetorical strategies that take into consideration the differing genres and concerns of public and academic discourse.

When writing academic researched arguments, students should know:
- how to formulate a research question;
- how to write a thesis statement and maintain focus on that thesis throughout an essay;
- how to write topic sentences and develop paragraphs that are unified and coherent;
- how to document sources using parenthetical citations and Works Cited pages in MLA style;
- how to quote, paraphrase, summarize sources;
- how to make an argument logically cohere;
- how to use the library, including electronic databases, electronic reserves, and other research tools.

9. **Topics Covered:**

1. Purposes and methods of academic research
2. Summarizing and analyzing arguments
3. Defining key terms and concepts
4. Constructing an argument in the rhetoric of the academy
5. Avoiding plagiarism in academic writing

10. **Class/Laboratory Schedule:**
NA

11. **Contribution to Meeting Professional Component:**
NA

12. **Relationship to Program Objectives:**
NA

13. **Relationship to Program Outcomes:**
NA

14. **Expectations for Academic Conduct/Plagiarism Policy:**
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15. **Assistance:**
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. M.J. Braun, Director of Composition  **Date:** March 2, 2005
Master Course Syllabus for ENC 1102

1. **Department:** ENGLISH

2. **Title:** ENGLISH COMPOSITION II

   **Credits:** 3

3. **Course Designation as Elective or Required:** Required

4. **Catalog Description:** In Composition II, students will work more specifically on becoming citizen critics with (1) a more specific focus on public reading and writing, and (2) refined development of political and cultural literacies. Students learn the ways in which knowledges are either included in or excluded from public spheres, develop an understanding of how to participate in civic discourse and activism, as well as the limitations on, opportunities for, and discipline-related approaches to civic engagement in the American political scene.

   Students build on the skills established in Composition I, doing more focused research, but now aimed at the production of writing projects in public genres appropriate to particular writing situations.

5. **Prerequisite(s):**

   Students entering ENC 1102 Composition II should have met all of the learning outcomes of ENC 1101 Composition I. If a student passes this course with a C- or above, Composition II instructors assume the student has met these outcomes. If the student has taken Composition I from another institution or program or has been exempted from Composition I, but is deemed by the instructor to not have met the learning outcomes for Composition I, the instructor may assign the student tutoring in the Writing Lab. In severe cases of deficiency, the student may wish to consider retaking Composition I.

6. **Textbook(s) and/or Other Required Materials:**

   Texts vary based on the theme of the course, but all students are required to have a handbook, which, like the texts, are chosen by the faculty.

7. **Course Objectives:**

   The Composition II course shifts from writing for academic purposes (writing the academic research paper) to writing for public purposes.

8. **Course Outcomes:**

   By the end of the course, Composition II students should:
   
   - understand that authors construct arguments using rhetorical strategies that take into consideration the differing genres and purposes of public discourse;
   
   - understand the ways in which knowledges, i.e., points of view and concrete experiences, are either included in or excluded from public discourses and mass media;

   - learn ways to participate in civic discourse and activism;

   - recognize the limitations on, opportunities for, and discipline-related approaches to civic engagement in American and global venues;

   - build reading and writing skills established in Composition I, this time, aimed at the production of writing projects in public genres appropriate to particular writing situations and the democratic tradition;
• and build on research skills developed in Composition I by using the university library and library’s website to specifically
  ▪ find electronic and print research material and what kind of material they can find at each site;
  ▪ use electronic course reserves;
  ▪ access books and journals in the stacks;
  ▪ retrieve full texts of journal articles and books;
  ▪ browse and find non-academic journals;
  ▪ locate background and explanatory material using encyclopedia, dictionary, and reference databases;
  ▪ use Lexis Nexis and alternative press search engines to gain knowledge of the conversations that circulate around topical events and issues;
  ▪ judge the appropriateness and authority of the sources for the type of genre in which an author is writing.

9. **Topics Covered:**
   1. Purposes and methods of researching for public writing projects
   2. Summarizing and analyzing arguments
   3. Defining key terms and concepts
   4. Constructing texts that correspond to the rhetorical genres pertinent to specific public writing projects
   5. Avoiding plagiarism according to the standards of public writing situations and genres

10. **Class/Laboratory Schedule:** NA

11. **Contribution to Meeting Professional Component:** NA

12. **Relationship to Program Objectives:** NA

13. **Relationship to Program Outcomes:** N/A

14. **Expectations for Academic Conduct/Plagiarism Policy:**
    Academic Conduct Policy: [http://uwf.edu/cas/aasr/academic_conduct.pdf](http://uwf.edu/cas/aasr/academic_conduct.pdf)
    Plagiarism Policy: [http://uwf.edu/cas/aasr/Plagiarism.pdf](http://uwf.edu/cas/aasr/Plagiarism.pdf)
    Student Handbook: [http://www.uwf.edu/uwfmain/stuHandbk/](http://www.uwf.edu/uwfmain/stuHandbk/)

15. **Assistance:**
    Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Dr. M.J. Braun, Director of Composition  **Date:** March 2, 2005
Master Course Syllabus for ENC 3240

1. **Department**: ENGLISH

2. **Title**: TECHNICAL WRITING  
   **Credits**: 3

3. **Course Designation as Elective or Required**: Required

4. **Catalog Description**: Practice in preparing documents used in science, business, industry, and government, including letters, manuals, reports and proposals. (Gordon Rule Course: Wrtg) Material and supply fee will be assessed.

5. **Prerequisite(s)**:  
   None

6. **Textbook(s) and/or Other Required Materials**:  
   *Technical Communication* by Mike Markel (7th ed. 2004) Bedford/St. Martin's

7. **Course Objectives**:  
The course provides instruction and guided practice so that students will be able to  
- Identify and assess their audience and their purpose in different writing situations and determine the most effective strategy for specific workplace documents  
- Analyze and describe their own process of designing a document in order to develop improved strategies for future documents in various writing situations  
- Demonstrate effective strategies for working with a group to produce a document: defining and dividing tasks, communicating with group members diplomatically, assessing the group’s process in order to improve procedures of collaboration and the final product  
- Shape, revise, and edit workplace documents which meet the criteria for excellence in technical communication: including clarity, accuracy, accessibility, conciseness, and correctness.

8. **Course Outcomes**: After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:  
- Identify and assess their audience and their purpose in different writing situations and determine the most effective strategy for specific workplace documents  
- Analyze and describe their own process of designing a document in order to develop improved strategies for future documents in various writing situations  
- Demonstrate effective strategies for working with a group to produce a document: defining and dividing tasks, communicating with group members diplomatically, assessing the group’s process in order to improve procedures of collaboration and the final product  
- Shape, revise, and edit workplace documents which meet the criteria for excellence in technical communication: including clarity, accuracy, accessibility, conciseness, and correctness.

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9. **Topics Covered:**

Students will complete close readings of texts which focus on language use, the impact of technology, and the role of technical communication in various professions and in society. In discussions, students will continue to study and practice rhetorical analysis of various texts, an approach introduced in ENC 1102 English Composition. Students will complete rhetorical analyses of their own workplace documents in context notes for each project assignment. Students will also study and discuss the topics of visual literacy, document design, and workplace conventions of written communication.

10. **Class/Laboratory Schedule:**

Not applicable.

11. **Contribution to Meeting Professional Component:**

This course develops written communication skills.

12. **Relationship to Program Objectives:**

To develop students' ability
- to function on multi-disciplinary teams
- to communicate effectively in writing to various audiences/purposes

13. **Relationship to Program Outcomes:**

To develop students' ability
- to function on multi-disciplinary teams
- to communicate effectively in writing to various audiences/purposes

14. **Expectations for Academic Conduct/Plagiarism Policy:**

As members of the University of West Florida, we commit ourselves to honesty. As we strive for excellence in performance, integrity—personal and institutional—is our most precious asset. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others. We pledge to share community resources in ways that are responsible and that comply with established policies of fairness. Cooperation and competition are means to high achievement and are encouraged. Indeed, cooperation is expected unless our directive is to individual performance. We will compete constructively and professionally for the purpose of stimulating high performance standards. Finally, we accept adherence to this set of expectations for academic conduct as a condition of membership in the UWF academic community.

**Statement on Plagiarism**

Plagiarism is academic dishonesty--willfully copying someone else’s work without acknowledging the source(s) or pretending that the work of a “ghost writer” is your own. Plagiarism is a very serious offense, and both the English Department and the University have stringent policies for handling offenders. A student found guilty of plagiarism may receive a failing grade on the assignment, test,
or for the course. The student may also be referred to the Dean for further action by the Academic Standards Committee.

15. **Assistance:**

   Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

16. **Prepared by:** Maria W. Warren, Instructor  
    **Date:** February 17, 2005

C. Faculty Resumes
1. **Name:** Ratha An  
   **Academic Rank:** Adjunct Lecturer of Electrical and Computer Engineering

2. **Degrees:**  
   M.Sc. Electrical Engineering, Auburn University, Auburn, Alabama, USA, 2005

3. **Service on UWF Adjunct Faculty:**  
   1 Year  
   Original Appointment: August 2005

4. **Other Related Experience:**  
   2004-Present Teaching and Students Assistance at University of West Florida  
   2003-2004 Research Assistance at Auburn University, Alabama  
   2002-2003 Teaching Assistance at Auburn University, Alabama  
   1997-2001 Students Assistance at University of West Florida

5. **Consulting, Patents, Etc.:** None

6. **State(s) in Which Registered:** None

7. **Principal Publications of Last Five Years:**  

8. **Scientific and Professional Societies of Which a Member:**  
   Institute of Electrical and Electronics Engineers, Inc. (IEEE),  
   Golden Key Honor society,  
   Society of Women Engineers (SWE)

9. **Honors and Awards:**  
   - Received 2nd place in 2001 of Southeastcon robotic competition (UWF team), was held at Clemson University.  
   - Received 4th place in 200 of Autonomous Underwater Vehicle competition (UWF team), was held at Orlando Florida, at Disney’s Coronado Spring Resort.  
   - Received Cooked Associated Scholarship Awarded in 1999  
   - Received Gold-Seal Scholarship from 1996-2001

10. **Institutional and Professional Service in the last Five Years:** None

11. **Professional Development Activities in the last Five Years:** None
1. **Name:** Ezzat G. Bakhoum

   **Academic Rank:** Assistant Professor of Electrical and Computer Engineering

2. **Degrees:**


4. **Service on UWF Faculty:**

   August 8, 2006.

4. **Other Related Experience:**

   2000-2005 Lecturer, Electrical and Computer Engineering Department, New Jersey Institute of Technology, Newark, New Jersey.

5. **Consulting, Patents, Etc.:**

   1. Bakhoum, US Pat. No. 5,613,001, "Digital signature verification technology for smart credit card and internet applications".
   4. Bakhoum, US Pat. No. 5,300,889, "Ground-free electrostatic measurement device".
   5. Bakhoum, US Pat. No. 5,267,311, "Intelligent diskette for software protection".
   8. Bakhoum, US Pat. No. 5,179,497, "Ground-free static charge removal device".

6. **State(s) in Which Registered:** N/A

7. **Principal Publications of Last Five Years:**

   **Refereed Journal Publications:**


8. **Scientific and Professional Societies of Which a Member:**

   Member, The Institute of Electrical and Electronics Engineers (IEEE)

9. **Honors and Awards:**

   - Selected by the editors of *BusinessWeek* for the list of *America’s New Innovators*, 1993.
• Received "Product of the Year" award by *Evaluation Engineering*, 1994, for design of *Electrostatic Monitoring System*.

10. **Institutional and Professional Service in the last Five Years:**

2000 to present: Reviewer for the following journals:
- Electronic Journal of Theoretical Physics,
- Physics Essays,
- Apeiron.

11. **Professional Development Activities in the last Five Years:**

Attended an educational course on Macromedia software tools, specifically: FLASH, Dreamweaver, and Javascript.
1. **Name:** Mohannad M. Bataineh  

   **Academic Rank:** Associate Professor of Electrical and Computer Engineering

2. **Degrees:**  
   - B.S. Electrical Engineering, Yarmouk University, 1987  
   - M.S. Electrical Engineering, Michigan State University, 1992  
   - Ph.D. Electrical Engineering, Michigan State University, 1997

3. **Service on UWF Faculty:**  
   - Five years  
   - Original Appointment: August 2000

4. **Other Related Experience:**  
   - 1997-2000 Visiting Assistant Professor, Electrical Engineering, Michigan State University

5. **Consulting, Patents, Etc.:** None

6. **State(s) in Which Registered:** None

7. **Principal Publications of Last Five Years:**

   **Refereed Journal Publications:**


   **Refereed Conference Publications:**


9. Scientific and Professional Societies of Which a Member:
   - Institute of Electrical and Electronics Engineers (IEEE) - Senior Member
   - American Muslims Scientists and Engineers (AMSE)
   - American Physical Society (APS)
   - International Association of Science and Technology for Development (IASTED)

9. Honors and Awards:
   - IEEE Student Chapter “Professor-of-the-Year” award 2002
   - 11th CFMR University/Industry Symposium “Best-Paper” award 1997

12. Institutional and Professional Service in the last Five Years:

   University/College level
   - Member University Growth and Development Committee (2003-present)
   - Member University Faculty Senate (2002-2003)
   - Member University Academic Council Committee (2002-2003)
   - Member University Planning Council / Programs & Resources Committee (2000-2002)
   - Advisor UWF Muslim Student Association, MSA (2003-present)

   Department level
   - Department Bylaws committee (2001-2002)
   - Faculty Search Committee (2002-2003)
   - Department Curriculum (2000-present)

   Department Administrative Functional Committees
   - Department Associate Chair (2005/2006)
   - School of Science and Engineering (Department Representative)

   Community Services
   - Engineering Advisory Council
   - Vice-Chair IEEE Northwest Florida Section (2002/2003)

   Professional / Technical Committees Services
   - Reviewer Antenna, Radars and Wave Propagation Conference (ARP-2004)
   - Reviewer Modeling, Simulation and Optimization conference (MSO-2004)
   - Reviewer Control and Applications (CA-2004)
   - Reviewer COSMOS (Complete Online Solutions Manual Organization System)

13. Professional Development Activities in the last Five Years:

   - University Research Award. UWF; 2004 ($6,500)
   - University Research Award. UWF; 2001 ($7,500)
   - Enhancing Teaching & Learning with Technology Award. UWF; 2001 ($2,500 + Laptop)
   - Faculty Activity Award. UWF; 2001 ($5,000)
1. **Name:** William P. Cast  
   **Academic Rank:** Adjunct Professor in Electrical and Computer Engineering

2. **Degrees:**  
   B.S  Mathematics, University of Tampa, 1964  
   M.S  Mathematics, University of Southern Mississippi, 1967  
   M.S.E.E.  Electrical Engineering, University of Florida, 1980

3. **Service on UWF Faculty:**  
   1 Year  
   Original Appointment: Fall 2004

4. **Other Related Experience:**  
   2001-2004 Adjunct Professor, Department of Computer Science at Troy University-Florida Region  
   1997-2004 Adjunct Professor, Mathematics Department at Embry-Riddle Aeronautical University (ERAU)  
   1995-2004 Adjunct Professor, Mathematics Department at Okaloosa-Walton Community College

5. **Consulting, Patents, Etc.:**  
   None

6. **State in Which Registered:**  
   None

7. **Principal Publications of Last Five Years:**  
   **Refereed Conference Publications:**  
   None

8. **Scientific and Professional Societies/Councils of Which a Member:**  
   Academic Technology Advisory Council-UWF

9. **Honors and Awards:**  
   • Distinguished Faculty Award – ERAU, 2002-2003.  
   • Distinguished Faculty Award – ERAU, 2003-2004

10. **Institutional and Professional Service in the last Five Years:**  
    None

11. **Professional Development Activities in the last Five Years:**  
    None
1. **Name:** John W. Coffey  
   **Academic Rank:** Assistant Professor

2. **Degrees:**  
   B.S. Psychology, College of William and Mary, 1971  
   B.S. Systems Science, University of West Florida, 1989  
   M.S. Computer Science, Software Engineering, University of West Florida, 1992  
   Ed.D. Curriculum and Instruction, Computer Science Option, University of West Florida, 2000

3. **Service on UWF Faculty:**  
   Twelve years  
   Original Appointment: Instructor, Computer Science, August 1992  
   Assistant Professor, Computer Science: 2001

4. **Other Related Experience:**  
   1990-Present: Institute for Human and Machine Cognition

5. **Consulting, Patents, Etc.:**  
   1995-1996 Consultant: NASA Glenn Research Center via Southern University  
   2004 Consultant: Tennessee Valley Authority, Chattanooga, TN

6. **States in Which Registered:**

7. **Principal Publications of Last Five Years:**  
   **Refereed Journal Publications:**  
   **Refereed Book Chapters:**  
   **Refereed Conference Publications:**  


8. Scientific and Professional Societies of Which a Member:
   Association of Computing Machinery
   Association of Information Technology Professionals

9. Honors and Awards:
   • As Chapter Advisor to UWF chapter of AITP (Association of Information Technology Professionals:
     Outstanding Student Chapter of the Year for AITP Region 7 (SouthEastern United States) 1998-1999
     Coordinated many trips to regional and National competitions in which we won or placed in many
     programming competitions.
   • Professional Development Leave, University of West Florida, to complete Doctoral Dissertation, academic
   • Distinguished Teaching Award, UWF (1997).

10. Institutional and Professional Service in the last Five Years:
    To the University of West Florida:
    • Member of the UWF University Planning Council for Information Technology (UPC-IT)
    • Member of the UPC-IT Subcommittee for Classroom Technology
    • Division of Engineering Technology External Review
    • UWF Saturday Open House Program
    • Faculty Search Committee, Institute for Human and Machine Cognition
      To the College of Arts and Sciences, University of West Florida:
      To the Computer Science Department, University of West Florida:
    • Chapter Advisor to the UWF chapter of AITP
    • Chair - Computer Science Department Scholarship Committee
    • Chair - Search Committee for Computer Science Department Office Manager
    • Computer Science Department Ad Hoc Curriculum Design Group
    • Faculty Search Committee, Department of Computer Science
    To External Entities:
    • Reviewer for three scholarly journals
    • Program Committee, CMC2004
    • Member of the PJC Advisory Committee for Computer Programming and Applications
    • PJC Level II Program Reviews of Computer Information Systems AA degree and the Computer Science
      AA degree.
    • Judge, Florida Panhandle Regional Science and Engineering Fair.

11. Professional Development Activities in the last Five Years:
    • Teaching Portfolio Workshop 2001.
1. **Name:** Doyle Ross Dingus  
   **Academic Rank:** Adjunct Instructor

2. **Degrees:**  
   B.A. Mathematics, Berea College, Berea, Kentucky, 1952  
   B.S.E.E. Electrical Engineering, University of Kentucky, Lexington, KY, 1957  
   M.S.E.E. Electrical Engineering, University of Kentucky, Lexington, KY, 1959  
   Ph.D. Electrical Engineering, University of Cincinnati, Cincinnati, OH, 1971

3. **Service on UF Faculty:**  
   Adjunct Professor, UF (Eglin AFB) 1975-1995  
   Adjunct Instructor, UWF, 2004-2005

4. **Other Related Experience:**  
   1953-1956 U.S. Navy. I was a general line officer with a meteorology specialty. I worked in the Washington Weather Bureau (Fleet Weather Center) for 18 months and served on an aircraft carrier as a line officer and the meteorologist for the carrier group and the fleet.  
   1959-1970 Electrical Engineer, Avco Corporation, Cincinnati, OH. I designed and developed systems, subsystems and components for the FPS-26, MPS-16 and FSS-7 radars. Refraction errors were corrected on FPS-26 with analog techniques; a new and effective process. Served as Industry representative on the Governor’s Study on how to improve public school scientific education.  
   1971-2001 Air Armament and Development Center, Studies and Analysis Division, Eglin Air Force Base. Directed and participated in many studies involving proposed new systems (AG and AA Weapons). My group designed, developed and successfully marketed the Joint Direct Attack Munitions (JDAM) concept, ran the initial tests and analyzed the results. I was the United States representative for about 6 years on a Medium Range Air-to-Air Missile Study with Germany, France and the United Kingdom. Results are classified and were published each year.  
   2001-2004 Formed the DRD-VU, Inc. company. Minor work for the Veridian Corporation, Niceville, FL in 2002. Currently teaching undergraduate Lab courses for UWF.

5. **Consulting, Patents, Etc.:** NA

6. **State(s) in Which Registered:** NA

7. **Principal Publications of Last Five Years:** NA
   **Books:** NA  
   **Refereed Conference Publications:** NA

8. **Scientific and Professional Societies of Which a Member:**  
   Member, IEEE  
   Member, ION  
   Member, AIAA

9. **Honors and Awards:**  
   • AVCO Fellowship, Cincinnati, OH  
   • Attended U.S Naval Postgraduate School – First to attend without the normal prerequisites (10 years service, regular status, …)

10. **Institutional and Professional Service in the last Five Years:** NA

11. **Professional Development Activities in the last Five Years:** NA

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1. Name: Dennis L. Edwards
   
   Academic Rank: Assistant Professor Computer Science Department, University of West Florida

2. Degrees:
   B.S. Computer Science, University of Southern Mississippi
   M.S. Computer Science, University of Southern Mississippi
   Ph.D. Computer Science, College of William & Mary, 1999

3. Service on UF Faculty:
   Two years
   Original Appointment: August 2001
   Assistant Professor: 2001

4. Other Related Experience:
   2001-Present Assistant Professor, Computer Science Department, University of West Florida
   1999-2001 Assistant Professor, Computing Department, The State University of West Georgia
   1996-1999 Visiting Professor, Computing Department, The State University of West Georgia
   1996-2001 UNIX Systems Administrator, Computing Department, The State University of West Georgia
   1992-1996 UNIX Assistant Systems Administrator, Department of Computer Science, The College of William & Mary
   1991-1992 Instructor, Department of Computer Science, The College of William & Mary
   1989-1991 VAX/VMS Systems Assistant, Department of Computer Science, The University of Southern Mississippi
   1989-1990 Instructor, Department of Computer Science, The University of Southern Mississippi

5. Consulting, Patents, Etc.:

6. State(s) in Which Registered:

7. Principal Publications of Last Five Years:


   D. Edwards and P. Kearns, "Graphical Limits of Concurrency," awaiting publication.

Books:

Refereed Journal Publications:

Refereed Conference Publications:

8. Scientific and Professional Societies of Which a Member:

9. Honors and Awards:

10. Institutional and Professional Service in the last Five Years:

11. Professional Development Activities in the last Five Years:

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1. **Name**: Andreas Fuchs  
   **Academic Rank**: Assistant Professor of Electrical and Computer Engineering

2. **Degrees**:  
   - B.S. Electrical Engineering, Clarkson University, Potsdam, NY, 1986  
   - M.S. Electrical Engineering, Clarkson University, Potsdam, NY, 1987  
   - Ph.D. Electrical Engineering, Clarkson University, Potsdam, NY, 1991

3. **Service on UF Faculty**:  
   N/A

4. **Other Related Experience**:  
   - 1991-1993 Visiting Assistant Professor of Electrical and Computer Engineering, Department of Electrical and Computer Engineering, Clarkson University, Potsdam, NY  
   - 1993-1994 Visiting Assistant Professor of Electrical Engineering, Engineering Department, Purdue University Fort Wayne, Fort Wayne, IN  
   - 1995 Visiting Assistant Professor of Electrical and Computer Engineering, Department of Electrical and Computer Engineering, Clarkson University, Potsdam, NY  
   - 1998-2003 Visiting Assistant Professor/Lecturer of Electrical and Computer Engineering, School of Engineering & Engineering Technology, Penn State Erie, The Behrend College, Erie, PA

5. **Consulting, Patents, Etc.**:  
   N/A

6. **State(s) in Which Registered**:  
   N/A

7. **Principal Publications of Last Five Years**:  
   **Books**:  
   N/A.  
   **Refereed Journal Publications**:  
   N/A  
   **Refereed Conference Publications**:  
   N/A

8. **Scientific and Professional Societies of Which a Member**:  
   Member IEEE  
   Member ASEE

9. **Honors and Awards**:  
   - Recipient of 2001 Penn State Erie Council of Fellows Excellence in Teaching Award  
   - Recipient of 1991 Clarkson Outstanding Teaching Award for Graduate Students  
   - Recipient of 1990 GRASP Conference Best Paper Presentation Award

10. **Institutional and Professional Service in the last Five Years**:  
    - **Reviewer of Papers**:  
    - IEEE Transactions on Automatic Control  
    - IEEE Transactions on Control System Technology  
    - IEEE Control Systems Magazine  
    - IEEE Signal Processing Magazine  
    - IEEE Conference on Decision and Control  
    - American Control Conference

11. **Professional Development Activities in the last Five Years**:  
    N/A
1. **Name:** Thomas C. Gilbar
   **Academic Rank:** Lecturer/Advisor/FEEDS Coordinator

2. **Degrees:**
   - B.Sc.(Eng.) Electrical Engineering, Florida International University, Miami, FL 1990
   - M.Sc. Computer Engineering, Florida International University, Miami, FL 1993
   - Ph.D. Computer Engineering, Florida Atlantic University, Boca Raton, FL 2002

3. **Service on UWF Faculty:**
   One year
   Original Appointment: August 2003

4. **Other Related Experience:**
   - 1990-1993 Graduate Assistant, Florida International University
   - 1994-2003 Instructor/Advisor, Florida International University

5. **Consulting, Patents, Etc.:**
   - 2004 Consultant to Baker and Hostetler for ATP vs. Core case

6. **State(s) in Which Registered:**
   None

7. **Principal Publications of Last Five Years:**
   **Conference Publications:**
   2. Gilbar, Thomas; A New GMDH Type Algorithm for the Development of Neural Networks for Pattern Recognition! PhD dissertation; Florida Atlantic University; August 8, 2002.

8. **Scientific and Professional Societies of Which a Member:**
   - Member, IEEE

9. **Honors and Awards:**
   - Member, Tau Beta Pi (1994-)
   - Member, Eta Kappa Nu (1992-)
   - Excellence in Advising Award in 1999 from Florida International University,
   - Excellence in Teaching Award in 1998 and 2003, Tau Beta Pi/Florida International University.
   - Teacher Appreciation Award, 1994, Eta Kappa Nu/Florida International University.

10. **Institutional and Professional Service in the Last Five Years:**
   - Served on Curriculum Committee, Florida International University
   - Served on 3 search and screen committees, University of West Florida
   - Serve on several departmental committees, including Fort Walton Beach, Computer Engineering, etc.
   - Serve on the board of directors for Science Center

11. **Professional Development Activities in the Last Five Years:**
   - Attended several DLL and Elearning lectures
   - Completed Ph.D. in Computer Engineering

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1. **Name:** Steve Gorman

   **Academic Rank:** Associate Professor of Electrical and Computer Engineering

2. **Degrees:**
   Ph.D in Electrical Engineering, University of Kentucky - May 1988.
   MS in Electrical Engineering, University of Kentucky - Dec 1985.
   BS in Electrical Engineering, University of Kentucky - Dec 1982.

3. **Service on UWF Faculty:**
   Original Appointment: August 2000

4. **Other Related Experience:**
   May 2001 – August 2001,
   May 2002 – August 2002,
   May 2003 – August 2003,
   May 2004 – August 2004
   Consulting Engineer to Ticom Geomatics, Inc. Austin, Tx.
   June 1988- July 2000
   Engineering Fellow, Raytheon Systems Company, formerly E-Systems

5. **Consulting, Patents, Etc.:**
   Consultant to Ticom, Inc.
   Consultant to Raytheon, Inc.
   Consultant to Separation Systems, Inc.
   Expert technical witness for law firm Clark, Pardington, Hart

6. **State(s) in Which Registered:**
   Professional Engineer since 1988

7. **Principal Publications of Last Five Years:**


8. **Scientific and Professional Societies of Which a Member:**
   Member IEEE

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9. **Honors and Awards**
   
   UWF Electrical and Computer Engineering Department Professor of the Year award, December 2003
   
   UWF Electrical and Computer Engineering Department Professor of the Year award, December 2001
   
   Received The E-Systems annual award for individual technical excellence, June, 1992.
   
   
   Recognized by Kentucky society of professional engineers for being one of three individuals (out of 12,000) to achieve a perfect score on the national professional electrical engineering exam in 1988.
   
   Eastman Kodak scholarship for most outstanding EE student, 1981.

10. **Institutional and Professional Service in the last Five Years:**

11. **Professional Development Activities in the last Five Years:**
1. **Name:** Jacalyn Huband

   **Academic Rank:** Assistant Professor of Computer Science

2. **Degrees:**
   
   - B.A. Mathematics, University of Virginia, Charlottesville, VA, 1982
   - M.Sc. Applied Mathematics, Old Dominion University, Norfolk, VA, 1995
   - Ph.D. Computational Mathematics, Old Dominion University, Norfolk, VA, 1997

3. **Service on UF Faculty:**
   
   Four years
   
   - **Original Appointment:** August 2002
   - **Assistant Professor:** August 2005

4. **Other Related Experience:**
   
   - 1986-1989 Member of the Technical Staff, TRW, Inc., Dayton, OH
   - 1989-1992 Senior Staff Analyst, ARINC Research Corp., Virginia Beach, VA
   - 1996-1998 Instructor, Department of Mathematics, College of Charleston, Charleston, SC
   - 1998-2002 Assistant Professor, Department of Mathematics and Computer Science, Georgia Southern University, Statesboro, GA

5. **Consulting, Patents, Etc.:**

   N/A

6. **State(s) in Which Registered:**

   N/A

7. **Principal Publications of Last Five Years:**

   **Refereed Journal Publications:**


   **Refereed Conference Publications:**


8. **Scientific and Professional Societies of Which a Member:**
   - Member, Mathematical Association of America (MAA)
   - Member, Society for Industrial and Applied Mathematics (SIAM)

9. **Honors and Awards:**
   - Fellow, Project Kaleidoscope Faculty of the 21st Century, September, 2004, PKAL National Assembly, Dallas, TX
   - Who’s Who Among America’s Teachers 2000, February, 2000, Georgia Southern University, Statesboro, GA
   - Fellow, MAA Project NExT (New Experiences in Teaching), July, 1999, Brown University, Providence, RI
   - Best Paper in Session, SIAM Student Conference, March, 1996, Clemson, SC

10. **Institutional and Professional Service in the last Five Years:**
    - Liaison to Fort Walton Beach/Eglin AFB, August, 2005 to present.
    - Course Coordinator for Introduction to C++, August, 2004 to present.
    - Course Coordinator for Applications of Discrete Structures, 2004 to present.
    - Course Coordinator for Object-Oriented Programming, 2004 to present.
    - Judge, Student Paper Presentations, Society of Industrial and Applied Mathematics (SIAM) -- Southeast Area Section, March 2005.
    - President, Society of Industrial and Applied Mathematics -- Southeast Area Section, 2002-2003.
    - Secretary-Treasurer (and President-Elect), Society of Industrial and Applied Mathematics -- Southeast Area Section, 2001-2002.

11. **Professional Development Activities in the last Five Years:**
    - Attended workshop "How to ‘manage’ being at a branch campus", February 2006
    - Attended workshop “Basic Grant Writing”, September 2005
1. **Name:** Dale H. Harrell  
   **Academic Rank:** Associate Professor of Electrical and Computer Engineering

2. **Degrees:**  
   B.Sc.(Eng.) Electrical Engineering, University of South Alabama, Mobile, AL, 1992  
   M.Sc. Electrical Engineering, University of South Alabama, Mobile, AL, 1996  
   Ph.D. Electrical Engineering, New Mexico State University, Las Cruces, NM, 2002

3. **Service on UF Faculty:**  
   Two years  
   Original Appointment: August 2002

4. **Other Related Experience:**  
   1992-1994 Laboratory Instructor, University of South Alabama, ECE Department  
   1994-1996 Laboratory Instructor, New Mexico State University, ECE Department  
   1996-2002 Instructor, New Mexico State University, ECE Department

5. **Consulting, Patents, Etc.:**  
   1999-2002 Consultant and instructor for EDSA Power Software, San Diego, CA  
   2000 Patent through EDSA for Harmonics Studies software and associated methods

6. **State(s) in Which Registered:**  
   None

7. **Principal Publications of Last Five Years:**  
   **Books:**  
   None

   **Refereed Journal Publications:**  
   None

   **IEEE Task Force Publications:**  
   Accepted:  
   *Tutorial on Harmonics Modeling and Simulation* Chapter 1  

   **Refereed Conference Publications:**  


8. **Scientific and Professional Societies of Which a Member:**  
   Member, The Institution of Electrical and Electronics Engineers,  
   Member, Industry Applications Society, Power Engineering Society,  
   Member, American Society of Military Engineers.
9. **Honors and Awards:**
   - Received the 2004 IEEE Frontiers In Education Faculty Fellow Award.
   - President, NMSU Graduate Student Council, 1998 – 1999
   - Vice President, NMSU Graduate Student Council 1997 - 1998
   - NMSU Graduate Student Research Award, 1996.
   - Life Time Member, Tau Beta Pi National Engineering Honors Society, 1990.
   - Member, Eta Kappa Nu Electrical Engineering Honors Society, 1990.

10. **Institutional and Professional Service in the last Five Years:**
    - Technical Program Committee Member, Transmission and Distribution Conference New Orleans, 2005
    - Vice Chair IEEE North West Florida Section 2004 – 2005.
    - Reviewed paper TPWRD-00249-2004 by Professor Arindam Gosh, “Static Shunt and Series
      Compensations of a SMIB System using Flying Capacitor Multi-Level Inverter,” for Transactions on
      Power Delivery.
    - IEEE Region 3 Winter Meeting Representative for NW Florida Section, Atlanta, GA.
    - IEEE Region 3 Southeast Conference Representative for NW Florida Section, Greensboro, NC.
    - Initiated Gulf Power contact with UWF which resulted in UWF receiving Gulf Power’s continuing education
      contract.
    - Executive Committee Member for SEA STARs a student research symposium.
    - Lead Judge in Physics for 49th Annual Science and Engineering Fair, at UWF.
    - Lead Judge for IEEE awards for 49th ASEF, at UWF.
    - Lead Judge for Concrete Engineering Society Award at 49th ASEF, at UWF.
    - Presenter, IEEE awards for 49th ASEF, Escambia County School District.
    - Member PKAL Conference Team, Atlanta, GA.

11. **Professional Development Activities in the last Five Years:**
    - Attended workshop “ABET Faculty Assessment Workshops Version 2.0,” Nashville, TN, 2004; in
      preparation of ABET 2006 evaluation.
1. **Name:** Mohamed A. Khabou

   **Academic Rank:** Assistant Professor of Electrical and Computer Engineering

2. **Degrees:**
   - B.Sc. Electrical Engineering, University of Missouri-Columbia, 1990
   - M.Sc. Electrical Engineering, University of Missouri-Columbia, 1993
   - Ph.D. Electrical Engineering, University of Missouri-Columbia, 1999

3. **Service on UWF Faculty:**
   Three years
   Original Appointment: August 2002

4. **Other Related Experience:**
   - 1999-2002 Assistant Professor, Physics Comp. Science and Engr. Dept, Christopher Newport University
   - 1991-1999 Research Assistant, Comp. Engr. and Comp. Science Dept, University of Missouri-Columbia
   - 1993-1999 Teaching Assistant, Math Dept, University of Missouri-Columbia
   - 1995-1996 Teaching Assistant, CECS Dept, University of Missouri-Columbia

5. **Consulting, Patents, Etc.:**
   None

6. **State(s) in Which Registered:**
   None

7. **Principal Publications of Last Five Years:**

   **Book Chapters**

   **Refereed Journal Publications:**

   **Conference Publications:**

8. **Scientific and Professional Societies of Which a Member:**
   - Member, IEEE (Also Vise Chairman of the Northwest Florida IEEE chapter)
   - Member, SPIE

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Member and National Representative, Tunisian Scientific Society

9. **Honors and Awards:**
   None

10. **Institutional and Professional Service in the last Five Years:**
    Organizing Committee Member, IEEE International Conference on Fuzzy Systems, 2004
    Organizing Committee Member, International Conference on Intelligent Technologies (InTech2003)
    International Organizing Committee Member, International Conference on Artificial and Comp. Intelligence for Control, Automation and Decision in Engineering and Industrial Systems, 2000
    Reviewer
    - IEEE Transactions on Fuzzy Systems
    - Journal of Fuzzy Sets and Systems
    - Optical Engineering
    - IEEE International Conference on Neural Networks
    - IEEE International Conference on Fuzzy Systems
    - SPIE Conference on Image Algebra and Morphological Image Processing
    - International Conference on Artificial and Computational Intelligence for Control, Automation and Decision in Engineering and Industrial Systems.

11. **Professional Development Activities in the last Five Years:**
    - Attended a workshop on writing NSF grant proposals (Tallahassee, FL)
    - Wrote a proposal to UWF to get summer research funding. Proposal was accepted.
    - Proposal title: Automatic Human Face Detection in Visual Scenes
    - Proposal Amount: $6,250
1. **Name:** Geoffrey LaForte  

**Academic Rank:** Associate Professor

2. **Degrees:**  
   B.A. Mathematics, 1986, University of Texas at Austin  
   M.A. Philosophy, 1990, University of Texas at Austin  
   Ph.D. Mathematics (Logic), 1995, University of Michigan

3. **Service on UWF Faculty**  
   - Associate Professor August 2005 - present  
   - Assistant Professor August 2000 - August 2005  
   - Instructor Jan 2000 - August 2000  

4. **Other Related Experience:**  
   - Postdoctoral Fellow, Victoria University of Wellington, New Zealand, July 1996 – Dec 1997  

5. **Consulting Patents:**

6. **State(s) in Which Registered:**

7. **Principal Publications in the Last Five Years:**  
   **Refereed Journal Articles:**  
   **Refereed Conference Publications:**  

8. **Scientific and Professional Societies of Which a Member:**  
   - Association for Symbolic Logic, 1992-present  
   - American Mathematical Society, 1992-present

9. **Honors and Awards:**

10. **Institutional and Professional Service in the Last Five Years:**  
   - College level: Computer Science Coordinator for CE program Sept. 2002 - present  
   - Department level: Graduate Admissions Committee, Chair, Sept. 2003 - present

11. **Professional Development Activities in the last Five Years:**  
   - Reviewer for  
     - Journal of Symbolic Logic  
     - Archive for Mathematical Logic  
     - Annals of Pure and Applied Logic  
     - Theoretical Computer Science

Appendix I-190
1. **Name:** Rachid Manseur

   **Academic Rank:** Associate Professor in Electrical and Computer Engineering (Full-Time)

2. **Degrees:**
   - Ph.D. Electrical Engineering, University of Florida, Gainesville, Florida. 1988

3. **Service on UWF Faculty:**
   - Eleven Years
   - Original Appointment: January 1994

4. **Other Related Experience:**
   - 1988-1992 Visiting/Assistant Professor of Electrical Engineering, UF/UNF Program. Jacksonville, FL.
   - 1992-1993 Adjunct Professor, Mathematics and Computer Science, Universite de Moncton, Canada.
   - 1993-1994 Assistant Professor, Electrical Engineering, University of North Florida, Jacksonville, FL.
   - 1994-Present Visiting (6 months) then Associate professor of Electrical Engineering. UWF.

5. **Consulting, Patents, Etc.:**
   - 1992 Consultant to Pegasus Industries Inc., Florida

6. **State(s) in Which Registered:** Professional Engineer, Florida

7. **Principal Publications of Last Five Years:**

   **Refereed Journal Publications:**

   **Refereed Conference Publications:**

   **Non-refereed Publications**

8. **Scientific and Professional Societies of Which a Member:**
   - Member, ASEE (American Society for Engineering Education.

9. **Honors and Awards:**
   - "Professor of the Year Award", UWF/UF IEEE student Chapter, 2000.
   - "1989 Outstanding Teacher of the Year Award." First recipient of this award, by student election. UF/UNF Program. $300.00 Award.

**Institutional and Professional Service in the last Five Years:**
- Member or chair of several department committees
- Member of the UFF faculty contract negotiation team 2003/2005
- Chair/Member of ECE faculty search committees. 1997/2003
- Chair of the EE curriculum committee
- Member, College Personnel Committee, COST, UWF, 1998-2001

11. **Professional Development Activities in the last Five Years:**
   - Attended about ten professional conferences and meetings on robotics and engineering education
   - Participated in the NSF-funded Summer 2004 Pan-American Studies Institute in Cochabamba, Bolivia. June 5-20. This two-week institute included workshops on embedded systems, VHDL-based digital design, signal processing, fuzzy control and neural nets.
   - Participated in a one day ABET faculty course assessment workshop. October 2004. Nashville, TN

   Established the Robotics and Image Analysis Laboratory in association with Dr. Melanie Sutton of Computer Science. The RIA lab serves as a platform for student projects and faculty research in robotics and computer vision.

**Funding:**
   - Harris RIA support grant: $18,500 in support for the RIA lab activities.

   **Robotics Competitions:** Organized and supervised UWF student teams that earned several top rankings in regional and international competitions.
1. **Name:** Cherian P. Mathews  
   **Academic Rank:** Associate Professor, Department of Electrical and Computer Engineering (Full-Time)

2. **Degrees:**  
   B.E. Electrical and Electronics Engineering, Anna University, Madras, India, 1987  
   M.S. Electrical Engineering, Purdue University, W. Lafayette, Indiana, USA, 1989  
   Ph.D. Electrical Engineering, Purdue University, W. Lafayette, Indiana, USA, 1993

3. **Service on UF Faculty:**  
   Nine years  
   **Original Appointment:** August 1995  
   **Associate Professor:** August 2000

4. **Other Related Experience:**  
   Aug. 2001 – May 2002 Visiting Associate Professor, Purdue University, W. Lafayette, IN (on sabbatical)  
   Jan. 1994 – May 1994 Visiting Assistant Professor, Purdue University, W. Lafayette, IN.

5. **Consulting, Patents, Etc.:** None

6. **State(s) in Which Registered:** Florida

7. **Principal Publications of Last Five Years:**  
   **Refereed Journal Publications:**  

   **Refereed Conference Publications:**  

8. **Scientific and Professional Societies of Which a Member:**  
   Member, The Institute of Electrical and Electronics Engineers (IEEE)  
   Member, American Society for Engineering Education (ASEE)

9. **Honors and Awards:**  
   Recipient of Purdue University Special Initiative Dissertation Fellowship, Fall 1993.  
   Recipient of David Ross Summer Research Grant (Purdue University), Summer 1991 and Summer 1992.

10. **Institutional and Professional Service in the last Five Years:**  
    - Chair, ECE faculty search committee (FEEDS coordinator - lecturer position) 2002-2003  
    - Member, ECE faculty search committee (Assistant Professor position) 2002 – 2003  
    - Member, Search committee for ECE laboratory specialist 2003  
    - Member, University Conduct committee 2002 - 2004  
    - Served on several departmental subcommittees including the bylaws committee, DLL delivery committee, alumni / employer relations committee 2003-2004  
    - Reviewer for the IEEE Transactions on Signal Processing.

11. **Professional Development Activities in the last Five Years:**
1. Name: Xuemin Millard  
   Academic Rank: Assistant Professor

2. Degrees:  
   B.Sc.(Eng.) Microwave Engineering, University of Electronic Science and Technology, China, 1994  
   M.Sc. Electrical and Computer Engineering, New Mexico State University, Las Cruces, NM, 1998  
   Ph.D. Electrical and Computer Engineering, Duke University, Durham, NC, 2002

3. Service on UF Faculty:  
   1 year  
   Original Appointment: August 2003

4. Other Related Experience:  
   1997-1998 RF Engineer, Shenzhen Huawei Technologies, LTD, Shenzhen, China

5. Principal Publications of Last Five Years:

   Refereed Journal Publications:  

   Refereed Conference Publications:  
   Q. H. Liu, L. P. Song, X. Millard, and F. Li, “Fast Forward and Inverse Scattering Methods for 3D Objects in Multilayered media", *PIERS. 04*, Nanjing, China, August 2004,


6. Scientific and Professional Societies of Which a Member:
   Member, The Institute of Electrical and Electronics Engineers (IEEE) Antenna and Propagation Society, EMC society
   Member, The Society of Women Engineers

7. Institutional and Professional Service in the last Five Years:
   Journal Reviewer: IEEE - Transactions on GeoScience and Remote sensing
   Journal Reviewer: IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control

8. Professional Development Activities in the last Five Years:
   Attended workshop “The fundamentals of EMC” sponsored by the EMC Melbourne section.
   Attended workshop on grant resources sponsored by the Research and Graduate Studies office
1. **Name**: Muhammad H. Rashid
   
   **Academic Rank**: Professor and Director of Electrical and Computer Engineering

2. **Degrees**:
   - B.Sc.(Eng.) Electrical Engineering, Bangladesh University of Eng. and Technology, Dacca, 1967
   - Ph.D. Electronic and Electrical Engineering, University of Birmingham, England, UK, 1976

3. **Service on UF Faculty**:
   - Eight years
   - Original Appointment: August 1997
   - Professor and Program Director: 1997

4. **Other Related Experience**:
   - 1981-1985 Associate Professor, Department of Electrical Engineering at Concordia University, Canada
   - 1985-1987 Associate Professor at Purdue University Calumet
   - 1987-1989 Professor at Purdue University Calumet
   - 1989-1997 Professor and Chair of Engineering Department at Purdue University Fort Wayne

5. **Consulting, Patents, Etc.**:
   - 1990-1995 Consultant to Magnatek Inc, Indiana
   - 1989-1997 External Examiner to Ngee Ann Polytechnic, Singapore
   - 2002-2006 External Examiner for Electrical Engineering, Kolej of Universiti Teknologi & Pengurusan Malaysia (KUTPM), Shah Alam, Malaysia
   - 2004-2005 External Examiner for the Faculty of Electrical Engineering, University Technology MARA, Selangor, Malaysia

6. **State(s) in Which Registered**:
   - Professional Engineer, Ontario, Canada (from 1977 – 2002)
   - Chartered Engineer, United Kingdom

7. **Principal Publications of Last Five Years**:
   **Books**:

   **Refereed Journal Publications**:

   **Refereed Conference Publications**:

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8. Scientific and Professional Societies of Which a Member:
Fellow, The Institution of Electrical Engineers (London),
Fellow, The Institute of Electrical and Electronics Engineers
Member, IEEE - Education Society, Industry Applications Society, Industrial Electronics Society, Magnetics Society, Mechatronics Society, Power Electronics society, and Power Engineering Society

9. Honors and Awards:
- Received the 2002 IEEE Educational Activity Award (EAB) Meritorious Achievement Award in Continuing Education with the citation "for contributions to the design and delivery of continuing education in power electronics and computer-aided-simulation".
- Elected as a Distinguished Lecturer and Speaker of IEEE-Industry Applications Society.
- Outstanding Engineer Award in 1991 from IEEE region 4,

10. Institutional and Professional Service in the last Five Years:
- Engineering Evaluator for the Southern Association of Colleges and Schools since 1999.
- Editorial Board Member for The Journal of Electric Machines and Power Systems,
- Journal Reviewer: IEEE - Transactions on Education, Power Electronics, and Industry Applications,
- Reviewer for (a) National Science Foundation (NSF), and (b) Australian Research Council, (c) University Grants Commission for the Govt. of Hong Kong.,

11. Professional Development Activities in the last Five Years:
- External Examiners of electrical engineering for University of Malaysia, Science and Technology, Penang
- NSF panel reviewer for Curriculum, and Laboratory Improvement (CCLI) program, Educational Materials Development (EMD) (2003 and 2004)
1. **Name:** Bassam R. Shaer

   **Academic Rank:** Assistant Professor of Electrical and Computer Engineering

2. **Degrees:**
   - B.S. Electrical Engineering, University of Florida, Gainesville, Florida, May 1989
   - M.S. Electrical Engineering, University of South Florida, Tampa, Florida, April 1991
   - Ph.D. Electrical Engineering, University of South Florida, Tampa, Florida, December 1995

3. **Service on UWF Faculty:**
   - One year
   - Appointment: August 2005 – Present
   - Assistant Professor

   **Service on UMD Faculty:**
   - Nine years
   - Appointment: September 1996 – May 2005
   - Assistant Professor

4. **Other Related Experience:**
   - 1995-1996 Adjunct Professor, Electrical Engineering, University of South Florida, Tampa, Florida
   - 1989-1995 Teaching Assistant, Electrical Engineering, University of South Florida, Tampa, Florida
   - 1991-1995 Research Assistant, University of South Florida, Tampa, Florida

5. **Consulting, Patents, Etc.:**
   1. THM BIOMEDICAL, INC., Duluth, MN, Consulting (1998)

6. **State(s) in Which Registered:** None

7. **Principal Publications of Last Five Years:**

   **Refereed Journal Publications:**

   **Refereed Conference Publications:**

8. Scientific and Professional Societies of Which a Member:
   Member of the American Society for Engineering Education (ASEE)
   Member of Institute of Electrical and Electronics Engineers (IEEE)
   Member of the IEEE Computer Society

9. Honors and Awards: None

10. Institutional and Professional Service in the last Five Years:
    MS Program Committee
    Faculty Search Committee
    Lab Equipment Committee
    UMD Library Committee
    MSECE Graduate Committee
    Orientation advising
    Campus preview
    Engineering Day - Lab preview
    Single Semester Leaves Committee
    Task Force on Freshman performance

11. Professional Development Activities in the last Five Years:
    Participated in the Technology Camp 6 for UMD faculty, January 9-17, 2002. This camp lays the groundwork for designing and teaching courses using technological tools. It provides us with hands-on activities and experiences to comfortably bring technology to bear on the academic courses we teach. The camp’s activities enable us to design and manage Web sites and to use digital audio and video, graphics, management tools and prepare us to use high-tech classrooms.
    Have taken several Cadence Internet Learning Series courses to enhance my use of CAD tools in the classroom.
    Attended several lectures and seminars dealing with teaching and technology and participated regularly in Tech Talk, organized by IDS. Many faculty and staff from various departments and colleges meet to discuss their teaching experience and the latest innovations in the use of technology in the classroom.
    Attended the IEEE Computer Society Workshop on VLSI, April 2001, Orlando, FL.
    Attended Grant Writing Seminar, October 17-18, 2002, Minneapolis Minnesota.
    Attended the IEEE Symposium on Very Large Scale Integration Systems, April 2002.
1. Name: Obaid Naveed Siddiqi
   
   Academic Rank: Adjunct Instructor of Electrical and Computer Engineering
   
2. Degrees:
   B.S.   Electronics Engineering, Southern Illinois University, Edwardsville Illinois
   M.S.   Applied Mathematics, Southern Illinois University, Edwardsville, Illinois
   
3. Service on UWF Faculty:
   Three years
   Original Appointment:       August 2002
   Adjunct Instructor:      August 2002
   
4. Other Related Experience:
   1977-1978 Visiting Lecturer, Southern Illinois University, Edwardsville, Illinois
   1978-1978 Amarillo College, Amarillo, Texas
   
5. Consulting, Patents, Etc.:
   1988-Present Associate Principal Engineer, JE Sverdrup Technology, Inc., Eglin Air Force Base, Florida.
   1978-1980 Test Engineer, Bell Helicopter Textron, Amarillo, Texas
   1979-1979 Lecturer, Electrical Engineering Department, Amarillo College, Amarillo, Texas.
   
6. State(s) in Which Registered:
   
7. Principal Publications:

   Refereed Journal Publications:    None
   Refereed Conference Publications: None
   
8. Scientific and Professional Societies of Which a Member:
   Member, The Institute of Electrical and Electronics Engineers
   
9. Honors and Awards:
   Sustained Superior Performance Award in Recognition of Outstanding Performance throughout the year, 1991.
   Outstanding Group Achievement Award in Support of Hammerhead Program, 1995.
   Letter of Appreciation from Mr. Wesley R. Gunn, Technical Director, Joint Direct Attack Munitions, in Support of the JDAM PIP Program, 27 April 1998.
   Letter of Appreciation for Performing an Outstanding Job on Computational Airframe Performance Task, May 12, 1989.
   
10. Institutional and Professional Service in the last Five Years:
   Board Member for the Ft. Walton Beach High School, 1999-2001
   
11. Professional Development Activities in the last Five Years: None
   
Appendix I-200
1. **Name:** Sharon J. Simmons  
   **Academic Rank:** Assistant Professor Computer Science Department, University of West Florida

2. **Degrees:**  
   B.S. Computer Science, University of Southern Mississippi  
   M.S. Computer Science, University of Southern Mississippi  
   Ph.D. Computer Science, College of William & Mary, 1999

3. **Service on UF Faculty:**  
   Half year  
   Original Appointment: August 2001  
   Assistant Professor: 2001

4. **Other Related Experience:**  
   2001-Present Assistant Professor, Computer Science Department, University of West Florida  
   1999-2001 Assistant Professor, Computing Department, The State University of West Georgia  
   1996-1999 Assistant Professor, Computing Department, The State University of West Georgia  
   1993-1996 UNIX Systems Administrator, Department of Computer Science, The College of William & Mary  
   1992-1993 Instructor, Department of Computer Science, The College of William & Mary  
   1989-1991 Instructor, Computer Science, University of Southern Mississippi  
   1988-1989 Software Engineer, Howard Industries, Laurel, MS  
   1984-1988 Scientific Engineer, Texas Instruments, Dallas, TX

5. **Consulting, Patents, Etc.:**

6. **State(s) in Which Registered:**

7. **Principal Publications of Last Five Years:**  
   S. Simmons, “Evaluating Distributed Asserts in the Asynchronous Domain”, work in progress.  
   S. Simmons, “Static Analysis Technique for Assertion Evaluation”, work in progress.

8. **Books:**

9. **Refereed Journal Publications:**

10. **Refereed Conference Publications:**

11. **Scientific and Professional Societies of Which a Member:**

12. **Honors and Awards:**  
   Named to Who’s Who Among College Students. 1995  
   Graduated with Highest Honors, University of Southern Mississippi. 1984  
   Upsilon Pi Epsilon. 1984

13. **Institutional and Professional Service in the last Five Years:**

14. **Professional Development Activities in the last Five Years:**

Appendix I-201
1. **Name:** Norman W. G. Wilde
   
   **Academic Rank:** Professor
   
2. **Degrees:**
   
   Bachelor of Science, (first class honors), 1967, University of Manitoba, Winnipeg, Canada.
   
   Doctor of Philosophy in Mathematics and Operations Research, 1971, Massachusetts Institute of Technology, Cambridge, Massachusetts, U.S.A.
   
3. **Service on UF Faculty:**
   
   Original Appointment: August 1987
   
   Associate Professor: August, 1993
   
   Professor: August, 1998
   
4. **Other Related Experience:**
   
   August 1985 - August 1987; Teaching Associate and Visiting Assistant Professor, University of Florida
   
   January 1979 - July 1985; Consultant in health services management and in information systems based in Cali, Colombia. Founder and principal partner of ETA Sistemas Ltda
   
   November 1984 - October 1978, Consultant and Systems Analyst, World Health Organization, Cali Colombia and Bangkok Thailand
   
   May 1971 to September 1974; Assistant Professor, Universidad del Valle, Cali, Colombia
   
5. **Consulting, Patents, Etc.:**
   
   **Grants:**
   
   
   2. "CEN5XXX - Object Oriented Methodologies", UWF Enhancing Teaching and Learning with Technology program, Summer 2002 $2,500.00
   
   
   4. "Understanding Software Features by Integrating Dynamic and Static Analysis", with Sharon Simmons and Dennis Edwards, Motorola, Inc. via the Software Engineering Research Center, October, 2005 - September 2006 $25,000.00
   
   
6. **State(s) in Which Registered:**
   
   N/A
   
7. **Principal Publications of Last Five Years:**
   
   **Refereed Journal Papers and Book Chapters:**
   
   
   
   
   
   

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Refereed Conference Publications:


8. Scientific and Professional Societies of Which a Member:
   Member, IEEE - Computer Society

9. Honors and Awards:
   • UWF College of Arts and Science, Outstanding Instructor Spring 2004, Eglin/Fort Walton Beach Student Government Association.

10. Institutional and Professional Service in the last Five Years:
   • Conference program committee or reviewer:
   • Reviewer for the following conferences, organizations and journals:
      o IEEE Transactions on Software Engineering (2005)
      o Information and Software Technology (2003, 2005)
      o National Science Foundation (2001).

11. Professional Development Activities in the last Five Years:
    N/A
1. **Name:** William J. Weber  

   **Academic Rank:** Instructor

2. **Degrees:**  
   M.Sc. Telecommunications Policy, George Washington University, 1984  
   B.Sc. Electronics Engineering Technology, Oklahoma State University, 1977  
   A.Sc. Digital Equipment Technology, Community College of the Air Force, 1977  
   A.Sc. Electronics Engineering Technology, Oklahoma State University, 1976

3. **Service on UF Faculty:**  
   Instructor, 4 years (Faculty Appointment: Aug. 8, 2000)  
   Adjunct Laboratory Instructor, 5 years (First lab teaching assignment: Jan. 1995)  
   Teaching Laboratory Specialist, 6 years (USPS Appointment: Feb. 22, 1994)

4. **Other Related Experience:**  
   
   1978-1986 U. S. Air Force Officer: Communications-Electronics Engineer and Communications & Computer Systems Engineer, Washington D.C.; Levkas, Greece; Belleville, Illinois; and other worldwide locations. Field engineer with formal training (1036 hrs.) and experience in testing, optimizing, maintaining, and operating communications systems including: tropospheric scatter, satellite, HF radio, telephone, data, and information security.
   
   1966-1977 U. S. Air Force Enlisted: Communications Equipment Maintenance Supervisor and Technician, Oklahoma City, Oklahoma; Republic of Vietnam; Cape Canaveral, Florida; and other locations. Formal training (2935 hrs.) and experience in maintaining and operating data, information security, and telephone systems.

5. **Consulting, Patents, Etc.:** None

6. **State(s) in Which Registered:** None

7. **Principal Publications of Last Five Years:** None

8. **Scientific and Professional Societies of Which a Member:**  
   National Institute for Certification in Engineering Technologies (NICET) (1977)  
   Armed Forces Communications and Electronics Association (AFCEA) (1978)

9. **Honors and Awards:**  
   Member National Honor Society of Phi Kappa Phi (1977)

10. **Institutional and Professional Service in the last Five Years:**  
    - Wrote and executed the implementation plan for the extension of the Electrical and Computer Engineering degree programs to the Fort Walton Beach campus.
    - Initiated communication for and participated in the implementation of an interinstitutional agreement establishing a pre-engineering program taught by a UWF Lecturer at Choctawhatchee High School in the Okaloosa County School District.
    - Lectures on Engineering Careers at High Schools and Community Colleges in conjunction with recruiting students.

11. **Professional Development Activities in the last Five Years:** None
1. **Name:** Dr. Joseph M. Zayas

   **Academic Rank:** Presently: Professor of Physics, Pensacola Junior College, Pensacola, Florida. (From 8/1977 to Present).
   9/76 to 6/77: Assistant Professor of Physics. Manhattan College, Riverdale, New York.

2. **Degrees:**
   - M.S. in Physics: Adelphi University, Garden City, New York, June, 1969
   - Ph.D. in Physics: Adelphi University, Garden City, New York, 1976

3. **Service on UWF Faculty:**
   - Spring, 2005: Engineering Dynamics (EGM 3401).
   - Fall, 2004: Engineering Statics (EGM 2500).
   - Spring, 2004: Engineering Dynamics (EGM 3401).
   - Summer, 2002: Engineering Statics (EGM 2990).

4. **Other Related Experience:**
   - 1997 – Present: Professor of Physics, Pensacola Junior College, Pensacola, Florida.

   Dating back to Fall 1981, I have taught many courses at UWF on an adjunct basis. Among them:

   PHY 3221 (Intermediate Mechanics I); PHY 3222 (Intermediate Mechanics II); PHY 3048 (University Physics)
   PHY 3123 (Principles of Modern Physics); EGS 2311 (Vector Statics); EGS 2321 (Vector Dynamics) and PHY
   3123 (General Physics). I also taught Modern Optics at Troy State University during the Fall 1979 Term.

5. **Consulting, Patents, Etc.:**

6. **State(s) in Which Registered:**

7. **Principal Publications of Last Five Years:**

   **Publications:**

   **Refereed Journal Publications:**
   1. “Measuring the Coefficient of Drag of a Ping Pong Ball Using a Motion Sensor” FL-AAPT Meeting, October 5, 2002.
   2. “Measuring the Drag Coefficient of a Ping Pong Ball” FL-AAPT Meeting, Sensor” FL-AAPT Meeting, October 7, 2000; Tarpon Springs, FL.

   **Curriculum Development:**
   1. Completing laboratory manual for PHY 2048L and PHY 2049L. All experiments incorporate the use of
   spreadsheets (Excel) and are written to integrate seamlessly with the PASCO sensors recently acquired by
   PJC.

8. **Scientific and Professional Societies of Which a Member:**
   - AAPT and FL-AAPT
   - Sigma Xi
   - Sigma Pi Sigma

Appendix I-205
SME (Society of Manufacturing Engineers)
Physics Alliance of Northwest Florida

Other Activities:
Served as Vice President 1993-94 and 1994-95
Served as Secretary: 2000- Present
Helped organize and run the Physics Olympics from 1992 - to present

9. Honors and Awards:
   Teaching Excellence Award for the Department of Physical Sciences at PJC, 1987.
   Inducted into the Academy of Teaching Excellence at PJC in 1991.
   Faculty Advisor of the Year Award, 2003 by the Florida Engineering Society for sponsorship
   of FES Student Chapter at PJC (Engineering Club)

10. Institutional and Professional Service in the last Five Years:
   1985 to Present: Sponsor of PJC Engineering Club (Student Delta Chapter # 105, Florida Engineering Society).
   Web Site Development: 2001-2002: Published website for PJC Engineering Club:  www.pjc.edu/engclub
   2001-2002: Published website for the Cuban American Association of Pensacola (CAAP).
   www.geocities.com/caapflausa
   2003: Published website for the Physics Alliance of Northwest Florida.  www.geocities.com/panfusa

11. Professional Development Activities in the last Five Years:
   None
APPENDIX III – HOW-TABLES

The how-tables describe how the program outcomes are achieved by various courses and how? The tables also indicate the types of supporting documents and if the course is required (Yes) or it is an elective course (Not required) for the curriculum.

Page

How-tables for computer engineering III-2
# 1: Knowledge of mathematics through differential and integral calculus, and advanced topics in differential equations, linear algebra, complex variables, and discrete mathematics

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Req'd</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3111</td>
<td>Formulation and solution of differential equations modeling first-order circuits; complex variables are used in sinusoidal steady-state analysis and power calculations; formulation and solution of simultaneous linear equations are introduced through nodal and mesh analysis of circuits.</td>
<td>Student work: homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3112</td>
<td>The course covers in detail the solution of linear constant-coefficient differential equations. The classical time-domain solution (homogeneous solution, particular integral) and the Laplace transform solution are covered. Step, impulse, and sinusoidal responses are discussed in depth.</td>
<td>Student work: homework assignments and exams. Instructor handouts and Mathcad files on differential equations.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3135</td>
<td>Difference equations are introduced. Methods for obtaining the natural and forced responses of systems described by linear constant-coefficient difference equations are covered. Z transforms are introduced and used to solve difference equations.</td>
<td>Student work: homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3304</td>
<td>Applications of mathematical techniques and basic circuit concepts for analysis and design of electronics circuits. Applications of physical sciences for understanding the characteristic and modeling of semiconductor semi-conductor devices.</td>
<td>Students work, design and homework assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3396</td>
<td>This course covers the solution of second order partial differential equations used in the Shrodinger wave equation and the diffusion equation. Calculus is also used throughout the material.</td>
<td>Samples of student work as well as instructor handouts and examples placed on the departmental server.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3472</td>
<td>This course uses multidimensional calculus and differential equations while solving for electric and magnetic field components.</td>
<td>Samples of student work as well as instructor handouts and examples placed on the departmental server.</td>
<td></td>
</tr>
<tr>
<td>EEL3473</td>
<td>This course uses second order partial differential equations to solve the wave equation. Most solutions are reduced to a single dimension for practical reasons.</td>
<td>Samples of student work as well as instructor handouts and examples placed on the departmental server.</td>
<td></td>
</tr>
<tr>
<td>EEL3701C</td>
<td>Boolean Algebra techniques are studied in depth as the basis for digital system design.</td>
<td>See course syllabus, text and materials.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>The course covers solutions to non-linear differential equations and Fourier analysis to analyze and evaluate the performances of power converters. Also, it uses iterative techniques to solve transcendental equations.</td>
<td>Student work: homework assignments and exams. Textbooks.</td>
<td></td>
</tr>
<tr>
<td>EEL4306C</td>
<td>Students are required to solve for transfer functions of higher order systems such as Butterworth and Chebyshev filters and apply complex variable techniques.</td>
<td>Homworks and samples of exams.</td>
<td></td>
</tr>
<tr>
<td>EEL4310C</td>
<td>Students are required to use calculus and differential equations in homework and on exams.</td>
<td>Homworks and samples of exams.</td>
<td></td>
</tr>
<tr>
<td>EEL4440</td>
<td>Students solve complex wave equation configurations with non-zero boundary conditions.</td>
<td>Homeworks, exams and projects.</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>How does the course support the goal? What do you do to achieve this goal?</td>
<td>Supporting document(s)</td>
<td>Reqd.</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>EEL3111</td>
<td>Formulation and solution of differential equations modeling first-order circuits; complex variables are used in sinusoidal steady-state analysis and power calculations; formulation and solution of simultaneous linear equations are introduced through nodal and mesh analysis of circuits.</td>
<td>Student work: homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3112</td>
<td>The course covers the modeling and response characteristics of linear time-invariant systems in detail. In particular, the following topics: zero-state and zero-input responses, impulse response and convolution, step response, sinusoidal response,</td>
<td>Student work: homework assignments and exams. Instructor handouts and</td>
<td>Yes</td>
</tr>
</tbody>
</table>

# 2: Knowledge of core electrical and computer engineering topics
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Textbook/Reference Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3135</td>
<td>Fourier transform and frequency response, Laplace transform and transfer function, 1st and 2nd order circuits.</td>
<td>Mathcad files.</td>
</tr>
<tr>
<td>EEL3211</td>
<td>The course introduces tools for analysis of linear, discrete-time systems. Topics such as impulse response, convolution, frequency response, transfer functions, discrete-time Fourier transforms, and fast Fourier transforms are covered.</td>
<td>Student work: homework assignments and exams. Yes</td>
</tr>
<tr>
<td>EEL3303L</td>
<td>The course introduces breadboarding of electric circuits, circuit simulation using PSPICE, circuit evaluation and testing using test equipment such as signal generators, oscilloscopes, and multimeters.</td>
<td>Student work: Lab notebook, lab practical exam. Yes</td>
</tr>
<tr>
<td>EEL3304</td>
<td>This course covers basic analog electronic circuit design techniques and analytical skills, using diodes, op-amps, MOSFETs, JFETs, and BJTs. It introduces to the characteristics, biasing techniques and circuit models of semiconductor devices. Also, it introduce to the characteristics of op-amps are covered through design examples of op-amp circuits.</td>
<td>Student work: homework assignments and exams. Textbook. No</td>
</tr>
<tr>
<td>EEL3396</td>
<td>Students use circuit models of devices and develop the physical basis for device models.</td>
<td>Homeworks and exams. Yes</td>
</tr>
<tr>
<td>EEL3472</td>
<td>Students must demonstrate an understanding of Ohm’s law in vector form.</td>
<td>Homeworks and exams. Yes</td>
</tr>
<tr>
<td>EL3701C</td>
<td>This course introduces digital electronics concepts through applications of electronic devices in digital systems.</td>
<td>See course and lab. Materials and student work. Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>The course covers the basic circuit analytical techniques, power semiconductor devices, and mathematical skills to analyze and design power electronic circuits. It uses modern engineering techniques, skills, and tools, including computer-based tools for analysis and design.</td>
<td>Student work: homework assignments and exams. Textbook.</td>
</tr>
<tr>
<td>EEL4304L</td>
<td>The course familiarizes with the capabilities and limitations of equipment in the electronics lab. It provides laboratory experience in the characterization of semiconductor devices and in measuring techniques, experimentation observation.</td>
<td>Student work: homework assignments and exams. Lab notes and reports. Yes</td>
</tr>
<tr>
<td>EEL4306C</td>
<td>Students must demonstrate a thorough understanding of circuits principles and frequency analysis.</td>
<td>Homeworks and exams</td>
</tr>
<tr>
<td>EEL4310C</td>
<td>Core circuits and analysis principles are integrated throughout the course as device physics topics are introduced.</td>
<td>Homework, exams and projects.</td>
</tr>
<tr>
<td>EEL4440</td>
<td>Students demonstrate an ability to integrate electrical engineering principles into the design of practical circuits.</td>
<td>Homework, exams and projects.</td>
</tr>
<tr>
<td>EEL4514</td>
<td>The course covers the following core topics in detail: linear and nonlinear distortion, analog and digital modulation, demodulation (both coherent and non-coherent), sampling, analog-to-digital conversion, the discrete Fourier transform, calculating signal-to-noise ratios.</td>
<td>Student work: homework and exams. Instructor handouts and Mathcad files.</td>
</tr>
<tr>
<td>EEL 4516</td>
<td>The following topics are covered: probability and random variables, random processes, performance of analog and digital communication systems in noise (signal-to-noise ratio calculations, bit error rate calculations), matched filters.</td>
<td>Student work: homework and exams. Instructor handouts and Mathcad files.</td>
</tr>
<tr>
<td>EEL4610</td>
<td>The course covers the state-space description of linear time-invariant systems, the relationship between state-space models and input-output models, and state feedback and its advantages.</td>
<td>Student work: homework, exams, and project.</td>
</tr>
<tr>
<td>Course</td>
<td>How does the course support the goal? What do you do to achieve this goal?</td>
<td>Supporting document(s)</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>EEL4657</td>
<td>This course relies on knowledge of signals and systems, Laplace transforms, circuits, operational amplifiers, and electric machines as applied to the analysis and design of control systems.</td>
<td>Instructors handouts and Mathcad files.</td>
</tr>
<tr>
<td>EEL4657L</td>
<td>This course relies on knowledge of signals and systems, circuits, Laplace transforms, operational amplifiers, and electric machines as applied to the analysis and design of control systems.</td>
<td>See course materials.</td>
</tr>
<tr>
<td>EEL4712C</td>
<td>This course requires students to use digital and analog electronics concepts in the design of advanced digital systems using VHDL.</td>
<td>See course materials and student work.</td>
</tr>
<tr>
<td>EEL4713C</td>
<td>Students apply digital design and hardware programming languages in the design and simulation of advanced computer subsystems.</td>
<td>See course materials and student work.</td>
</tr>
<tr>
<td>EEL4744C</td>
<td>Students apply digital and analog electronics concepts as well as computer tools in the design of microprocessor applications and embedded systems</td>
<td>See course materials and student laboratory projects.</td>
</tr>
<tr>
<td>EEL4751</td>
<td>The use of the fast Fourier transform for spectrum analysis of signals is covered. The design and implementation of digital filters is covered.</td>
<td>Student work: homework assignments, laboratory write-ups, and exams.</td>
</tr>
<tr>
<td>EEL4930</td>
<td>Student use concepts from several electrical engineering core course such as controls, electronics, digital design.</td>
<td>See course materials and class projects.</td>
</tr>
<tr>
<td>EEL4931</td>
<td>Seminars involve topics relevant to electrical and computer engineering and assume some knowledge of core topics.</td>
<td>See seminar lists and topics.</td>
</tr>
<tr>
<td>CDA3101</td>
<td>The course emphasizes general architectural principles, with discussions of parallel and pipelined machines, etc. Students apply design criteria in completing assignments related to understanding computer organization, interfacing, etc.</td>
<td>Homework assignments.</td>
</tr>
<tr>
<td>CEN3031</td>
<td>Students are exposed to both the classical and object-oriented paradigms. Classical techniques are discussed to provide students with the necessary knowledge to maintain or reengineer legacy systems in their future careers. Limitations of existing techniques are also discussed. Students are required to use established techniques and tools when developing their team projects.</td>
<td>Final product documentation. Test questions</td>
</tr>
<tr>
<td>CIS3020</td>
<td>Students use modern software tools like Emacs, Grasp, etc.</td>
<td>Homework.</td>
</tr>
<tr>
<td>COP3530</td>
<td>Students use modern software tools like Emacs, Grasp, etc.</td>
<td>Homework.</td>
</tr>
</tbody>
</table>

# 3: An ability to use modern engineering techniques, skills, and tools, including computer-based tools for analysis and design

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3111</td>
<td>Students use Mathcad and Matlab for numerical, symbolic, and graphical analysis. Pspice is used for simulation and analysis of circuit responses.</td>
<td>Student work: homework assignments and exams. Instructor handouts/computer files</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3112</td>
<td>Students use Mathcad for numerical, symbolic, and graphical analysis. In particular, for convolution, transforms and inverse transforms, frequency response plots, and</td>
<td>Student homework assignments. Instructor Mathcad and Schematics</td>
<td>Yes</td>
</tr>
<tr>
<td>Course Code</td>
<td>Description</td>
<td>Tools/Files</td>
<td>Assignments</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td>EEL3135</td>
<td>Students use MATLAB for the analysis of discrete-time linear systems. MATLAB is used for plots of signals, convolution calculations, frequency response plots, pole-zero calculations, and FFT computation.</td>
<td>Matlab files provided by instructor. Student homework assignments</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3303L</td>
<td>Students use the simulation program PSpice to simulate electric circuits and examine their behavior.</td>
<td>Laboratory Manual. Student laboratory notebooks.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3304</td>
<td>Students use SPICE software to analyze electronic circuits and for design verifications including evaluating the worst-case performance.</td>
<td>Students work, design and homework assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3396</td>
<td>Pspice and Mathcad are used to solve problems and demonstrate fundamental concepts</td>
<td>Homeworks and exams</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3472</td>
<td>Mathcad and Pspice are used in problem solving; especially in analyzing transmission line behavior.</td>
<td>Homework and exams</td>
<td></td>
</tr>
<tr>
<td>EEL3473</td>
<td>Mathcad is used to solve problems.</td>
<td>Homework and exams.</td>
<td></td>
</tr>
<tr>
<td>EEL3701C</td>
<td>Students build digital circuits based on TTL technology and learn to program, assemble and simulate microprocessor applications using computer-based tools.</td>
<td>Laboratory assignments and student work</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>Students use Pspice software to verify the design assignments to evaluate the performance of power electronics circuits in terms of power factor, harmonic factor, distortion factor and switching angles for PWM switching.</td>
<td>Students work, design and homework assignments</td>
<td></td>
</tr>
<tr>
<td>EEL4304L</td>
<td>Each student uses PSpice to simulate and analyze electronic circuits for comparing computer-simulated results with those of laboratory measurements.</td>
<td>Students work, design and lab assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4306C</td>
<td>This course makes heavy use of simulations and design tools. Pspice, Mathcad and Matlab are used throughout the course.</td>
<td>Homework, exams and projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4310C</td>
<td>Mathcad and Pspice are used extensively.</td>
<td>Homework, exams and projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4440</td>
<td>Mathcad and Pspice are used.</td>
<td>Homework, exams and projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4514</td>
<td>Students use Mathcad and MATLAB for analysis and simulation of communication systems and components of systems, and for general numerical, symbolic, graphical analysis.</td>
<td>Student homework assignments. Mathcad and MATLAB files provided by instructor.</td>
<td></td>
</tr>
<tr>
<td>EEL4514L</td>
<td>Students use Mathcad and MATLAB for their prelab numerical and graphical analysis, and Schematics/Pspice for simulation and design verification of circuits used in the lab.</td>
<td>Student lab notebooks. Mathcad and Schematics files provided by instructor.</td>
<td></td>
</tr>
<tr>
<td>EEL4516</td>
<td>Students use Mathcad and MATLAB for analysis and simulation of communication systems and components of systems, and for general numerical, symbolic, graphical analysis.</td>
<td>Student homework assignments. Mathcad and MATLAB files provided by instructor.</td>
<td></td>
</tr>
<tr>
<td>EEL4610</td>
<td>Students use MATLAB and Mathcad for general numerical, symbolic, and graphical analysis. The MATLAB Control Toolbox is used extensively for system analysis and for design of state feedback.</td>
<td>Student work: homework, exams, and final project. Instructor supplied files.</td>
<td></td>
</tr>
<tr>
<td>EEL4657</td>
<td>Students use Laplace transform techniques, Matlab, Mathcad, or CC (controls software package) in the analysis and design of control systems.</td>
<td>See lab. Assignments and students lab reports.</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Students use several computer-based tools such as CC, Matlab, Labview with data-acquisition and processing, and a Feedback control training system in the performance of their laboratory experiments.</td>
<td>See lab. Assignments and students lab reports.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>EEL4712C</td>
<td>Students learn about digital design using programmable logic devices (PLD), memory chips, CPLDs, A/D converters, and computer tools like Warp-VHDL compiler and simulation.</td>
<td>See student work and course materials. Yes</td>
<td></td>
</tr>
<tr>
<td>EEL4713C</td>
<td>Students design and simulate computer hardware systems using computer tools and utilizing LSI and VLSI blocks.</td>
<td>See course materials and student work.</td>
<td></td>
</tr>
<tr>
<td>EEL4744C</td>
<td>Students use assemblers and simulators, an HC11 microcontroller board, analog/digital interfaces and a variety of analog and digital electronics components.</td>
<td>See course materials, labs, and student work Yes</td>
<td></td>
</tr>
<tr>
<td>EEL4751</td>
<td>Students use assemblers and simulators, an HC11 microcontroller board, analog/digital interfaces and a variety of analog and digital electronics components.</td>
<td>See course materials, labs, and student work</td>
<td></td>
</tr>
<tr>
<td>EEL4914C</td>
<td>Computer use varies among projects. All students use various combinations of Mathcad, MATLAB, Schematics/PSpice, Logic Works, ASM11, IAS11, CC, and Galaxy</td>
<td>Student design notebooks and final reports. Yes</td>
<td></td>
</tr>
<tr>
<td>EEL4930</td>
<td>Elements of robotics. Students use various computer based tools such as Matlab and the robotics toolbox, the Internet and Internet based tools such as RobotDraw.</td>
<td>See course materials and projects.</td>
<td></td>
</tr>
<tr>
<td>CEN3031</td>
<td>Students are exposed to both the classical and object-oriented paradigms. Classical techniques are discussed to provide students with the necessary knowledge to maintain or reengineer legacy systems in their future careers. Limitations of existing techniques are also discussed. Students are required to use established techniques and tools when developing their team projects.</td>
<td>Final product documentation. Test questions. Yes</td>
<td></td>
</tr>
<tr>
<td>CIS3020</td>
<td>Students use modern software tools like Emacs, Grasp, etc.</td>
<td>Homework. Yes</td>
<td></td>
</tr>
<tr>
<td>COP3530</td>
<td>Students use modern software tools like Emacs, Grasp, etc.</td>
<td>Homework. Yes</td>
<td></td>
</tr>
<tr>
<td>COP4710</td>
<td>In terms of learning how to plan-while designing ER diagrams.</td>
<td>Student assignments.</td>
<td></td>
</tr>
</tbody>
</table>

# 4: An ability to apply knowledge of mathematics, science, and engineering to the analysis of electrical engineering problems

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3111</td>
<td>Students apply differential and integral calculus, linear algebra, complex variables, and physics to the analysis of problems in linear circuits.</td>
<td>Student work: homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3112</td>
<td>Students apply differential and integral calculus, differential equations, linear algebra, complex variables, basic physics, and circuit theory to the analysis of problems in linear systems and circuits.</td>
<td>Student homework assignments and exams. Instructor Mathcad and Schematics files.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3135</td>
<td>Students learn signal and system theory and use it to analyze discrete-time signals and systems.</td>
<td>Student work: homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3211</td>
<td>Students use circuit theory and understanding of electric and magnetic fields to develop steady state models for electric machines. The models are used to predict device behavior under different operating conditions.</td>
<td>Student work: homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Description</td>
<td>Required Materials</td>
<td>Prerequisite</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>EEL3303L</td>
<td>Students use circuit theory to analyze electric circuits. They also construct the circuits in the lab, make measurements on the circuits, and compare the measurements with theoretical predictions.</td>
<td>Laboratory manual. Student laboratory notebooks.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3304</td>
<td>Applications of mathematical techniques and basic circuit concepts for analysis and design of electronics circuits. Applications of physical sciences for understanding the characteristic and modeling of semiconductor semi-conductor devices.</td>
<td>Students work, design and homework assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3396</td>
<td>Problem solving is an integral part of this course. More basic science is presented in this course than any in the curriculum.</td>
<td>Homework and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3472</td>
<td>Students must use all their skills to solve electromagnetic problems.</td>
<td>Homework and exams.</td>
<td></td>
</tr>
<tr>
<td>EEL3473</td>
<td>Students must use all their skills to solve electromagnetic problems.</td>
<td>Homework and exams.</td>
<td></td>
</tr>
<tr>
<td>EEL3701C</td>
<td>Student apply Boolean algebra techniques in the analysis of various digital circuits and applications</td>
<td>See student work and course materials</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>This course develops student ability to apply knowledge of calculus and differential equations for the analysis and design of power electronics circuits.</td>
<td>Students work, exams design and homework assignments.</td>
<td></td>
</tr>
<tr>
<td>EEL4304L</td>
<td>The course applies basic circuit analytical techniques and mathematical skills to analyze and design electronic circuits. Students are required to design, build and test at least five (5) electronics analog circuits.</td>
<td>Students work, exams design and lab assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4914C</td>
<td>Every project involves, in various combinations, the application of mathematics, science, and engineering science to the analysis of engineering problems.</td>
<td>Student design notebooks and final reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>CDA3101</td>
<td>The course emphasizes general architectural principles, with discussions of parallel and pipelined machines, etc. Students apply design criteria in completing assignments related to understanding computer organization, interfacing, etc.</td>
<td>Homework assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>CEN3031</td>
<td>Students are encouraged to participate in class discussions. The fact that software engineering includes mathematics, computer science, psychology, economics, and management aspects is emphasized from the beginning. Students are expected to analyze problems and to construct solutions based on their knowledge from all the components of SE. The planning phase of the software life cycle includes metrics for cost and size estimation.</td>
<td>Test questions.</td>
<td>Yes</td>
</tr>
<tr>
<td>CIS3020</td>
<td>Students implement programs involving concepts from elementary number theory, sequences, progressions, etc</td>
<td>Homework exercises. Exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP3530</td>
<td>Students implement programs involving concepts from data compression, machine learning, etc.</td>
<td>Homework exercises. Exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>COT3100</td>
<td>Students study a broad range of topics involving discrete mathematics and apply this knowledge to simple circuit design problems and the construction of an analysis of simple algorithms and computationally useful mathematical structures.</td>
<td>Homework, exams, and Programs.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4710</td>
<td>Some concepts of relational algebra and functional dependencies are covered.</td>
<td>Student assignments.</td>
<td></td>
</tr>
<tr>
<td>COT4400</td>
<td>Students learn mathematical techniques for analyzing the resource requirements and correctness of programs on digital computers. Mathematical structures are used in specifying the algorithms involved.</td>
<td>Students’ homework and exams on this material.</td>
<td></td>
</tr>
</tbody>
</table>
# 5: An ability to design and conduct scientific and engineering experiments, as well as to analyze and interpret data

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3303L</td>
<td>Students conduct experiments on DC, AC, and op-amp based circuits. They present data in tabular and graphical formats. They are required to analyze data and draw conclusions from it.</td>
<td>Student laboratory notebooks.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3304</td>
<td>The analysis and design of electronics circuits are emphasized. Students are required to design five (5) design projects to meet certain specifications including worst-case analysis.</td>
<td>Student design assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>Students are required to design two (2) design projects to meet certain specifications including worst-case analysis.</td>
<td>Student design assignments.</td>
<td></td>
</tr>
<tr>
<td>EEL4304L</td>
<td>Students must measure device behavior in order to obtain device parameters.</td>
<td>Lab notebooks.</td>
<td></td>
</tr>
<tr>
<td>EEL4310C</td>
<td>Students must interpret measurement results in order to calculate low level device characteristics.</td>
<td>Lab notebooks and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4514L</td>
<td>Students conduct experiments in analog and digital communication systems. They present data in tabular and graphical formats, and they are required to analyze the data and draw conclusions from it.</td>
<td>Student laboratory notebooks.</td>
<td></td>
</tr>
<tr>
<td>EEL4751</td>
<td>Students do lab experiments that investigate the use of a DSP processor for real-time time processing of signals. They gather, analyze, and interpret data.</td>
<td>Laboratory experiment sheets. Student lab write-ups</td>
<td></td>
</tr>
<tr>
<td>EEL4914C</td>
<td>Varies among projects. All projects involve some amount of presentation and analysis of laboratory data.</td>
<td>Student notebooks and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>CEN3031</td>
<td>Students construct test cases and analyze the results from executing the code.</td>
<td>Test cases and results.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP3530</td>
<td>Students have to design data sets exercising the programs they write.</td>
<td>Homework assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4710</td>
<td>Yes, the SQL query language is used and experimentation is encouraged.</td>
<td>Student work and assignments.</td>
<td></td>
</tr>
</tbody>
</table>

# 6: Knowledge of probability and statistics, including electrical or computer engineering applications

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3396</td>
<td>Students must demonstrate an ability to use Fermi-Dirac statistics in order to determine carrier densities.</td>
<td>Homework and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4516</td>
<td>Basics of probability, random variables, random processes, and hypothesis testing are applied to the analysis and design of communication systems in the presence of noise.</td>
<td>Student homework and exams. Instructor supplied Mathcad and MATLAB files.</td>
<td></td>
</tr>
<tr>
<td>EEL4931</td>
<td>Students are given an introduction to the techniques of hypothesis testing, parameter estimation, and regression analysis. Emphasis is placed on the use of the statistical functions available in Mathcad for analysis of actual data sets.</td>
<td>Student homework.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4710</td>
<td>Used lightly.</td>
<td>Student assignments.</td>
<td></td>
</tr>
<tr>
<td>COT4400</td>
<td>Students learn how to analyze the average resource</td>
<td>Students’ homework and</td>
<td></td>
</tr>
</tbody>
</table>

Appendix III - 9
requirements of an algorithm, which entails the use of
probability. exams on this material.

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Req'd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STA4321</td>
<td>The probability theory with emphasis on distribution theory and statistical methods. The techniques of reliability theory are also covered. Statistical methods are provided for reliability data also.</td>
<td>Students’ homework and exams on this material.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

# 7: An ability to identify, formulate, and solve novel electrical or computer engineering problems including planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Req'd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3304</td>
<td>The electronic design projects are required to meet certain specifications including worst-case analysis and costs.</td>
<td>Student design assignments and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3701C</td>
<td>Students are required to design digital systems to solve applicable engineering problems.</td>
<td>See student work.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>The power electronic design projects are required to meet certain specifications including worst-case analysis and costs.</td>
<td>Student design assignments and reports.</td>
<td></td>
</tr>
<tr>
<td>EEL4304L</td>
<td>Students are required to design, build and test analog electronic circuits to meet certain specifications.</td>
<td>Student design lab assignments and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4306C</td>
<td>This is a project-oriented course with many opportunities to demonstrate design abilities.</td>
<td>Projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4310C</td>
<td>Students are required to demonstrate an understanding of device design criteria.</td>
<td>Homework and exams.</td>
<td></td>
</tr>
<tr>
<td>EEL4440</td>
<td>Students must design optical communications systems with emphasis on minimum cost and acceptable performance.</td>
<td>Homework, exams and projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4514</td>
<td>Several homework problems involve the formulation and solution of communication engineering problems, including the specification and design of systems and components to meet performance criteria. The students also do a small design project of a communication system component during the course.</td>
<td>Student homework and project reports. Instructor supplied Mathcad and MATLAB files.</td>
<td></td>
</tr>
<tr>
<td>EEL4516</td>
<td>Several homework problems involve the formulation and solution of communication engineering problems, including the specification and design of systems and components to meet performance criteria.</td>
<td>Student homework.</td>
<td></td>
</tr>
<tr>
<td>EEL4610</td>
<td>Several homework problems involve the formulation and solution of control engineering problems, including the specification and design of systems and components to meet performance criteria. The students also do a design/simulation project of a feedback control system.</td>
<td>Student homework and project reports. Instructor supplied Mathcad and MATLAB files.</td>
<td></td>
</tr>
<tr>
<td>EEL4657</td>
<td>Student are required to design control systems to meet or exceed a given set of specs.</td>
<td>See student work.</td>
<td></td>
</tr>
<tr>
<td>EEL4712C</td>
<td>Students are required to design digital systems to solve applicable engineering problems.</td>
<td>See student work.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4713C</td>
<td>Students are required to design digital systems to solve applicable engineering problems.</td>
<td>See student work.</td>
<td></td>
</tr>
<tr>
<td>EEL4744C</td>
<td>Students are required to design and implement microprocessor-based solutions to solve engineering problems.</td>
<td>See student work.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4930</td>
<td>Robotics: Student design and build and demonstrate a robotic</td>
<td>See student work.</td>
<td></td>
</tr>
<tr>
<td>Device to satisfy a set of external specifications with cost, quality, and safety requirements included</td>
<td>Homework assignments.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------------------------</td>
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<td></td>
</tr>
<tr>
<td>CDA3101 Students learn how to weigh considerations for alternative computer organization designs (e.g., cheapest versus fastest versus “best” design).</td>
<td>Prototype or preliminary user’s manual, specification documents, design documents, and test cases. Demonstration of the product.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CEN3031 Students develop a product from specification to implementation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS3020 Students implement moderate sized programs (200-300 lines) to meet a given specification</td>
<td>Homework exercises.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>COP3530 Students implement several moderate sized programs (200-300 lines) to meet a given specification</td>
<td>Homework exercises.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>COP4600 Students demonstrate an ability to design a system, component, or process to meet desired needs through programming projects. Commencing Spring 2000, students will be required to complete programming exercises that will require the creation of multi-threaded software, the creation and manipulation of kernel objects, and the handling of interprocess communication in a modern operating system (e.g. Windows NT/2000, UNIX, etc.).</td>
<td>Students programming assignments and examinations.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>COP4710 Yes, entity relationship models are thoroughly investigated.</td>
<td>Student tests and assignments.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# 8: An ability to function on multi-disciplinary teams, where possible

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3304</td>
<td>Students are encouraged to work on design projects in a team of 2 persons.</td>
<td>Students assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>Students are encouraged to work on design projects in a team of 2 persons.</td>
<td>Students assessment.</td>
<td></td>
</tr>
<tr>
<td>EEL4304L</td>
<td>Students work on the lab in a team of 2 persons.</td>
<td>Student assessment and lab reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4914C</td>
<td>Students are encouraged, but not required, to work in teams on their design projects.</td>
<td>Student design notebooks and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4930</td>
<td>Robotics: Students are required to work in teams with students of various electrical engineering training to build a robotic device as a project.</td>
<td>Students’ projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4949</td>
<td>Students often work on a team-oriented project(s).</td>
<td>Co-op employer evaluation and students co-op reports.</td>
<td></td>
</tr>
</tbody>
</table>
CEN3031  Students are assigned to teams based on their previous work experience, personality type, and communication skills. An effort is made to construct teams such that each team includes a mix of personality types and experience levels. Students are required to evaluate the performance and participation of each team member with respect to assigned tasks and all group activities as determined by the team. Evaluations are conducted at the end of each major deliverable and upon completion of the product.

### # 9: An understanding of professional and ethical responsibility

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3304</td>
<td>The professional and ethical issues are discussed during the classes in relation to design project.</td>
<td>Course assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>The professional and ethical issues are discussed during the classes in relation to design project.</td>
<td>Course assessment.</td>
<td></td>
</tr>
<tr>
<td>EEL4306C</td>
<td>Team projects force students to realize their responsibility to peers.</td>
<td>Projects.</td>
<td></td>
</tr>
<tr>
<td>EEL4914C</td>
<td>During the design process and in the final written report students are asked to consider the safety aspects and the possible impact on society of their designs.</td>
<td>Student design notebooks and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4931</td>
<td>The seminars on ethics, professional safety, and design are conducted by professional industry representatives. Students are also encouraged to give presentations on these topics.</td>
<td>See course materials.</td>
<td>Yes</td>
</tr>
<tr>
<td>CDA3101</td>
<td>Assignments emphasize the importance of professionalism and ethics in designing programming specifications.</td>
<td>Programming specifications.</td>
<td>Yes</td>
</tr>
<tr>
<td>CEN3031</td>
<td>Professional and ethical responsibilities are integrated into the lectures.</td>
<td>Test questions.</td>
<td>Yes</td>
</tr>
<tr>
<td>CIS3020</td>
<td>Students are allowed to collaborate but proper acknowledgment of any external assistance is stressed.</td>
<td>Syllabus. Classroom discussions.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP3530</td>
<td>Students are allowed to collaborate but proper acknowledgment of any external assistance is stressed.</td>
<td>Syllabus. Classroom discussions.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4600</td>
<td>Professional and ethical responsibility are covered throughout the course, but particularly in the sections discussing the security and protection of operating systems.</td>
<td>Examinations include questions on security and protection.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### # 10: An ability to communicate effectively in writing and to convey technical material through oral presentation and interaction with an audience

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3304</td>
<td>Students write formal design reports.</td>
<td>Design reports and course assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3701C</td>
<td>Students give oral and written project reports.</td>
<td>Project reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>Students make oral presentation to the class and write formal design reports.</td>
<td>Design reports and course assessment.</td>
<td></td>
</tr>
<tr>
<td>EEL4304L</td>
<td>Students write formal lab reports.</td>
<td>Lab reports and course assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4306C</td>
<td>Students write project reports and give oral presentations.</td>
<td>Project reports.</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>How does the course support the goal? What do you do to achieve this goal?</td>
<td>Supporting document(s)</td>
<td>Reqd.</td>
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<tr>
<td>----------</td>
<td>---------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>EEL4440</td>
<td>Students give oral and written project reports.</td>
<td>Project reports.</td>
<td></td>
</tr>
<tr>
<td>EEL4514L</td>
<td>A formal written report on one of the laboratory experiments must be submitted.</td>
<td>Student reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4657</td>
<td>Students are required to maintain a laboratory notebook or submit written reports on lab experiments.</td>
<td>Lab reports.</td>
<td></td>
</tr>
<tr>
<td>EEL4657L</td>
<td>Students are required to maintain a laboratory notebook or submit written reports on lab experiments.</td>
<td>Lab reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4712C</td>
<td>Students are required to maintain a laboratory notebook or submit written reports on lab experiments.</td>
<td>Lab reports.</td>
<td></td>
</tr>
<tr>
<td>EEL4713C</td>
<td>Students are required to maintain a laboratory notebook or submit written reports on lab experiments.</td>
<td>Lab reports.</td>
<td></td>
</tr>
<tr>
<td>EEL4744C</td>
<td>Students are required to maintain a laboratory notebook or submit written reports on lab experiments.</td>
<td>Lab reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4914C</td>
<td>During the course of their design projects students submit a written project proposal, make two oral design review presentations, and submit a final written project report.</td>
<td>Student proposals, design notebooks, and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4949</td>
<td>Students submit one written report.</td>
<td>Student co-op report.</td>
<td></td>
</tr>
<tr>
<td>CDA3101</td>
<td>Students complete a research paper related to the course objectives.</td>
<td>Research paper.</td>
<td>Yes</td>
</tr>
<tr>
<td>CEN3031</td>
<td>Each student is required to participate in all phases of software development. Technical writing skills are emphasized by requiring students to produce documentation for each of the major phases of the software life cycle model from requirements to implementation. Students are encouraged to voice their opinions in class discussions. In addition, formal presentations of the product are conducted at the end of the semester.</td>
<td>Final documentation for the product.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4710</td>
<td>Yes, in terms of handing in assignments clearly laid out.</td>
<td>Homework assignments.</td>
<td></td>
</tr>
<tr>
<td>ENC3240</td>
<td>Develop skills to clearly and effectively communicate technically oriented material to a variety of audiences, both high-tech and low-tech.</td>
<td>Student homework.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

# 11: The broad education and knowledge of contemporary issues necessary to understand the impact of electrical or computer engineering solutions in a global and societal context

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3304</td>
<td>The issues on the impact of analog electronic circuit designs are discussed during the classes.</td>
<td>Course assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4230</td>
<td>The issues on the impact of power electronic circuit designs are discussed during the classes.</td>
<td>Homework assignments.</td>
<td></td>
</tr>
<tr>
<td>EEL4914C</td>
<td>Every project involves, to some degree, the consideration of the societal impact of the design.</td>
<td>Student design notebooks and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4931</td>
<td>Seminars cover topics on professional safety and regulations, ethics, and other topics relevant to the modern engineering profession.</td>
<td>See seminar topics.</td>
<td>Yes</td>
</tr>
<tr>
<td>CIS3020</td>
<td>Classroom discussions of the importance of proper software design.</td>
<td>Discussion of alternative designs in the report associated with home works.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### # 12: A recognition of the need for, and an ability to engage in life-long learning

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Req'd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3304</td>
<td>The importance of the need for and ability to engage in life-long learning are discussed during the classes.</td>
<td>Course assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3701C</td>
<td>Students are required to seek information on parts and systems and learn computer tools on their own.</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4304L</td>
<td>Students are forced to understand that they must be able to obtain information on their own and be able to learn about new ideas.</td>
<td>Lab notebooks.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4440</td>
<td>Students are given topics in optical communications which they must research and discuss.</td>
<td>Reports</td>
<td></td>
</tr>
<tr>
<td>EEL4712C</td>
<td>Students are required to seek information on parts and systems and learn computer tools on their own.</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4713C</td>
<td>Students are required to seek information on parts and systems and learn computer tools on their own.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEL4744C</td>
<td>Students are required to seek information on parts and systems and learn computer tools on their own.</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4914C</td>
<td>In proposing and conducting their design projects, students discover that their coursework provides a solid foundation but it does not provide all of the technical knowledge they need; they must learn about new devices and components, software, simulation tools, etc.</td>
<td>Student design notebooks and reports.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4930</td>
<td>Students are required to seek information on parts and systems and learn computer tools on their own.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDA3101</td>
<td>The course emphasizes the past, current, and future evolution of computing machinery.</td>
<td>Course overheads.</td>
<td>Yes</td>
</tr>
<tr>
<td>CEN3031</td>
<td>The importance of life-long learning is emphasized at the beginning of the course. New technologies and techniques are integrated into the lecture.</td>
<td>Test questions.</td>
<td>Yes</td>
</tr>
<tr>
<td>CIS3020</td>
<td>Discussion of limitations of homework assignments and possible enhancements.</td>
<td>Homework assignments. Reports. Classroom discussions</td>
<td>Yes</td>
</tr>
<tr>
<td>COP3530</td>
<td>Discussion of limitations of homework assignments and possible enhancements.</td>
<td>Homework assignment Reports. Classroom discussions</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4600</td>
<td>Students are introduced to the requirement to engage in life-long learning through the study of the nature in which operating systems continue to change in order to attempt to satisfy current requirements in science and business.</td>
<td>Examination questions cover the evolutionary nature of operating systems and focus on requirements to solve current problems with future operating system software.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
COP4710  Yes, as students are aware of versions of Oracle, evolution of ER-models and general computing advances.  Student assignments.

# 13: Knowledge of discrete mathematics

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL3701</td>
<td>Student apply Boolean algebra techniques in the analysis of various digital circuits and applications</td>
<td>Student work, homework assignments and exams.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL3701L</td>
<td>Students build digital circuits based on TTL technology and learn to program, assemble and simulate microprocessor applications using computer-based tools.</td>
<td>Student work, homework Lab assignments</td>
<td>Yes</td>
</tr>
<tr>
<td>COP3530</td>
<td>Students are introduced to the concepts of algorithm analysis.</td>
<td>Exams. Assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>COT3100</td>
<td>This class increases the students' knowledge of discrete math through both learning mathematical concepts of basic theoretical computer science and applying these concepts to the analysis and construction of both simple algorithms and simple circuits.</td>
<td>Students' homework and exams on this material. Also, students' programming assignments.</td>
<td>Yes</td>
</tr>
<tr>
<td>COP4710</td>
<td>Yes, insofar as set theory is used.</td>
<td>Student assignments.</td>
<td></td>
</tr>
<tr>
<td>COT4400</td>
<td>Students learn the theory of recurrence equations in order to analyze recursive algorithms. Estimating the number of possible inputs to an algorithm requires the use of combinatorics. Combinatorial properties of trees and graphs are covered in order to study correctness and structural properties of searching and sorting algorithms.</td>
<td>Students' homework and exams on this material.</td>
<td></td>
</tr>
</tbody>
</table>

# 14: Knowledge of the fundamental theory and practice of computer science and electrical engineering, as it applies to computer hardware and software, and the understanding of the interaction between hardware and software

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEL 4744</td>
<td>Students will learn, for example, how each HC11 instruction executes and what the different hardware elements necessary for its execution are.</td>
<td>Students' homework and exams on this material.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL4744L</td>
<td>In one of the lab experiments, students observe and analyze the content of the data and address buses and relate that information to the instructions being executed.</td>
<td>Student work, homework Lab assignments</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL 4713</td>
<td>The design of a RISC instruction set architecture (MIPS architecture) is covered in details. Efficiency issues and design compromises are addressed. Students learn that a decision on what type of instructions to include in the instruction set will influence the complexity of the hardware.</td>
<td>Students' homework and exams on this material.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL 4713L</td>
<td>Students will design a simple processor from scratch and implement/simulate it using VHDL.</td>
<td>Student work, homework Lab assignments</td>
<td>Yes</td>
</tr>
</tbody>
</table>

# 15: Understanding of all the elements required to design a complete computer system (hardware and software)

<table>
<thead>
<tr>
<th>Course</th>
<th>How does the course support the goal? What do you do to achieve this goal?</th>
<th>Supporting document(s)</th>
<th>Reqd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code</td>
<td>Course Description</td>
<td>Assessment</td>
<td>Requirement</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------</td>
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<td>-------------</td>
</tr>
<tr>
<td>EEL 4744</td>
<td>Students learn, for example, the different addressing modes used by a particular microprocessor and the hardware needed to support those addressing modes. Students also learn about the different components and capabilities of the HC11 and the necessary hardware to support those capabilities.</td>
<td>Students' homework and exams on this material.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL 4744L</td>
<td>Lab experiments are designed to use the different component/capabilities of the HC11. Students, for example, learn about the capabilities and limitations of the different timing functions and peripheral interfaces of the HC11. They also learn about how each function/component is implemented in hardware.</td>
<td>Student work, homework Lab assignments</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL 4713</td>
<td>Students learn about the major components of a computer. Each component (ALU, memory hierarchy, etc.) is studied in details. Ways to improve the performance of each component are studied. The influence of the instruction set on the hardware design is also studied.</td>
<td>Students' homework and exams on this material.</td>
<td>Yes</td>
</tr>
<tr>
<td>EEL 4713L</td>
<td>Some lab experiments have students design/simulate components of a CPU in VHDL. Other lab experiments require the students to design/simulate simple processors in VHDL and analyze how instructions are executed.</td>
<td>Student work, homework Lab assignments</td>
<td>Yes</td>
</tr>
</tbody>
</table>
APPENDIX IV

STUDENT ADVISEMENT

A. Degree Progress for Computer Engineering IV-2
B. SASS Audit for Computer Engineering IV-4
C. Sample of Course Equivalency Certification IV-7
A. DEGREE PROGRESS FOR COMPUTER ENGINEERING

UF/UWF Joint Program/Bachelor of Science in Computer Engineering

<table>
<thead>
<tr>
<th>Required Course</th>
<th>Cr</th>
<th>Course Taken</th>
<th>Cr</th>
<th>Semester</th>
<th>Gr</th>
<th>HP</th>
<th>Required Course</th>
<th>Cr</th>
<th>Course Taken</th>
<th>Cr</th>
<th>Semester</th>
<th>Gr</th>
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<td>3</td>
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<td>REL 2300</td>
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<td>EEL 3135</td>
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** A separate course or can be included in other CS or EEL courses. 1. Approved ECE Technical Electives: Any 3000 level or above EEL course, except EEL 3003
2. Approved CS Technical Electives. See the Joint Program for the list of approved Computer Science courses.

Certification: I certify that this student has met, or will meet requirements for the degree indicated subject to the following conditions:

______________________________
Signature of Program Director

DATE

IV - 2
### UFWJF Joint Program/Bachelor of Science in Computer Engineering
126 credits Required/Curriculum for Fall 2004 to Present

<table>
<thead>
<tr>
<th>Student Name: Michael Money</th>
<th>Student Number: 22A 69 7488</th>
<th>Catalog Year: 2004</th>
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**Notes:**
- GPA is calculated for all courses attempted, not just these courses.
- Total credits of all courses attempted must be 126 or more to graduate.

---

**Admission to the program Conditions:**
- GPA is required for admission.

**Pre-grad certification:**
- GPA is required for graduation.

**Graduation Certification:**
- GPA is required for graduation.

---

**Total Transferred:** 0
B. UNIVERSITY STUDENT ACADEMIC SUPPORT SYSTEM (SASS) AUDIT FOR COMPUTER ENGINEERING

UNIVERSITY OF WEST FLORIDA
UNIVERSITY OF FLORIDA
DEGREE PROGRAM: CS:CE
EXPECTED GRADUATION: 09/22/2013

LAST UPDATE ON 03/27/2002

OK 5 SEMESTER FIVE
1) EGM3012 ENGINEERING MECHANICS
   **AND** EGM3401 OR EGM3402 ENG MECHANICS - DYNAMICS
   9908 EGM3012 4.00 A
2) EEL3111/EEL3203L CIRCUITS I/LAB
   9905 EEL3111 3.00 C  9895 EEL3203L 1.00 B
3) CDA101 INTRODUCTION TO COMPUTER ORGANIZATION
   9908 CDA101 3.00 A
4) MAS3105 LINEAR ALGEBRA
   9808 MAS3105 3.00 A
5) STA4321 INTRODUCTION TO MATHEMATICAL STATISTICS I
   9908 STA4321 3.00 C

OK 6 SEMESTER SIX
1) EEL3112 CIRCUITS II
   9901 EEL3112 3.00 C
2) COP3530 DATA STRUCTURES & ALGORITHMS
   9901 COP3530 3.00 A
3) EGN4034 PROFESSIONAL ISSUES
   (MAS CSH4034 - SAME TITLE BEFORE FALL 2000)
   9908 EGN4034 1.00 A
4) EEL3112 ANALYTIC GEOMETRY & CALCULUS II [GR:N/MATH]
   9908 EEL3112 4.00 A
5) PHY2013 GENERAL PHYSICS I/LAB [GR:PHYS/LAB]
   9908 PHY2013 4.00 A

OK 7 SEMESTER SEVEN
1) EEL4304/EEL4304L ELECTRONIC CIRCUITS I/LAB
   9901 EEL4304 3.00 B+  9901 EEL4304L 1.00 A
2) EEL3202 DIGITAL LOGIC & COMPUTER SYSTEMS
   9908 EEL3202 4.00 B
3) EEL4944C ELECTRICAL ENGINEERING DESIGN
   9906 EEL4944C 3.00 C

OK 8 SEMESTER EIGHT
1) COP4000 OPERATING SYSTEMS
   9901 COP4000 3.00 B
2) EEL4712C DIGITAL DESIGN

CONTINUED ON NEXT PAGE

WARNING
PROHIBITED
TRANSMITTAL TO
A THIRD PARTY

REPORT PRODUCED FOR:
<table>
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<tr>
<th>COURSE</th>
<th>HOURS</th>
<th>GRADE</th>
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<td>CED3031 INTRODUCTION TO SOFTWARE ENGINEERING</td>
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### Computer Engineering GPA

- **Minimum GPA Required**: 2.40
- **Earned GPA**
  - 46.00

### General Studies

- **Minimum GPA Required**: 2.00
- **Earned GPA**
  - 87.10

### Mathematics

- **Subject Test Score**
  - 6590
- **English Language Test (CLEP)**
  - 9805
- **Math (Math)**
  - 9815
- **Greek Exam**
  - 9805

### Gordon Req - 32 Writing HRS Req

- **Earned**: 12.00
- **GPA**: 2.666

### Gordon Req - 2 Theor. Math & 2 Appl. Math Hrs Req

- **Grade of C- OR Better is Required in Each Course**
  - 9701
  - 4.00
- **Earned**: 3.650

### General Studies - Mathematics Option 2 - 6 SEM HRS

- **Earned**: 8.00
- **GPA**: 3.626

### University Credit Hour Requirements

- **Includes Credit for Current Semester Enrollment**
  - **Earned**: 16.00
- **GPA**: 3.008
- **126 SEM HRS TOTAL**
  - **Earned**: 168.00
- **GPA**: 3.008
- **48 SEM HRS of Upper Level Courses**
  - **Earned**: 81.00
- **GPA**: 2.753

---

**Continued on Next Column**
30 SEM HRS IN RESIDENCY AT UF
(64.00 HOURS TAKEN) 31 COURSES TAKEN 2.788 GPA

4) *** GPA DOES NOT INCLUDE COURSES TAKEN WHILE IN A ***
********** NON DEGREE STUDENT STATUS **********
* THREE COURSES WILL BE INCLUDED IN GRADUATION REVIEW *

OF 21 9 SUMMER HRS -- CHECK WITH ADMISSIONS FOR APPLICABILITY
SM EARNED: 9.00 HOURS 2.472 GPA

TOTAL HOURS USED TOWARD DEGREE PROGRAM

END OF ANALYSIS

FLORIDA C.C. CREDIT APPLIED TOWARDS DEGREE PROGRAM

OTHER COURSES

EARNED: 41.00
ATT HRS: 44.00

9108 ENC1119 WRITING SK L 1.00 B+J
9108 LIN1070 TRAD ENG GPA 3.00 B J
9108 MTX1041 COLLEGE MATH 3.00 A J
9201 HSP1081 CONC LIFE F1 3.00 C J
9201 ISC1591 MED TERMINOL 3.00 A J
9206 CSS1030 INTRO COMPUT 1.00 B+J
9306 L161001 USE OF LINK 1.00 A J
9308 MATH221 MANAGEMENT 3.00 B+J
9701 ENGR1481 ENGR I / COMP 0.00 A-N
9708 SAC3113 ANAL GEO CAL 4.00 B+J
9708 PHY1048L PHYS I LAB W 1.00 B+J
9801 COP2220 C PROGRAMMV 3.00 A J
9801 PHY1049L PHYS II LAB 1/C 1.00 B+J
9805 ENGR9998 CLAST E 0.00 A
9805 MAP2403 MATH METHODS 3.00 B
9905 MTH2089 MATL 1 0.00 C
9805 MTH2098 CLAST REG 0.00 A
9905 WRT2005 CLAST WR 0.00 A
9901 BSHL211 BSHL ENGR 3.00 C+
0001 EEL2472 ELECTRO MAG 3.00 C+
0101 COR2253 JAVA PROGRAM 3.00 A

CMN1045 WAS TRANSFERRED AS CMN2045

WAS WAIVED

THIS REPORT IS TO ASSIST THE STUDENT IN COURSE PLANNING.
FINAL CONFIRMATION OF DEGREE REQUIREMENTS IS SUBJECT TO
APPROVAL BY THE DEAN OF A COLLEGE. IT IS THE RESPONSIBILITY
OF THE STUDENT TO MEET GRADUATION REQUIREMENTS.

CONTINUED ON NEXT COLUMN
C. SAMPLE OF COURSE EQUIVALENCY CERTIFICATION

MEMORANDUM:

TO: Chair, Department of ECE

FROM: Dr. Muhammad H. Rashid
Professor and Director

Date: 12-6-04

Please arrange to evaluate the equivalency of the following course(s) by the faculty members responsible for the respective course.

1. EEL 3111

2. ____________________________

3. ____________________________

4. ____________________________

Please return the completed Course Equivalency form to ECE Department, Bldg. 70/116 by: 12-20-04

Thank you.
COURSE EQUIVALENCY CERTIFICATION

Credit may be given for courses transferred from other universities provided that they are shown to be equivalent, and the University of Florida has accepted the credits. Documentation required for review are the catalog, course syllabus, and text used from the university where the course was taken. **You must check with the department for approval or denied before registering for the next level course(s).**

Name ____________________________ SSN ____________________________
Signature: ________________________ Date: 11-18-04

REQUIRED COURSE AT UF:

Course No. EEL 3111 LAB  Course Title Circuits 1 W/LAB  Semester Cr. 4

REQUESTED SUBSTITUTION:

Course No. ETR 116  Course Title DC & AC FUNDAMENTALS  Semester Cr. 4
or Quarter Cr. __________

University Where Course Was Taken TIDEWATER COMMUNITY COLLEGE

Term Course Taken  FALL 2002  Grade Received  B

I recommend this request be approved/ X denied.

Comments MATH REQUIREMENTS ARE NOT COMPARABLE TO OUR PREREQUISITES PER UF/UWF REQUIREMENTS /CATALOGUE

Date 1-1-04  Date 11-18-04
Signature of UWF/UF Faculty  Print Signature  Date

Approved/ X Denied

Signature of UWF/UF Program Director

Date

11/13/02  Equal Opportunity / Affirmative Action Employer

Date Student Informed

12-6-04
# APPENDIX V – ENGINEERING ADVISORY COUNCIL

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
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<td>A. Significant Constituencies</td>
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<td>B. Purpose and Functions</td>
<td>V-3</td>
</tr>
<tr>
<td>C. Membership and Subcommittees</td>
<td>V-4</td>
</tr>
<tr>
<td>D. Letter from Mr. Dell, Chair of EAC Sub-Committee</td>
<td>V-13</td>
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<tr>
<td>E. Letter from Mr. Knut R Bergan, President of Ian-Conrad Bergan, Inc.</td>
<td>V-15</td>
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<tr>
<td>F. Minutes of the Engineering Advisory Council (EAC) Meetings</td>
<td>V-16</td>
</tr>
<tr>
<td>G. Curriculum Feedback Comments of Engineering Advisory Council (EAC)</td>
<td>V-34</td>
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</table>
A. Significant Constituencies

THE UNIVERSITY OF WEST FLORIDA
ELECTRICAL AND COMPUTER ENGINEERING

The UWF-ECE faculty has identified a number of stakeholders of the UF/UWF Joint Program.

Significant Constituencies*

- Students*
- Employers*
- Alumni*
- Co-op Employers*
- Graduate Schools
- Engineering Advisory Council*
- Faculty*
- UWF Administration*

* These constituencies provide direct input and feedback to the programs

March 16, 1999
B. Purpose and Functions

UNIVERSITY OF WEST FLORIDA
ENGINEERING ADVISORY COUNCIL

April 9, 1999

Purpose

The purpose of the Engineering Advisory Council (EAC) is to advise, assist, and support the College of Arts and Sciences (CAS) in all matters related to its engineering programs and to serve as an advocate for engineering education and research in the region of Northwest Florida.

Functions

- Advise on community needs for engineering education and research.
- Advise on community needs for education and research in other engineering disciplines.
- Assist in strategic planning and identify opportunities for the development of engineering programs of excellence.
- Advise on various matters that are of strategic importance to the development of engineering education, research and service.
- Assist and support as desired and appropriate fund raising for scholarships, equipment, program development and improvement, new program start-up costs, faculty development activities and program/course offering
- Make suggestions commensurate with needed changes.
- Inform the college of industry trends, new technology, expectations of graduates and other appropriate matters.
- Represent the interest of industry and the engineering community in the process of facilitating engineering education, research and service.
- Make suggestions commensurate with needed changes.
- Inform the college of industry trends, new technology, expectations of graduates and other appropriate matters.
- Represent the interest of industry and the engineering community in the process of facilitating engineering education, research and service.
C. Membership and Subcommittees

The University Of West Florida
College of Arts and Sciences
Engineering Advisory Council (EAC)

Martha Blodgett, Director
Univ. Division of Development
B-12, 11000 University Pkwy
Pensacola, Florida 32514
850-474-3306
mblodget@uwf.edu

Mr. Bill Board, Subcommittee Chair
4525 Soundside Drive
Gulf Breeze, Florida 32561-9273
850-932-6942
Wmargebill9@cs.com

Mr. Fred Bond, Subcommittee Chair
Schmidt Dell Associates, Inc.
139 East Government Street
Pensacola, Florida 32501
Tel: 850-438-0050
Fax: 850-432-8631
Email: bond@sdace.com

Mr. Sam Burkett
Sverdrup technology Inc.
PO Box 1935
Eglin AFB, Florida 32542-0935
850-678-2001 Fax: 850-678-0598
Samuel.burkett@eglin.af.mil

Mr. Charles Carlan (EAC Chair)
Branch Manager, Hatch Mott MacDonald FL
5111 N 12 Avenue
Pensacola, Florida 32514
Charles.carlan@hatchmott.com
850-484-6011

Mr. Robert Hayes, Chief Engineer
The Boeing Company
626 Anchors St.
Ft. Walton Bch., FL 32548
850-449-7835
Robert.b.Hayes@boeing.com

Ms. Lydia Hernandez, V.P.
MEVATEC CORP. (NW)
127B John Sims Pkwy
Valparaiso, Florida 32580
850-729-6169
Lydia.hernandez@baesystems.com

Dr. Paul S. Hsu, president / CEO
Manufacturing Technology, Inc. (MTI)
70 Ready Avenue NW
Fort Walton Beach, Florida 32548
850-664-6070 x 557
hsup@mtifwb.com

Mr. Chris Lettiere
Vice President of Engineering
DRS Technologies
645 Anchors Street Northwest
Fort Walton Beach, Florida 32548
850-302-3000
clettiere@metric-idt.com

Mr. Richard Marshall
Software Manager
Spectrum Systems Inc.
3410 West Nine Mile Road
Pensacola, Florida 32526
850-944-3392
rpmarsh@specsys.com

Mr. Will Mullet
Chief Executive Officer
Wayne-Dalton Corp.
3395 Addison Drive
Pensacola, FL 32514
850-474-9890

Appendix V - 4
(Sect.) rcutting@wayne-dalton.com

Mr. Tom Nquyen (Win)
Air Products & Chemicals Inc.
4575 Hwy 90
Pace, Florida 32571
850-995-5317
Nguyent2@apci.com

Mr. Bob Ogden, Chief Financial Officer
Manufacturing Technology, Inc. (MTI)
70 Ready Avenue NW
Fort Walton Beach, Florida 32548
850-664-6070 x 305
Robert.ogden@mtifwb.com

Ms. Rebbecca Peterson, Plant manager
Solutia Inc.
PO Box 97
Gonzales, Florida 32560-0097
rmpete@solutia.com
850-968-7000

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Appendix V - 10
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D. Letter from Mr. Dell, Chair of EAC Sub-Committee on Curriculum and Program Outcome Assessment

SCHMIDT, DELL & ASSOCIATES INC.
CONSULTING ENGINEERS

May 20, 2002

Muhammad H. Rashid, Ph.D.
Director, Electrical Engineering
University of West Florida
11000 University Parkway
Pensacola, FL 32514

RE: UWF/UF Joint Program in Electrical Engineering

Dear Dr. Rashid:

I must voice a concern. The UWF/UF Joint Program in Electrical Engineering has produced such qualified and marketable graduates, it is very difficult to find graduate engineers from your program to hire. I say this jokingly because of their success and I applaud your department's achievement.

This past spring, I reviewed the responses from the employers of the program's graduates. It was obvious that the general opinion from the other employers was consistent with mine. The UWF Engineering Program is producing quality graduates and they are being well received by the industry. The few concerns about additional training in certain areas have already been addressed by the addition of new professors and courses.

I was not surprised to hear that the engineering students consistently rank extremely high in the competitions with the other universities. More notably, placing higher than the University of Florida on several occasions.

The three engineers I have working with my firm from the UWF program are progressing well. One has passed his professional engineering exam and the other two will be sitting for the exam within the next year. I am confident that they too will pass.

The engineering program faces a tough challenge. How can you improve on such a stellar performance? I have not been disappointed with your performance in the past and do not anticipate being disappointed in the future. The engineering program continues to attract quality professors and students.

I am proud to be associated with the engineering program at UWF and feel that the scholarships provided by our company to the engineering program are an investment in the future of our community.

Respectfully Yours,
SCHMIDT, DELL, & ASSOCIATES, INC.

H. I. Dell, P.E.
Senior Vice President
May 1, 2000

Muhammad H. Rashid, Ph.D.
Director, Electrical Engineering
University of West Florida
11000 University Parkway
Pensacola, FL 32514-5754

RE: Engineering Graduates

Dear Dr. Rashid:

I wanted to take a moment and congratulate you on the success of the UWF/UF Joint Program in Electrical Engineering. Our firm currently has four electrical engineers from the UWF engineer program and they are working out better than I could have imagined.

In general, engineering schools do not teach the basic information that is needed for the consulting business. The engineers are required to obtain the necessary skills by "on the job" training. I have found, through experience, that the students completing the engineering program at UWF are quick learners and have a good engineering foundation. Several of my employees have successfully passed the Fundamentals of Engineer Exam.

Keep up the good work! I feel that the UWF Engineering Program is an asset to our community and to the students it serves.

Respectfully Yours,

SCHMIDT, DELL, COOK & ASSOCIATES, INC.

H. L. Dell, P.E.
Senior Vice President

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Appendix V - 14
E. Letter from Mr. Knut R Bergan, President of Ian-Conrad Bergan, Inc.

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Att: Muhammad H. Rashid, Ph.D.

Subject: Evaluation of graduate and EE program

Dear Dr. Rashid:

This is a follow up to my visit in which we want to recruit from your student body and hopefully spark interest amongst your graduates for work within the marine industry. We hired one of your recent graduates (Mr. Joe Nguyen) back on February 2005 as an entry level electrical engineer. He was tasked to help develop some new products which required engineering knowledge above and beyond that which would be part of the electrical engineering curriculum. He skillfully accomplished his task and we quickly realized that Joe is an exceptional bright young man with incredible work ethics. He has been promoted and has been instrumental in supporting our engineering efforts as a result of our growth.

He has been involved in micro-controller embedded code development to actual on-board implementation of our new Guard Level DFG (Digital Float Gauge) for its maiden installation on-board a new tanker being built in Hiroshima Japan. He was instrumental in developing our in-house expertise of a new multiplexed bubble gauge system for use on ballast and fuel tanks and he developed mathematical equations to simplify tank volume calculations on-board oil and chemical tankers.

Needless to say I believe his education both with respect to academic rigors and practical on-hand experience gave him a solid foundation to which one build a career.

We look forward to see more of your graduates as our company grows.

Sincerely Yours;
Ian-Conrad Bergan, Inc.

Knut R. Bergan
President

Pensacola, May 4, 2006
F. Minutes of the Engineering Advisory Council Meetings

February 4, 2005: ENGINEERING ADVISORY COUNCIL MINUTES

Date: February 4, 2005

Location: Pensacola and FWB Distance Learning Classroom

Attendees: FWB EAC members:
Public Relations and Fund Raising: Col. Donald Pulley, Retired/Independent Consultant; Ms. Lydia Hernandez, V.P., MEVATEC CORP.

PNS EAC members:
Public Relations and Fund Raising: Charles Carlan, Hatch Mott Mac
Curriculum and Program Outcome Assessment: Lynn Dell, Schmidt, Dell, & Associates, Inc., Laura Solari, IEEE Student Chapter President

UWF PNS representatives: Jane Halonen, Dean, Dean Van Galen, UWF Div. of Development, from ECE Muhammad Rashid, Cherian Mathews, Bill Weber, and Sherry Whitlock

OPENING REMARKS

EAC Chair, Charles Carlan, thanked everyone for coming.

Program Status:
Dr. Rashid said that feedback from EAC members is important for accreditation. In addition, we must know what a Quality Education Program and an Academic Learning Impact is to help in our programs. He went on to point out his presentation for example, student count, student and department needs, teaching at Choctawhatchee HS, Gulf Power contract, scholarships, completion of EE and CEE at FWB, new SWE in PNS and IEEE in FWB student chapters, etc. (see folder). Dr. Rashid mentioned the possibility of electronic classes in Panama City but students will need to take labs in FWB. In addition, the Robotics competition is doing very well and if and when the research center is built, the center will help to provide space for robotics research. Also, equipment in PNS is ten years old and obsolete or not working and students are complaining. Laura Solari, IEEE Student Chapter said that some students have to wait in line for the equipment that does work. The Bill Weber said that $216,000 ($121,000 is available in the Foundation money) is needed to upgrade equipment and enlarge current space. The Dean promised $42,000. Planning for our new building is scheduled for 2006 and to start building in 2007 with the joint program being turned over to UWF 1/1/09.

The results of adding a new program looks like Civil and Mechanical Engineering were the choices. These two will compliment current resources very well. Dr. Rashid asked is it the consensus that if we want to add new programs that it would be Civil (Environmental emphasis) and Mechanical. The answer was yes. If we want to be more aggressive, we could go with computational Engineering and work with Physics and math here on campus. He suggested for the members to have a subcommittee to address this issue. Bill Weber then shared some data in his presentation (see folder).

Feedback on Program:
Lynn Dell mentioned that the University is growing and the feedback he is getting from the graduates is that they speak well of the University. Industries are very happy with the graduates.
There is very strong interaction with the Professors. He thanked everyone for sending in their answers to the questionnaire and asked the remaining members who have not filled out the questionnaire yet to please send it in.

**Briefing on $1 Million Campaign:**
Dean Van Gaylen summarized his handout and mentioned that not much solicitation has been conducted in the Pensacola area since Ivan. Focus has been in the FWB were a 100,000 proposal was submitted to the Aerospace Integration Corp., contacts with Crestview Aerospace (Dr. Little met with them to involve some co-op students), and ARINC involved asking for a gift. He also mentioned that UWF will be starting a five year campaign of funding raising which will help support ECE. The major gifts lie around the defense related industries such as Eglin and in the FWB area. They have resources going into these industries and there is a tremendous need for engineers. Dr. Rashid asked if some of the contributions of the five year UWF campaign could be linked to some new engineering majors. His answer was that this would fit right in for support of a new engineering major.

**Other Items:**
Lynn Dell asked why isn’t the cognition center more involved with the department. Dr. Rashid answered that there are plans to involve more faculty with the center. A faculty member mentioned that some of our students are presently involved with the center. Laura Solaris said that she would like to see a more active relationship with the center for students for example, internships and more interaction with the department so students are not going on their own to find activities with the center. If more space is not found, the program may have a problem with accreditation. Charles Carlan suggested that Terry Scruggs could subcommittee to help get this campaign back in swing and have a goal of this fund drive no later than July 1. He will call Terry to start an aggressive campaign. Dr. Rashid mentioned the PE exam for this area and Lydia Hernandez mentioned that Eglin needs it for their employees. Lynn Dell, Subcommittee Chair of Curriculum Program and Outcome Assessment recommended that the PE is needed and would be an asset to this community. Students can be offered the exam when they have recently taken classes to help students successfully pass the test, because students may pass this opportunity up in future years. Concerning pasted money, the Dean asked if the $50,000 that was promised by Dr. Dimsdale was used to help with updating equipment. The answer was no, because it was not needed at the time and the Dean asked for a copy of the letter with Dr. Dimsdale’s promise.

EAC Subcommittee Chair, Lynn Dell thanked everyone for Charles Carlan for coming and reminded everyone that their attendance is very important.
February 6, 2004: ENGINEERING ADVISORY COUNCIL MINUTES

Date: February 6, 2004

Location: Pensacola and FWB Distance Learning Classroom

Attendees: FWB EAC members:
Public Relations and Fund Raising: Col. Donald Pulley, Retired/Independent Consultant
Internships and Career Opportunities: Sam Burkett, Sverdrup Tech. Inc., Gordon Eldridge, BAE Systems

PNS EAC members:

UWF PNS representatives: Jane Halonen, Dean, Martha Lee Blodgett, UWF Div. of Development, ECE Director, Muhammad Rashid, ECE Faculty (Mohamed Khabou, Rachid Manseur, Cherian Mathews, Xuemin Millard, Mohannad Bataineh), ECE Staff (Bill Weber, Sherry Whitlock)

UWF FWB representatives: Chris Pierce, FWB Campus Director, ECE Faculty: Tom Gilbar

OPENING REMARKS

EAC Chair, Charles Carlan, thanked everyone for coming.

Program Status:
ECE Director, Muhammad Rashid mentioned that Drs. Gilbar (FWB) and Millard (PNS) came to the department this past fall and Kevin Rigby (FWB high school program) joined in January. Student numbers have been increasing, and now there is a digital lab in FWB which has been dedicated to MTI. There is also a computer lab for students, and this spring, a controls and a communications lab is scheduled for next fall semester. A Senior Design lab in FWB will be built sometime in the future. GERC, OWCC/FWB UWF campus, or Choctaw High School has been considered for the location of these labs. The UWF President has signed an agreement with Choctaw High School officials to allow the students in the 4 year pre-engineering program (9th, 10th, 11th, 12th grades) to come into the college engineering program with 3 credits. Courses will give the student awareness and life long skills in engineering such as in their 1st year: interaction or what engineering is about, 2nd year: applications of computers in engineering, 3rd year: analog and digital circuitry, and the 4th year: exposure to internship. Students must apply and be interviewed for this restricted program. A four year partnership is now official with Gulf Power to offer power courses for engineering degrees, and engineering training for employees, and for employees to prepare for EIT or PE exams. This partnership is financed by Gulf Power (still in the works to hire new faculty, but no adjuncts) and will offer continuing education only for Gulf Power employees. The classes will be independent from the regular classes that are being taught now. The ECE Director added that presently all classes are now being taught at FWB, and as a result, we need more faculty for this growth. Also the PNS labs were installed in 1994 and some of the labs are becoming obsolete.

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Feedback on Program:
Lynn Dell mentioned that he could not give much feedback, because no one sent back the e-
mailed questionnaire. It was suggested that the members fill out the questionnaire and get it to
Lynn Dell for feedback. Dr. Rashid said that this information is needed for accreditation.

Briefing on $1 Million Campaign:
Martha Lee Blodgett mentioned that in August there was a dedication to the MTI lab in FWB. In
September Charles Carlan hosted a campaign meeting to introduce the campaign to Dr. Dean Van
Galen (UWF VP Univ. Development) and identify specific targets for follow-up. In October,
Martha Lee did a presentation to the National Defense Industrial Association at Eglin for a group
of professionals for an endowment scholarship which has been approved for March in the amount
of $20,000 for FWB. Six companies have been identified by Charles Carlan and Dean Van Galen
for immediate follow-up and letters have been sent to make appointments with them. Two
proposals have been out since last year that will be followed-up on. Lydia Hernandez and Martha
Lee have also contacted six companies in the FWB area, and have sent letters out, and made
phone calls to make appointments. In 30 to 60 days proposals will be in there hands and they will
have additional information to follow-up on.

Charles Carlan added that the UWF President may have some key prospects and that he would be
available to call on them. For the next meeting, Mr. Carlan would like to have a dollar value
update of where we are, and where we are going, and the prospects and proposals that we have out,
which can give us a better idea of how accurate this campaign is at this point. Mr. Carlan
suggested to have this campaign finished by June or July at the latest.

Other Items:
Charles Carlan mentioned that the EAC council needs a replacement for the sub-committee chair
of Internships and Career Opportunities and to contact Dr. Rashid if you would like to volunteer.
In addition, Colonel Donald Pulley, a new member, was introduced by Charles Carlan. Dr.
Rashid answered the question of how many students are in FWB, which is about half the size of
PNS. For student outcomes, student work is used for accreditation, but feedback from the EAC
members is also needed for accreditation.

A Word from Dean Halonen, College of Arts and Sciences:
She mentioned that the engineering department is emerging in national prominence through the
Gulf Power Partnership because it is a very unique enterprise, and the robotics competitions are
held with colleges that have larger endowments and longer histories. In addition, this department
is more advanced with student outcomes in relation to accreditation. Also mentioned was that a
new line for technical assistant has been approved, and the engineering department along with
chemistry, math, physics, computer science are now under the name of School of Science and
Engineering with the College of Arts and Sciences. This School brings research together from
more than just one area. A unit director will be needed for this school with the right background
and is familiar with the military. She added that a plan has been approved and money allocated
for a building for the school. Dr. Rashid mentioned that with the expertise from offering classes
in relation to EIT, that that expertise can also be offered to other industries.

The EAC Chair thanked everyone for coming and to have another meeting in about 45 days.
November 18, 2002: ENGINEERING ADVISORY COUNCIL MINUTES

Date: November 18, 2002

Location: Pensacola and FWB Distance Learning Classroom

Attendees: UWF representatives: ECE Director, Muhammad Rashid, ECE Faculty (Mohannad Bataineh, Dale Harrell, Rachid Manseur, Cherian Mathews, Bill Weber), Aaron West, Director of College Development, Dr. Daine Barlar, FWB Campus Director, EAC minutes: Acad. Adv./Off. Man., Sherry Whitlock

Public Relations and Fund Raising: Charles Carlan, EAC Chair, Greg Fountain

Professional Development and Continuing Education: Fred Bond, subcommittee Chair, JT Young

Internships and Career Opportunities: Sam Burkett (FWB), Bob Ogden (FWB), Gordon Eldridge (FWB)

Curriculum and Program Outcome Assessment: none

OPENING REMARKS

EAC Chair, Charles Carlan thanked everyone for coming and commented on the agenda which was the 1 Million Campaign update.

1 MILLION CAMPAIGN

FWB Luncheon:

Aaron West began the discussion that he and the UWF President, Dr. John Cavanaugh had lunch with the senior management and UWF graduates from Manufacturing Technology Inc. in FWB. He added that Dr. Cavanaugh has reaffirmed his commitment to the program, but that the campaign has really slowed down in momentum due to things going on in his office since the last meeting. Although, he is working on a Boeing grant and will need some help or contacts from the FWB EAC members.

EAC Chair=s update:

Charles Carlan added that on the contact list half of the 18 are ready to be contacted and that his company was ready to step up and make a commitment. He suggest to go ahead and contact these companies, and to get a similar list from the FWB EAC members, and initiate calls. We could have a meeting the middle of January to have the committees actively pursue some of these calls.

Campaign materials:

Aaron said that the campaign brochure and folders are ready and the engineering brochure has gone out to companies. MTI had a concern for the general brochure in that it failed to include the FWB community enough. Aaron felt that it did, and that he tried not to focus on either community. The phone number was pointed out as being a Pensacola number, but Aaron explained the number was the program=s phone number, and that this can be addressed since it is a sensitive issue.

Campaign ideas:

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Aaron agreed that a proposal for some year end money is a good idea, but we do not want to risk not getting a larger amount next year. Gordon Eldridge, from BAE, said that they could probably contribute this year and that year end contributions might be lost if an effort was not made.

Aaron suggested that more needs to be said about the program for example, in FWB Rebecca Cason wrote a color article for the FWB Daily News that outlined the programs and the expansion which was more than we could pay for. Daine Barlar suggest to insert the article in any proposals that go out. Aaron commented that it would help the campaign to get a letter of support to put in a package for example, from Bill Grant of Boeing, General Chetister of Eglin, Paul Hsu of MTI a supplier for Boeing.

It was agreed that personal contacts is now what needs to be done and that the campaign should end by end of 2003 with commitments over a three year span, because the program needs to be set up in FWB by 2004. If needed, a five year span can be discussed. Aaron explained that he would need a small committee to discuss what would be appropriate to ask in dollar amounts from certain companies before a formal proposal is made.

Daine Barlar suggested and the committee agreed to invite the people from the companies to the FWB and Pensacola campus for lunch and give them a tour of what the money will be used for.

Aaron brought up the idea that if the dollar figure were 100,000 then the committee would need to get the President involved and an appropriate volunteer to approach the company. Aaron expressed to Bob Ogden that he would get together with him in FWB to set up the small committee to examine year end money and what is the appropriate dollar figure to ask, and to make proposals and a list of companies to approach. Aaron said he would get back with the EAC members who took names and see if certain companies should be asked for year end money or wait for the next year.

Closing:

Charles Carlan ended by saying that the small committees need to communicate with the entire committee and that the campaign needs to be re-energize, estimate appropriate money to ask for, have informal visits, send e-mails to council members telling them what we are doing, send information on potential donors to a committee member who will make a commitment to approach potential donor they feel they have a possible personal relationship, and if $100,000 is involved get on President Cavanaugh=s calendar.

The meeting ended with Charles Carlan thanking everyone for coming and that the next meeting would be called when needed.
June 17, 2002: ENGINEERING ADVISORY COUNCIL MINUTES

Date: June 17, 2002

Location: Institute for Human and Machine Cognition

Attendees: Kitty Fouche’, CAS Associate Dean, ECE Director, Muhammad Rashid, Bill Weber, ECE Faculty, Dianne Barlar, Director (FWB campus), Aaron West, Director of College Development, Sherry Whitlock ECE Academic Advisor and Office Manager

Public Relations and Fund Raising: Charles Carlan EAC Chair, subcommittee Chairs,

Professional Development and Continuing Education: Fred Bond, subcommittee Chair, JT Young,

Internships and Career Opportunities: Bob Ogden (FWB), Ken Corley

Curriculum and Program Outcome Assessment: Richard Marshall, Tom Skinner, David Eaton

OPENING REMARKS, GREETINGS AND INTRODUCTIONS:

EAC Chair, Charles Carlan thanked everyone for coming and commented for discussion the status of EAC feedback and program accreditation, class offerings in FWB, the $1 Million campaign leadership, and progress/status of subcommittees.

UWF, CAS, Associate Dean Fouche’ gave her greetings and commented that this campaign was on the move and she looked forward to meeting some of the new members. (JT Young from Gulf Power was mentioned as a new member of the EAC.)

EAC FEEDBACK AND PROGRAM ACCREDITATION

Muhammad Rashid mentioned that the classes are ready to go at the FWB campus, and that he appreciates the support of the EAC members. Also that UWF representatives are there to give information, and that EAC members can inform the UWF representatives as to what they want in regards to the program. The accreditation team will again visit the program on November 17th and 18th with the focus on an improvement process. The self-study report has been sent to UF for ABET review. UF would like an EAC meeting in September or October to look at the Missions and Goals of the academic programs to assess the program in that is the program following the recommendations of the EAC. The new UF Dean mentioned attending this meeting to discuss how much longer should the joint program continue but that the quality of the program is what the UF Dean is most interested in.

CLASS OFFERINGS IN FWB

Muhammad Rashid added that the two-way audio lecture classes in FWB for fall semester are Circuits 1, Digital Logic, Statics, and Signal and Systems, but the instructor will attend the labs. The equipment and furnishings have been ordered and hope for another dedicated two-way audio classroom for engineering will be ready by January 2003. OWCC will teach the lower level classes and the UWF FWB campus will teach the upper level. Two new faculty members have been hired with one position as a brand new position. A third position was offered but the candidate has also been offered a position at Florida State, the program is waiting for a decision from the candidate, if he does not accept another search will be conducted.

Dianne Barlar added that she knows of 50 people who are interested in the degree, but that she did not know if they had the lower level courses already. She also mentioned that she was glad that engineering was coming to
the FWB campus and that the instructors are actually coming to the campus to teach some of the classes. Also that from the evaluations conducted, the two-way audio classroom does very well.

$1 MILLION CAMPAIGN

Charles Carlan addressed the issue of awareness of the program coming to the FWB area and that Bill Board and Terry Scruggs will head up the Escambia/Santa Rosa areas as co-chairs for the Pensacola enhancement campaign. Bob Ogden will co-chair the Okaloosa/Walton areas and invites anyone that is well respected in the community to join him, even if they are not on the EAC. If they would like to join the EAC, Charles Carlan extents his invitation to join the EAC.

The figures presented by Aaron West, UWF, Director of College Development were $1.7 million is needed for the FWB expansion and $300,000 for the Pensacola enhancement. The University and State have pledged $1 million to help supply equipment for the first year. Money for faculty, general program, and scholarship support is needed, but money for equipment is the largest category. West mentioned that money raised could be more useful if it is not restricted. There are plenty of naming opportunities in the donor’s behalf for labs, classrooms, and anyone who makes a ten thousand or more donation will be noted on a wall located at both FWB and Pensacola. It is important to let the community know where the support is coming from with the donor’s permission. It was noted that Charles Carlan discussed the expansion with the new UWF President, John Cavanugh, and reported that the new UWF President is very supportive of the campaign. Carlan hopes that the campaign will already have commitments from the EAC members in raising funds and that they will have submitted five names of people to approach for fund raising.

It was suggested that individuals now need to submit to giving of their time to go out and help with the fund raising. Aaron West has a step-by-step plan and will manage and coordinate the campaign. He sees an internal phase, a quite phase, and a public phase and the internal phase is where we are right now. He sees 50% of the campaign money coming from the EAC as an example to approach the public. Also, a promotional piece to promote the program generally (not the campaign) in making communities aware that there is an engineering program in the area will be sent to engineers, engineering firms, colleges, etc., before promoting the campaign.

Dianne Barlar, Director of the FWB campus sent out letters to about 300 members of the EAC and inhabitants of the industrial park who would hire graduates and be supportive. She also sent out a follow-up letter with a scaled down version of the programs’ engineering poster and sent it in a flyer form to circulate around; in addition, press releases have also been released. She hopes that this will set the stage for a breakfast meeting in FWB that she will host for people on this list as potential donors.

Aaron West mentioned that the lead commitment has been committed from MTI in the FWB area of $100,000. Support of $700,000 is needed for FWB and $300,000 for Pensacola (a break down was given out) during a five-year campaign. The largest amount is needed for the FWB area. FWB students will benefit from the expansion, which will allow a student to complete his engineering major without having to drive to the Pensacola campus and having to take off from work. Now companies can send their employees to the FWB campus, but if the student population is largely non-traditional, they can benefit from night classes as well as the Pensacola students by using the distance classroom. At the same time, the Pensacola campus can provide dorms and the atmosphere for the traditional student.

West added that there was a concern that there would be a “dip” in enrollment at the Pensacola campus. Increasing publicity can help to get more people involved and enrollment up. Emphasis on the awards that the students have received in national competitions where they won against teams from Georgia Tech, MIT, and UF in Gainesville could be used as a selling point. Also this expansion is a good economic development issue. A good selling point is that the students walk away with a UF degree, and that the FWB area has wanted an engineering program in their area for years.

PROGRESS/STATUS OF SUBCOMMITTEES
Fred Bond reported that he spoke with Sonny Cushing, UWF, VP of Academic Affairs, about continuing education for the professional engineer, and that he has not heard back from him as yet. Continuing classes are needed in order for an engineer to keep his PE license. It was suggested that there are some online classes but that some engineers do not want to take classes online. The Director of the Joint Engineering program mentioned that the current students are encouraged to take the EIT exam and that they do not have any access to classes where other Universities have courses to prepare their students. He offered to check with the IEEE in helping with this issue. Fred Bond suggested that action needs to be taken before the opportunity is lost to other resources that will provide the needed classes.

The meeting ended with Charles Carlan thanking everyone for coming.
April 19, 2002: ENGINEERING ADVISORY COUNCIL MINUTES

Date: April 19, 2002

Location: UWF Alumni Room

Attendees: UWF Executive VP/Interim Provost Parks Dimsdale, Kitty Fouche’ CAS Associate Dean, ECE Director, Muhammad Rashid, ECE Faculty, Mohannad Bataineh, Rachid Manseur, Bill Weber, Aaron West, Director of College Development, Sherry Whitlock ECE Academic Advisor and Office Manager

Public Relations and Fund Raising: Charles Carlan EAC Chair, subcommittee Chairs, Bill Board and Terry Scruggs

Professional Development and Continuing Education: Fred Bond, subcommittee Chair, Mike Frey

Internships and Career Opportunities: Joe Ochsner subcommittee Chair, Tom Nguyen, Bob Ogden (FWB)

Curriculum and Program Outcome Assessment: Lynn Dell subcommittee Chair, David Eaton

OPENING REMARKS, GREETINGS AND INTRODUCTIONS:

EAC Chair, Charles Carlan thanked everyone for coming and commented for discussion the status of EAC feedback and program accreditation, class offerings in FWB, the $1 Million campaign leadership, and progress/status of subcommittees.

UWF Executive VP/Interim Provost Parks Dimsdale gave his greetings and commented that the state legislature will have money end of this month and hopefully; we will receive $3 million for UWF. There are three candidates for the President position who will be coming next month for intensive interviews and all of you are invited to attend the open sessions. President Marx is in Spain this week, but wants everyone to know that he will assist in any way he can toward the $1 million campaign regardless of the enrollment. Parks Dimsdale also said to let him know how he can help toward this good program.

ABET

Lynn Dell discussed the ABET questionnaire that was sent out to industry, employers, and students. The questionnaire is concerning the programs’ students and had only 5 out of the 28 returned. UWF is doing well with their students and the students are very successful in industry he added, but the comments involved the evolution of the program and the questionnaire need to be answered.

Muhammad Rashid discussed the program process of the objectives and outcomes for ABET. One question was what makes you value the students in this program. He stressed the need for feedback about this program, for example does this program serve the needs of the curriculum and the objectives of the students. Also, what are the important areas and what experience do you want the program to prepare for future graduates in the job market, and what do you think about the program’s mission and the outcome. The quality of the program is not the issue, UF is solid and has been established for many years he added. The accreditation process is needed to ensure enough faculty and support, and that the process is implemented. It was stressed to please give your comments about what areas are the students serving.

Bill Board asked about one of the comments in the questionnaire, is it a good idea to focus on electronics and also power systems?
Muhammad Rashid said that UF is larger than the joint program and has areas of specialization but that the joint program can have broad specializations because the students do not know where they will work. This area has an interest in power.

Rachid Manseur mentioned that one of the new faculty hired would teach power and that in the last three years this area has been more interested in power engineers.

Bill Board responded that the program seems to have already recognized the demand.

Muhammad Rashid said that the ABET criteria is that students should not only know their curriculum but that they must understand their designing.

FWB CLASSES
The issue of classes in FWB was addressed and that the commitment has already been made to teach three classes and two labs at the FWB UWF campus. Muhammad Rashid expressed that two things to make it work is to have a room converted into a high tech classroom so transmission can be directly to FWB. Equipment is needed to begin teaching in August. Parks Dimsdale remarked that the money is already committed for the equipment. Kitty Fouche’ added that the university is already working on a second tech lab and that classes are scheduled in the existing tech lab and will be taught this fall.

BUDGET
Next Charles Carlan addressed the issue of the $1 Million campaign in that a budget needs to be set. Aaron West brought up the feasibility study was 18 interviews between Pensacola and FWB. $140,000 committed out of Okaloosa/Walton and $160,000 out of Escambia/Santa Rosa coming from the Engineering Advisory Committee who should be the most committed to the $1 Million campaign. Expansion to the FWB campus and enhancement of the Pensacola campus were the two focuses of the study. The funding pool for gifts is small, and large gifts must be depended on.FWB is not as familiar with the program as Pensacola because the program is not there yet. The need for marketing still exists. A four-page insert or magazine of a thousand is in the works to help in marketing the program. Another challenge West indicated was that a campaign chair is needed that has the time and knowledge of the advisory council and can make this campaign the main priority. Also, concern for a FWB team and a Pensacola team was expressed, but concern was that FWB needs $1 million, and is there two separate goals, and would the money be segregated. The answer was that there is one team goal and that goal is to raise money overall for engineering, but that the FWB area wants their money to go to the expansion and the Pensacola area to enhancement, and that the $1 million leadership involvement is ongoing. One $100,000 gift has not been identified as yet, but these types of gifts will be needed for the tech lab in Pensacola and FWB and will be recognized.

BUDGET LIST
Concern for a budget list for the Pensacola campus is needed and that there is one for the FWB campus, but monies needed for summer and fall 2002 will be from the State per Parks Dimsdale. Bill Board suggested that the funding could be segregated as to the amount of State money and private money needed and as to how the money will be spent on the Pensacola campus. Aaron West suggested that if we have a fix amount on items and from each sector then that would limit the amount from the private sector.

SUBCHAIRS
An overall chair and a sub chair from FWB and Pensacola was suggested to organize the expansion in FWB and the enhancement in Pensacola, but mainly a FWB sub chair since, it was suggested, 75% of support should come from FWB. The sub chairs would need to understand what we are doing and able to answer a technical question and to be able to get in and contact the right people. Bob Ogden, MTI, FWB volunteered to help and open doors.

STUDIES
Aaron West concluded that the program is expanding and the masses need to be informed now and ongoing, but it was asked is there a student base and is there support from the FWB community. The feasibility and the
HAAS studies have shown a need for the expansion, somewhere around 5 times the need in Okaloosa compared to Escambia and Santa Rosa but it is hard to pin down the student base reports Bill Weber. It is known that 1/3 (and growing) of the students attending the Pensacola campus presently are from Okaloosa and that there were 40 prospective students from Eglin alone. Also that on average two calls per day for a month were interested prospective students who need four to two years of education to obtain an engineering degree.

FWB MONEY
It was suggested that money needs to come from people who do not even know about us yet. Bob Ogden suggested that “$140,000 was probably an unrepresentation of what you could get for those potential donors in the FWB area and that $500,000 is small potatoes” and he believes half a million dollars could come from the FWB area. He could not commit to Chair of the FWB area, but he could be on the subcommittee, and suggested to have the meeting closer to FWB. Subcommittee meetings and then communicate back and forth with information that can be passed on through e-mail. He also suggested that more marketing needs to be done in educating people of what is going on by knowledgeable university representatives as to what the money can be used for, and that there might be matching funds, and believes you will get more commitments for funds if this is done. Also, that the fund raising committee needs to be from this committee because this committee knows what’s going on. Aaron West agreed and Bill Board suggested that there be two fund raising committees, one in Pensacola, and one in FWB.

DISTANCE LEARNING FACILITIES
Parks Dimsdale suggested that the distance learning facilities (where over 200 classes are taught) for meetings and then you also get to see what it’s like.

In closing, the EAC Chair suggested to have another meeting but have a Pensacola budget list of what is needed in Pensacola so that when going out to talk with people specific items can be shown as either Pensacola or FWB items with realistic goals.
OPENING REMARKS, GREETINGS AND INTRODUCTIONS:

EAC Chair, Charles Carlan thanked everyone for coming and commented for discussion the status of new engineering programs, expanding programs in Ft. Walton Beach area, fund raising for new and existing programs, and the progress/status of subcommittees.

UWF President Morris Marx gave his greetings and commented that each University will have its own institution Board of Trustees with a fair amount of power, which will be beneficial to the state of Florida. He expressed that this new board will have the power to approve masters and bachelors programs. He feels much more comfortable about discussing the issues of engineering with a board like this. He gave his hopes that one or more of the EAC members might be on that board but that it was the governor’s call. He expressed that whomever will be on the board will have the recognition of the leadership of NW Florida. He mentioned that he would be around to get the board established and institutionalized, and also to present to them his strategic plan.

Martha Saunders assured everyone that the engineering faculty is still among the finest not only in the college but also in the institution at every level from students to colleague, and administers. She mentioned that the robotics team won 2nd place national this year. She said it seems to be a habit and that the department is taking good care of their students.

Muhammad Rashid, Director of Electrical and Computer Engineering informed everyone of the two new faculty members. Mentioned that the program received no deficiencies from the accreditation process but not until July will the program know of the full outcome of the accreditation that was conducted this past October. Visits to Ft. Walton to meet with students and conduct surveys was shared with the committee. The surveys involved four counties. Interests were the following: 1st electrical/electronics 770, 2nd environmental 744, 3rd computer engineering 654, 4th industrial, and 5th civil engineering and that there are more chemical engineering students than jobs.

Bill Weber added that there were 212 responses, 42 responses associated with the FWB interest meetings in FWB, 84 from math classes at OWCC, 12 from Ft. Walton Beach High School, and 75 from the local high schools. Responses from local high schools (Santa Rosa and Escambia) only addressed interest in discipline. He said they only addressed the issue of what the interest in discipline was. Data indicated 58.9% elected a preference for electrical or computer engineering, but that this is not realistically in comparison with the other disciplines. Civil and environmental came out next highest for all responses. OWCC tied for civil, environmental, and mechanical engineering. Of surveyed, 43% said they would come to the UWF campus, but
59% would not. Mr. Weber mentioned in his survey of current engineering students, those students overwhelmingly selected “UF degree” and “location,” as the most significant factors in their decision to enroll at UWF.

Debate on the national responses was discussed as to how this survey compares to a national survey. Dr. Rashid mentioned that at the last accreditation meeting, Rick Harper in his presentation, said that electrical and computer engineering was on top then civil engineering nationwide. The question was since the engineering program is strong should we expand to the FWB area? Should we have the same number of faculty or teach courses online electronically? He advised not to have faculty travel because it will tier them out. He suggested that if we duplicate labs in the Ft. Walton Bch. area the cost would be $960,000. The question is the expense, do we need labs in the FWB area and then if so, we need space.

It was asked if there had been any progress with the idea of expanding the engineering program into computer science options and then devising a career curriculum to prepare students for a career information technology. Martha Saunders replied that a proposal has been sent to the board for a interdisplinary technology program and if we do not get approval now than we will have to wait for the new governing board to get in place and that will delay us a year. She said that this is an intercollege program, which means all Deans must agree to it. The tracks could include engineering and does not at this point, but the tracks are from digital design to applied computer technology.

It was mentioned that with the changes in the board, could we still count on Tallassee matching the funding. Aaron West replied that the matching program was not going away. The state will match annual private gifts in excess of $100,000 if the gift creates an endowment. There is no state matching for gifts less than a $100,000 endowment. As for “bundling” or combining small gifts to get to $100,000, the state will no longer allow that.

The next discussion was based on getting help from the Ft. Walton area and setting up labs in that area. Muhammad Rashid mentioned that a couple of labs could be set up and that the GERC has 6/7 labs we possibly could use. A question was asked, is it possible to start the program in Ft. Walton without the labs? He replied that it is possible but one faculty is needed there and that one lab could be added but will cost $200,000. A concern was, should we raise the money needed in the beginning or wait to see if student numbers increase then raise the funds. There was another concern that since the classes are already suffering from low student numbers, which included 30% from the Ft. Walton Bch. Area, if we start teaching over there that this 30% will be lost from this campus.

Another question was, will there be an increase in Ft. Walton to compensate for that loss here and will the increase successfully sustain the program on two campuses. The risk needs to be measured. An increase in students was suggested in order for the program to be viable. The program needs 120 to 150 upper division students to support itself and that the state sets the formula according to students per faculty. It was suggested that teaching in the Ft. Walton Bch. area would be experimental and not to raise the funds for the labs at this point. It was also suggested to make this program more attractive with night classes so that people that work in the Ft. Walton Bch. area could drive to the Pensacola campus and try to increase enrollment this way first.

It was also suggest to broadcast classes over to Ft. Walton and have the students come over to the Pensacola labs then see how the interest goes before setting up two programs and investing for labs in the Ft. Walton area. A suggestion of another multi media classroom for broadcasting classes to the Ft. Walton area would be about $60,000 per unit. Martha Saunders said we need to have UWF faculty meet with her to work out the bugs as to teaching in the Ft. Walton area and what impact would result. Other opinions were that in time a program in Ft. Walton might be bigger than the Pensacola campus, but to keep the quality of the program.

It was suggested to contact more engineering employers in the Ft. Walton Bch. area to help and that GERC needs more students, and this program could provide undergraduates as a result both programs could feed each other, and by offering courses as a survey it might be a better method in terms of a survey.
In closing, the idea for some members was to teach in Ft. Walton and have labs at the Pensacola campus then see if other engineering companies will join the EAC in helping to put a program over in the Ft. Walton Bch. area with the understanding that the level of enrollment at the Pensacola campus not be put at risk.
OPENING REMARKS, GREETINGS AND INTRODUCTIONS:

EAC Chair, Charles Carlan thanked everyone for coming and commented for discussion the status of new engineering programs, expanding programs in Ft. Walton Beach area, and the progress/status of subcommittees.

UWF President Morris Marx gave his greetings and commented that his office is working with the transition for a Board of Trustees and that this new board will have the power to approve masters and bachelors degrees. A local board will better understand the needs of this area. He invited anyone who is interested in the aspects of the transition to visit www.uwf.edu.main/transition. This site is to inform anyone about the transition. He also mentioned that the expansion to the Ft. Walton Beach area is an important topic. The growth of UWF will certainly be eastward. UWF is registering a 13% growth in students, a total of 8500 with about 1000 at the FWB campus, with 1000 residential students on the Pensacola campus and another 200 will be added and filled. There are another 1000 living near the campus that are traditional students who plan to go to ball games, join fraternities or sororities, etc.

Dean Saunders mentioned that she met with the ECE faculty and discussed concerns about moving the program over to Ft. Walton. She invited Muhammad Rashid, ECE Director if he would like to speak first.

Muhammad Rashid mentioned the positive increase in student GPA’s and give two examples of students who spoke with him for the need of the ECE program to expand to FWB. First was the cost of traveling to the Pensacola site and that this student would not be able to afford this cost along with taking time off from work, and the other student mentioned that he also had to take twice as much time off from work, compared to a Pensacola student, for his travel. Muhammad Rashid suggested that there is a need for this program in the FWB area, but that teamwork is needed. He also mentioned that he did not want the faculty to have to drive to the FWB area and proposed to the Dean a method of teaching through high tech all the classes, but that the student will still need to come to Pensacola for the labs. In the second phase, once we have the numbers of students using this high tech classroom, a lab can be established for a cost of $200,000. This way they can take two or three classes.
A question to Dean Saunders was are classes going to be taught at GERC or the FWB center? She said originally they were talking about the FWB center, not to move the program, but to expand the program to Ft. Walton. GERC has a keen interest in increasing the growth in their graduate program, and they made some suggestions but no commitments and that they could offer space and help with lab equipment.

Muhammad Rashid commented that GERC has the space but they do not have a library like the FWB UWF campus which also has facilities for students to register and receive advising, a university environment. At the GERC facility they close at 5 p.m., this is a disadvantage.

Martha Saunders answered the question of what is the time frame for teaching in the FWB area. Her reply was that the first step was to see how many students would want to be a part of the program and that this will be a part of the marketing program for the whole region. If we get 15 students, the faculty agreed to offer course for fall 2002 via the two-way interactive classroom with the students coming here for their labs until equipment is up and running. Depending on the Governor, money is set aside for branch campuses and could be used to add another lab per Dr. Dimsdale.

President Marx replied that that was correct as long as the Governor does not veto the tuition increase and the $600,000 for branch campus activities that money will be used in part for programs to expand to the east. He believes that branch campuses will continue to be supported, reducing the pressure to build universities, an giving access to these programs. As this program grows and succeeds, it will have a good shot at getting legislature funding and private funding for the basic expansion for the program for equipment. He encouraged the Dean, Director, and others to think about the lab needs and the equipment needs.

Martha Saunders answered the question as to when the labs will be established in FWB. She replied that there is an interest for this program but will the students really go? By having lecture classes only in the fall of 2002 then in fall of 2003 have labs in the FWB area, if we can get them equipped. By January of 2003 there should be a good indication of how many students are really interested.

Muhammad Rachid suggested that the minimum amount needed for a lab is $200,000.

The question was asked, where is the pressure and need coming from to expand the program? President Marx replied that the FWB area wanted the ECE program as much as the Pensacola area because there is a big need for technical people. For the 27% of students coming over to the Pensacola area, there is a hardship on them. With the success of the distance learning, the two-way studio seems feasible to teach at both sites. If there is a genuine need for a program of this type, then we need to get that program there as soon as possible, especially for the non-traditional student. Martha Saunders replied that UF has considerable interest also.

Aaron West suggested that commitment from privatizing funding is needed. President Marx added that if people want to make multiple yearly commitments and if the money is needed up front, it can be borrowed and then paid off.

A concern was made that if the 27% from the FWB area attended classes in the FWB Area would student numbers decrease in the Pensacola classes. Martha Saunders replied that Dr. Barlar who heads up the FWB campus thinks that students will be able to get the time off to attend the FWB classes and that would not be a disadvantage. She added that she is comfortable testing the market and to add resources as needed.

It was mentioned that there is a large adjunct pool in the FWB area, but the reply was that this joint program is the best in the state but permanent faculty is needed for a quality education. Also mentioned was the fact that a lot of engineering companies in the FWB area have a vested interest in this program. A reply was, are these companies interested in training for their employees or to bring more engineers into the area. The answer was both, but mostly to bring in new engineers because most of the employees already have a graduate degree,
which is why GERC is over there for that demand. The problem of transportation to Pensacola was brought up but that the travel time was the issue.
G. Curriculum Feedback Comments of Engineering Advisory Council (EAC)

As part of the accreditation process, it is important for the University to continuously evaluate not only the curriculum, but the final product. Our graduates are our ambassadors to the community and industry. Our success with the engineering program is directly related to our graduate’s success in the work place and higher academics.

The following questions are being provided to you to help us evaluate our programs. The responses will be taken into consideration in scoring our shortcomings, current success and future efforts. Your input is needed!

Please take a few minutes and answer the questions. We will discuss these and some of the responses at our next meeting. If you have the opportunity, please email your responses to Sherry Whitlock by February 1, 2004.

Thank you for your time and I look forward to discussing the engineering program with you at our next meeting on February 6, 2004.

Lynn Dell, P.E.
EAC Subcommittee Chair

1. A. What are the strengths of the graduates as compared to other programs? The students have a closer relationship with the University Staff and it shows. Due to the smaller class size, the professors are able to spend more time with the students. The students feel closer to their fellow students and facility. This improves grades and their success in completing the program.

   B. Do you see this program as a bottle resource of graduates for your company? Absolutely. Our company has hired four of the graduates, two of which are still with us. We also have one of the students that work full time. We have a great deal of difficulty hiring engineers from other disciplines (mechanical and structural). On the other hand, we always have a good resource of electrical engineering graduates to pick from.

2. What areas can the engineering program improve in enhancing their graduate’s education? Electives in power would be helpful. I also think it should be required that all engineering students take the EIT exam prior to graduation. I would recommend that it be required during the junior year. I am sure that they would have a high success rate while the core curriculum is fresh on their minds.

3. Are there any additional curriculums in engineering that are a necessary part of the community in FWB and Pensacola? We have a strong need for structural (which is an advanced civil degree). The mechanical engineering demand is being supplemented by Pensacola Christian. I would think a degree program in civil would be welcome. There are several large civil firms in the area that would benefit. Structural and environmental could develop from the core civil program.

4. How is the availability of engineers in the area, is there difficulty in hiring engineers? As stated previously, the supply of electrical engineers is good. We could use help with structural and I am sure that civil would be welcomed by several other companies.
5. Are any companies offering co-op experiences, or on the job type training? We could use co-ops, but it would have be for at least three semesters with alternate students. The co-ops would have to be experienced with AutoCAD. We would teach them the rest.

6. What is the retention record of keeping the co-op engineers after they graduate? N/A.

7. Any recommendations on the program objectives (see separate attachment)? Make sure that your graduates are proficient in CAD and technical writing. These are basic skills that all engineers can benefit from. It would also be a benefit to the students if they were exposed to public speaking and Power Point presentations. The engineers that can present themselves to their fellow engineers and clients are the ones that progress.

8. Any recommendations on the program outcomes (see separate attachment)?
No.

(c/form.ltr.FEEDBACK.questions)
## APPENDIX VI – PROGRAM OBJECTIVES EVALUATIONS SURVEYS

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Summary of Alumni Survey</td>
<td>VI-2</td>
</tr>
<tr>
<td>B</td>
<td>Summary of Employer Survey</td>
<td>VI-12</td>
</tr>
<tr>
<td>C</td>
<td>Summary of Engineering Advisory Council Survey</td>
<td>VI-16</td>
</tr>
</tbody>
</table>
A. SUMMARY OF ALUMNI SURVEY

A.1 Spring 2006 Survey Results

Date Sent: 11/30/05  Number Sent: 44  Number of Response 6
Degree received: 6 (100%)  ~ Bachelor of Science in Electrical Engineering (BSEE)
~ Bachelor of Science in Computer Engineering (BSCEN)
~ Both the BSEE and BSCEN

1. Please rate your level of agreement with each of the following accomplishments of our educational objectives as a result of our engineering education at the University of West Florida by checking the appropriate column of your response by a mark, x:

<table>
<thead>
<tr>
<th>#</th>
<th>Accomplishments of our educational objectives</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Develop electrical engineering solutions either individually or through interdisciplinary teams within a global and societal context.</td>
<td>5 (83%)</td>
<td>0</td>
<td>0</td>
<td>1 (17%)</td>
<td>6 (100%)</td>
<td></td>
</tr>
<tr>
<td>1b</td>
<td>Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context.</td>
<td>2 (33%)</td>
<td>2 (33%)</td>
<td>0</td>
<td>0</td>
<td>2 (33%)</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.</td>
<td>5 (83%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>3</td>
<td>Continue professional growth through post-graduate education, continuing education, or professional activity.</td>
<td>5 (83%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Contribute to the Northwest Florida regional economic development.</td>
<td>2 (33%)</td>
<td>3 (50%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
</tbody>
</table>

2. Do you think that our educational objectives (as listed above) are sound, sufficient, achievable and appropriate to the practice of electrical and computer engineering? 5 (83%) YES 1 (17%) NO, suggest changes.

If NO, what changes and/or modifications would you suggest?

- New grads need some background and/or training in business skills (proposals, communication, etc) as well as scheduling (Project) and budgets.

3. Do you have any suggestions for improving our curriculum (courses, laboratories, computer facilities) so that we could better meet our objectives?

- I wish I could have learned more about the RF and spectrum analyzers but its my fault for not having taken the courses – it would have made working a little easier. I have to learn it and use it which is tough in crunch times.
- From the technical side, the education I got was top notch. The soft skills need more attention and emphasis.
- No
- the program, when I was there, was really strong in communications, electronics, and digital type classes. I would like to see more electric power type curriculum added to the program. I would like to see more local businesses involved in the Senior Design projects. This way the student learns how industry works, and it will go along way with getting the graduates jobs.

4. What do you consider to be the greatest strengths and/or weakness of our undergraduate programs?

- I believe that the small class size proves an advantage to educational development. There is much more to be gained from the ability to see the professor directly, as opposed to a graduate student. Also, I assume it is still true, having professors that have come back from industry help to shed a “real” side to Engineering.
- Class size and professor accessibility.
- -Strength: hands on use of scopes and building the robots (programming controllers) I did in school is very useful. Every job I have had people say, “we wish we could clone you”.

Appendix VI - 2
- The faculty (when I was there) was the greatest strength with one notable exception but he's gone. The facilities were perfect for a group the size of mine. I can't imagine that the same labs are sufficient for much larger class.
- Greatest strength at the time of my graduation was the small class size and the lab availability.
- The size of your program allows students to really get to know their professors. Especially, since you will have them for multiple classes. I think the support staff at the department makes things very personal with all students. Sherry and Mr. Weber were all ways a big help.

5. How do you continue professional growth? Please check as appropriate

<table>
<thead>
<tr>
<th>Professional society</th>
<th>3 (50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuing Education</td>
<td>4 (67%)</td>
</tr>
<tr>
<td>Passed EIT Exam</td>
<td>1 (17%)</td>
</tr>
<tr>
<td>Passed PE Exam</td>
<td>1 (17%)</td>
</tr>
<tr>
<td>Masters Degree</td>
<td>2 (33%)</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>1 (17%)</td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Please specify __________________
Appendix VI - 4

A.2  Spring 2005 Survey Results

No Sent: 126  Received: 11
Mailed Feb. 15, 2005

Degree received: Bachelor of Science in Electrical Engineering (BSEE) 2 (18%)  Term & year received May 2003, May 99
Bachelor of Science in Computer Engineering (BSCEN)  Term & year received
Both the BSEE and BSCEN 1 (9%)  Term & year received 2003

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response:

As a result of my UF/UWF Joint Program education, I am well prepared to

<table>
<thead>
<tr>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>2 (18%)</td>
<td>8 (73%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer’s needs</td>
<td>1 (9%)</td>
<td>9 (82%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>3 (27%)</td>
<td>5 (9%)</td>
<td>1 (9%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
<tr>
<td>understand my professional and ethical responsibilities</td>
<td>2 (18%)</td>
<td>7 (64%)</td>
<td>1 (9%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
<tr>
<td>understand the impact of engineering solutions in a global societal context</td>
<td>1 (9%)</td>
<td>6 (55%)</td>
<td>2 (18%)</td>
<td>1 (9%)</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>1 (9%)</td>
<td>9 (82%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
<tr>
<td>understand contemporary engineering issues</td>
<td>1 (9%)</td>
<td>5 (45%)</td>
<td>3 (27%)</td>
<td>1 (9%)</td>
<td>0</td>
<td>0</td>
<td>10 (91%)</td>
</tr>
</tbody>
</table>

2. Which of the following general categories best describes your current work assignment?
(a) Design 1 (9%)  (d) Sales/Marketing  (g) Environmental
(b) Manufacturing  (e) Management 1 (9%)  (h) Unemployed
(c) Research & Development 2 (18%)  (f) Graduate School  (l) Other 4 (36%)

3. What is your situation regarding the Fundamentals of Engineering Exam (formerly EIT Exam)?
   4 (36%) Have not taken  Taken once and failed  1 (9%) Taken once and passed
   ~ Taken more than once and failed

4. What do you consider to be the greatest strength of your undergraduate program?
   • Digital Design
   • Micro-processor applications
   • I got invaluable problem solving skills from the program, and learned to make continuing education part of my life.
   • The ability to think analytically. The confidence in knowing I can learn anything. The work ethic I developed while going through in my opinion, most difficult undergrad degree you can obtain.
   • Digital design and programming and interfacing the two.
   • One on one contact with the teachers.
   • Smaller classes and personal attention by professors

5. What do you consider to be the greatest weakness of your undergraduate program
   • Communication design process
   • Lack of hands on application. Using design tools for PCB, and other complex instruments such as a network analyzer.
   • The lack of professors with work experience. The one professor who had “real world” experiences was able to relate the theory to practical applications much better than the other professors.
   • Signals and systems – but I didn’t study it enough, I feel it was presented and lord knows I took it enough times.
   • Teaching equipment in the labs.
   • Lack of emphasis on the importance of teams in engineering. Teamwork is essential for success. We worked in teams during labs and this gave us the team experience. However, I believe a class should be offered to focus on teams and how to effectively work with others.

6. What one or two specific curriculum changes would you recommend? Why?

Appendix VI - 4
• No changes
• Provide students with the opportunity to learn about circuit board design and manufacturing. Discuss common problems and how to avoid them – cross-coupling, signal reflections, power budgets, ground loops, etc. Most students will face these issues in the course of their careers. Learning the basics of board design will help students avoid costly mistakes in the future.
• More electives – offer more opportunities to take classes like digital communications, dsp, etc. Electives are not offered often and at convenient times.
• More design work like senior design. Senior design work forces a student to go through the entire engineering process from idea conceptualization to having a working product. Steps, like device selection, is something that is very important to get a working product, but is not dealt with in theoretical work.
• The undergrad’s should have more presentation opportunities and more “soft skill” training.
• Not sure it’s needed. I feel good about it.
• None
• Need a class regarding contracts, p & c balance sheet, etc.
• Need a leadership class to prepare for team environment.

7. How long did it take you to get your first full-time permanent job after completing your bachelor’s degree?
   Accepted position upon graduation 2(18%)  Have not obtained a full-time permanent job
   1-6 months 1(9%)  Went to graduate school after graduation
   7-12 months 1(9%)  Returned to military service
   Over 1 year 1(9%)

8. What is your current employment status?
   Employed full-time (35+ hours per week) 4(36%)
   Employed part-time (34 hours or less per week)
   Unemployed, but seek employment
   Unemployed, not seeking employment

9. If you are currently employed, within what general range is your income per year?  (This information will remain strictly confidential)
   Under $20,000 1(9%)  $20,000-$29,999 1(9%)  $30,000-$39,000
   $30,000-$39,000 1(9%)  $40,000-$49,999 1(9%)  $50,000-$59,000
   $50,000-$59,000 1(9%)  $60,000-$69,999
   $70,000 or over 3(27%)

10. If you are employed, the name and address of your company

    Company Name  Fairhope High School, Bell South, Ian Conrad Bergan, Microsystems, Inc., Wayne Dalton Corp., ASI, Boeing, Naval Surface Warfare Center, 46th Test Wing, Automated Publishing Solutions

    Address  ____________________________________________________________________________  ____________________________________________________________________________

11. Please provide any additional comments/suggestions concerning your undergraduate program or the Department of Electrical and Computer Engineering.
    • UF/UWF program is an excellent program and I would recommend its graduates to any employer. Keep up the good work!
    • I learned a great deal in sr. design. I had no idea how important it was going to be to my future. The projects I worked on, I think, are what got me hired. Not to mention the skills, even though green, demonstrated. I had to do a great deal of learning and “putting it all together” during that time.
Questionnaires for Program Objectives

Summary

Sent: 126  Received: 11

1. Mission statement for the joint program
   8(73%) No Changes  1(9%) Changes

   - Offer more electives each semester

2. Program objectives for electrical engineering
   8 (73%) No Changes  1(9%) Changes

   - Focus more on analog electronics. Offer a class on circuit board design to cover board design issues-ground issues, decoupling and cross-coupling issues.

3. Program Objectives for computer engineering
   9 (82%) No Changes  0 Changes

5. Relation to Joint Program:
   Alumni: 11 (100%)
A.3 Fall 2001 Survey Results

Date Sent: 8/29/01  Number Sent: 65  Number of Response 3
Degree received: 3 (100%) Bachelor of Science in Electrical Engineering (BSEE)
Both the BSEE and BSCEN

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response:

As a result of my University of Florida engineering education, I am well prepared to

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>3 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer's needs</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Understand my professional and ethical responsibilities</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Understand the impact of engineering solutions in a global societal context</td>
<td>0</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Understand contemporary engineering issues</td>
<td>0</td>
<td>3 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (100%)</td>
</tr>
</tbody>
</table>

2. Which of the following general categories best describes your current work assignment?

1 (33%) (a) Design (d) Sales/Marketing (g) Environmental
(b) Manufacturing (e) Management (h) Unemployed
2 (67%) (c) Research & Development (f) Graduate School (i) Other
(Field ______________) (Specify:

3. What is your situation regarding the Fundamentals of Engineering Exam (formerly EIT Exam)?

2 (67%) Have not taken  Taken once and failed 1 (33%) Taken once and passed

4. What do you consider to be the greatest strength of your undergraduate program?
   • The ability to work one on one with the instructors.
   • Development of problem-solving skills.

5. What do you consider to be the greatest weakness of your undergraduate program?
   • The lack of available electives.
   • Lack of real-world applications.

6. What one or two specific curriculum changes would you recommend? Why?
   • I would offer more courses at night for those of us who work to take continuing educations courses (especially electives).
7. How long did it take you to get your first full-time permanent job after completing your bachelor’s degree?

   3(100%)  Accepted position upon graduation
   1-6 months
   7-12 months
   Over 1 year

   Have not obtained a full-time permanent job
   Went to graduate school after graduation
   Returned to military service

8. What is your current employment status?

   3 (100%)  Employed full-time (35+ hours per week)
   Employed part-time (34 hours or less per week)
   Unemployed, but seek employment
   Unemployed, not seeking employment

9. If you are currently employed, within what general range is your income per year? (This information will remain strictly confidential)

   Under $20,000  1 (33%)
   $20,000-$29,999  2 (67%)
   $30,000-$39,000

   $40,000-$49,999
   $50,000-$59,000
   $60,000-$69,999
   $70,000 or over

1. Please provide any additional comments/suggestions concerning your undergraduate program or the UF/UWF Joint Program in Electrical and Computer Engineering.
   - The stated program objectives are noble, but the actual coursework did not seem to honor them.
   - There needs to be more emphasis on start-to-finish projects. At work, I don’t solve individual math problems.

1. MISSION STATEMENT FOR THE JOINT PROGRAM
   3 no changes

2. PROGRAM OBJECTIVES FOR ELECTRICAL ENGINEERING
   3 no changes

3. PROGRAM OBJECTIVES FOR COMPUTER ENGINEERING
   3 no changes

4. RELATIONSHIP TO THE JOINT PROGRAM
   3 alumni
A.4  Spring 1999 Survey Results

Date Sent: 2/18/99  Number Sent: 54  Number of Response 16
Degree received: Bachelor of Science in Electrical Engineering (BSEE)
Bachelor of Science in Computer Engineering (BSCEN)
Both the BSEE and BSCEN

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response:

As a result of my University of Florida engineering education, I am well prepared to

<table>
<thead>
<tr>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>11 (69%)</td>
<td>5</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer's needs</td>
<td>10 (63%)</td>
<td>5</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>10 (63%)</td>
<td>6</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
<tr>
<td>Understand my professional and ethical responsibilities</td>
<td>8 (50%)</td>
<td>8</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
<tr>
<td>Understand the impact of engineering solutions in a global societal context</td>
<td>8 (50%)</td>
<td>6</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>11 (69%)</td>
<td>5</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
<tr>
<td>Understand contemporary engineering issues</td>
<td>7 (44%)</td>
<td>8</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>16 (100%)</td>
</tr>
</tbody>
</table>

2. Which of the following general categories best describes your current work assignment?

10  (a) Design   (d) Sales/Marketing
     (b) Manufacturing  (e) Management
     (c) Research & Development (f) Graduate School
     (Field ______________) (Specify: Computer
     Engineer)

3. What is your situation regarding the Fundamentals of Engineering Exam (formerly EIT Exam)?
16  Have not taken   Taken once and failed   Taken once and passed
    Taken more than once and passed   Taken more than once and failed

9. What do you consider to be the greatest strength of your undergraduate program?
   ♦ Location/Reputation of UF
   ♦ The program was very difficult. The difficulty of the program prepared me well for the real world.
   ♦ The high level of work ethic that is necessary to acquire a BSEE is truly indicative of the work ethic required to function as a design engineer.
   ♦ Small classes and teachers always available.
   ♦ The knowledge & experience of the faculty.
   ♦ One on one student/instructor interaction.
   ♦ Professors are nearly always available to assist students.
   ♦ Lab equipment and student teacher ratio
   ♦ Labs & Lab Equipment
   ♦ My digital preparation. Most instructors had background in this, and it spilled over.
10. What do you consider to be the greatest weakness of your undergraduate program?
- More class time offerings including night courses.
- I was not able to concentrate on one field.
- Ability to take desired electives (due to size of faculty and student population.
- Attitude of the faculty.
- EE’s are often expected to know how to program in a standard language such as C or CH. Requiring students to learn CH would be very beneficial.
- No system design training.
- More could be done to demonstrate how the deep theoretical knowledge used/acquired in school is applied to real world engineering problems.
- Quality of instructors
- The lack of practical knowledge (tool use, soldering, etc.). Engineers need some basic understanding of these skills to be more useful at the start.
- A growing trend among a few faculty to make the program easier so that more students can make it through.
- Microprocessors.
- There was very little material covered to educate the student on the financial issues of an engineering program.
- Organization.

6. What one or two specific curriculum changes would you recommend? Why?
- Add a lab to the power course
- Require more tech electives be from the electrical engineering curriculum – Force students to take a direction towards a specialty. They are more useful and marketable in the workplace.
- Electronics II needs to have 3 hours of class time. Two fifty minute classes a week is not sufficient. There is too much information that is missed.
- The only change I recommend is requiring students to be proficient in a high-level programming language.
- Add more electives to allow students to tailor program to individual needs & desires.
- A course on “project management” would be of great benefit since cost and schedule often has a great impact on design. Extending “Senior Design” to 2 terms (1 for the design and 1 for the implementation) while requiring each design to be much more complicated.
- Add more process development to all design classes

7. How long did it take you to get your first full-time permanent job after completing your bachelor’s degree?
- Accepted position upon graduation (75%)
- 1-6 months (25%)
- 7-12 months
- Over 1 year

8. What is your current employment status?

Appendix VI - 10
9. If you are currently employed, within what general range is your income per year?  *(This information will remain strictly confidential)*

<table>
<thead>
<tr>
<th>Range</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $20,000</td>
<td>8</td>
</tr>
<tr>
<td>$20,000-$29,999</td>
<td>2</td>
</tr>
<tr>
<td>$30,000-$39,000</td>
<td>4</td>
</tr>
<tr>
<td>$40,000-$49,999</td>
<td></td>
</tr>
<tr>
<td>$50,000-$59,000</td>
<td></td>
</tr>
<tr>
<td>$60,000-$69,999</td>
<td></td>
</tr>
<tr>
<td>$70,000 or over</td>
<td></td>
</tr>
</tbody>
</table>

10. Please provide any additional comments/suggestions concerning your undergraduate program or the UF/UWF Joint Program in Electrical and Computer Engineering.

♦ This is a wonderful program. I was glad to attend. The small classes made it a wonderful atmosphere. Students learned to work in groups outside of class to help each other do well in the class. The teaching by all the professors was excellent. They knew their subjects.

♦ I believe the program is very sound. It has prepared me very well for both engineering employment as well as graduate school.

♦ Major projects in the “real world” have a large number and type of supporting documents (i.e. Custom Specification, Details Design Doc., Software Requirement Spec, Interface Requirement, etc.). The closest course to giving me any insight to engineering “documentation” was Software Engineering I from the Computer Science Department. UWF needs to do more on “Documentation” classes.

♦ Need Masters level degree offered for Computer Engineer. August 1998 I Quit Dynetics to enter the M.S.E.E. program in Gainesville, Fl. That is why I marked (F) for #2. However, all other answers refer to my period of employment at Dynetics, Inc., including #2 ©
B. SUMMARY OF EMPLOYER SURVEY

B.1 Fall 2004 Survey Results

Sent: 25          Received: 2
2004 Survey

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response:

The graduates of the UF/UWF Joint Program in Electrical & Computer Engineering are well prepared to:

<table>
<thead>
<tr>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer’s needs</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>understand my professional and ethical responsibilities</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>understand the impact of engineering solutions in a global societal context</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>understand contemporary engineering issues</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

2. What do you consider to be the greatest strength of our undergraduate program?
   - Student faculty ratio
   - Small class sizes = better mentoring of students
   - What do you consider to be the greatest weakness of our undergraduate program?
   - Facilities
   - Outdated lab equipment

4. What one or two specific curriculum changes would you recommend? Why?
   - More electives, make electronics II a 4 credit course
   - Technical writing requirements, excellent communication skills are a must have
B.2 Fall 2001 Survey Results

Date Sent: 8/29/01 Number Sent: 15 Number of Response 7

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response: **Highly recommended by firms, which have graduates**

The graduates of the UF/UWF Joint Program in Florida Electrical and Computer Engineering program are well prepared to:

<table>
<thead>
<tr>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>4 (66%)</td>
<td>1 (17%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer’s needs</td>
<td>1 (17%)</td>
<td>4 (66%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>1 (17%)</td>
<td>2 (33%)</td>
<td>2 (33%)</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>Understand my professional and ethical responsibilities</td>
<td>3 (50%)</td>
<td>2 (33%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>Understand the impact of engineering solutions in a global societal context</td>
<td>1 (17%)</td>
<td>4 (66%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>2 (33%)</td>
<td>3 (50%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
<tr>
<td>Understand contemporary engineering issues</td>
<td>0</td>
<td>6 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (100%)</td>
</tr>
</tbody>
</table>

2. What do you consider to be the greatest strength of our undergraduate program?

- The students are mature and well suited for our company.
- Quality professors & instructors.
- Excellent campus & scholastic atmosphere relationship with Univ. of Florida
- Small size classes allows for individual attention.
- Affiliation with UF.
- Source of qualified engineers for industry and government in a region where recruitment is difficult.

3. What do you consider to be the greatest weakness of our undergraduate program?

- Lack of facilities to facilitate growth.
- This is a common problem the students have not been exposed to the national electric code and medium voltage systems. Most universities are not set up to help teach the students design.
- Size. A larger program will offer greater flexibility.
- Lack of practical experience by the professors.
- Inflexibility in working with employers for student internships.
- Students in the graduate program here display weaker analytical skills than the students from other colleges.

4. What one or two specific curriculum changes would you recommend? Why?

- Exclusive of the existing curriculum, add other discipline(s) which provide immediate job opportunities in the region.
• Make power systems and a power design project.
• More EE electives. More EE communication electives.
• Curriculum changes not necessary. More selective entrance requirements may permit more complete exploitation of existing curriculum.

1. MISSION STATEMENT OF THE JOINT PROGRAM

No Changes  4     Changes 2     No Response 1

• Change which serve the needs of …..to serves the needs of interested students.
• The students are well trained in digital systems. Maybe add section for power systems.

2. PROGRAM OBJECTIVES FOR ELECTRICAL ENGINEERING

No Changes  2     Changes 1     No Response 2

• Students should have take EIT prior to graduation.
• More power systems. Make students take EIT prior to finishing school.
• Growth will be beneficial.

3. PROGRAM OBJECTIVES FOR COMPUTER ENGINEERING

No Changes 6     Changes 0     No Response 1

4. RELATION TO THE JOINT PROGRAM

2 EAC Member/Employer; 1 Employer; 3 Employer/Co-op Employer; 1 Graduate Program Director
B.2  Spring 1999 Survey Results

Date Sent: 2/18/99  Number Sent: 54  Number of Response 7

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response:

The graduates of the UF/UWF Joint Program in Florida Electrical and Computer Engineering program are well prepared to:

<table>
<thead>
<tr>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>3 (43%)</td>
<td>4 (57%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 (100%)</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer’s needs</td>
<td>3 (43%)</td>
<td>3 (43%)</td>
<td>1 (14%)</td>
<td></td>
<td></td>
<td></td>
<td>7 (100%)</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>3 (43%)</td>
<td>3 (43%)</td>
<td>1 (14%)</td>
<td></td>
<td></td>
<td></td>
<td>7 (100%)</td>
</tr>
<tr>
<td>Understand my professional and ethical responsibilities</td>
<td>4 (57%)</td>
<td>2 (29%)</td>
<td>1 (14%)</td>
<td></td>
<td></td>
<td></td>
<td>7 (100%)</td>
</tr>
<tr>
<td>Understand the impact of engineering solutions in a global societal context</td>
<td>2 (29%)</td>
<td>2 (29%)</td>
<td>2 (29%)</td>
<td>(13%)</td>
<td>1</td>
<td>7 (100%)</td>
<td></td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>3 (43%)</td>
<td>4 (57%)</td>
<td></td>
<td></td>
<td></td>
<td>7 (100%)</td>
<td></td>
</tr>
<tr>
<td>Understand contemporary engineering issues</td>
<td>3 (47%)</td>
<td>3 (43%)</td>
<td>1 (14%)</td>
<td></td>
<td></td>
<td></td>
<td>7 (100%)</td>
</tr>
</tbody>
</table>

2. What do you consider to be the greatest strength of our undergraduate program?

♦ Elec. Eng. Theory
♦ Object oriented programming
♦ Working in different groups of people. Challenging projects

3. What do you consider to be the greatest weakness of our undergraduate program?

♦ No hands on experience for most graduates
♦ Need more hands on experience in the program

4. What one or two specific curriculum changes would you recommend? Why?

♦ Require more design projects for hands on experience. Require more writing skills and communication skills.
♦ Emphasize software design before implementation.
♦ Make C programming a required course.
### C. SUMMARY OF ENGINEERING ADVISORY COUNCIL SURVEYS

#### C.1 Spring 2006 Survey Results

**Date Sent:** 01/24/06  **Number Sent:** 33  **Number of Response:** 4

1. Please rate your level of agreement with each of the following Educational objectives by checking the column of your response by a mark, x

<table>
<thead>
<tr>
<th>#</th>
<th>Accomplishments of our educational objectives</th>
<th>Rating</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Not Applicable</td>
<td>Total</td>
</tr>
<tr>
<td>1a</td>
<td>Develop electrical engineering solutions either individually or through interdisciplinary teams within a global and societal context.</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>1b</td>
<td>Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context.</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Professionally and ethically, engage in technical or business activity through engineering ability, communication skills, and knowledge.</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>3</td>
<td>Continue professional growth through post-graduate education, continuing education, or professional activity.</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>4</td>
<td>Contribute to the Northwest Florida regional economic development.</td>
<td>1 (25%)</td>
<td>1 (25%)</td>
<td>0</td>
<td>0</td>
<td>2 (50%)</td>
<td>4 (100%)</td>
</tr>
</tbody>
</table>

2. Do you think that our educational objectives (as listed above) are sound, sufficient, achievable and appropriate to the practice of electrical and computer engineering? _3 (60%) YES _2(40%)_ NO, suggest changes.

- Consider modifying
  - Continue professional growth and life-long learning through post-graduate education, continuing education, or professional activity.

- I know it may be splitting hairs, but if this is the formal statement of educational objectives, you may want to consider the following changes:
  - 1a Original: Develop electrical **engineering solutions** either individually or through interdisciplinary teams **within a global and societal context**.
  - 1a Alternate: Develop electrical **engineering solutions** both individually and through interdisciplinary teams **within a global and societal context**.

**Rationale:** In today’s environment (for too many reasons to describe here) being able to function effectively in a team is essential. The original statement implies it is acceptable for the student to learn how to work either individually or in a team, when in reality, when they leave UWF, they should be fully capable and experienced in working with both.

- 1. 1.b Original: Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context.
- 2. 1.b Alternate: Develop computer engineering solutions either individually or through interdisciplinary teams and act accordingly within a global and societal context.
- 3. I currently have no UWF graduates under my supervision. I have had UWF graduates in my prior positions, and found them to be well prepared to function in the EE and CompE technical areas.

- Do you have any suggestions for improving our curriculum (courses, laboratories, computer facilities) so that we could better meet our objectives?
  - Make sure the laboratories and curriculum provide a wide range of applications, e.g. Component design, chemical process control, mechanical process control, statistical control, power distribution, etc. Also, graduates should be familiar with general business and project management concepts.

**Rationale:** Continue improving and promoting the facilities and classes at the FWB campus.

- Continue working with Government and private industry personnel in the Eglin AFB area to determine additional course requirements and focus.
• Not at this time

• Continue to evolve curriculum to stay abreast of new software engineering languages and techniques.

4. What do you consider to be the greatest strengths and/or weakness of our undergraduate programs? Candidates graduate with a good academic background. This could be improved by developing co-op programs or internships with local businesses so that students understand their application of the academics to the daily work environment.

• While I have not attended a UWF class in quite a while, I attended the university, the smaller class sizes were a major strength. From what I understand, class sizes are still relatively small. If that is still the cases, I would say small class sizes are strength.

• Strong academic skills and ready to function in the workplace.

• While I do not have any EEs working for me I do have 4 of UWF computer science graduates working under my supervision. I am a graduate of State University of New York at Buffalo with a BSEE. I would note that while we currently have only hired CS graduates, some of the best programmers I have worked with have come from the Electrical Engineering and other Engineering disciplines. Much of the programming we do is very technical in nature and EES generally have a better grasp of the physical principles and constrains of the systems we are writing code for. I would suggest that perhaps your EE program could emphasize the opportunities Ees have as programmers.
C.2  Spring 2005 Survey Results

Summary of Emailed Questions to EAC
Spring 2005

1. What are the strengths of our graduates?
   - Can’t Answer
   - Hardworking, teamwork skills
   - I believe UWF graduates have had access to more individual attention that students at other schools and therefore can receive a better education.

2. What areas can be improved?
   - Can’t Answer
   - Technical writing skills
   - Don’t know – haven’t been a student or worked with a student recently.

3. What areas are most/least important to your company/the Northwest Florida region?
   - Electrical Engineers, Computer Science, Mechanical, Systems
   - N/A
   - Engineering, Business, Scientific/Technical

4. What additional experiences/preparations do you value?
   - Intern experience is valuable (experience can distinguish a new grad from others)
   - Problem solving skills, using knowledge from a combination of classes to accomplish a design
   - Managing and completing projects in which students must apply principles of the course of study, evidence that the student can apply principles creatively and successfully, some appreciation of safety and environmental impacts of their work.

5. What on-the-job training do you provide?
   - The majority of our training is OJT through assigned work tasks with a mentor as guidance
   - N/A
   - Safety training, business system training, project handling

6. Do you foresee any changes in the mission statement and goals of the UF/UWF Joint Programs?
   - Can’t answer. I don’t know the current mission statement.
   - No
   - Only if necessary to incorporate the values above.

7. Do you see and changes that may need to be made or considered with the program objectives? If so, what would be your suggestion?
   - None at this time.
   - The Computer Engineering program objectives should be converted into the format of the objectives for Electrical Engineering (bulleted list as opposed to paragraph format)
   - Only if necessary to incorporate the values above.

8. Do you see any changes that may need to be made or considered with the program outcomes? If so, what would be your suggestion?
   - None at this time.
   - No
   - Only if necessary to incorporate the values above.
9. Do you see any other issues that may need to be discussed? Is consideration being given to addition of other programs? If so, what area(s)?

- The requirements for honors graduation after the program is turned over to UWF need to be addressed because current UWF requirements for honors graduation is just GPA without any kind of project. I believe that the project requirements should remain in effect because it enhances the meaning of graduation with honors and is an excellent learning opportunity for students. Also, the UWF honors GPA cutoffs are different from that of UF and the GPA is based off of a student’s overall GPA rather than their departmental GPA. The impact of these changes needs to be discussed and resolved as soon as possible because there are students currently at UWF who will be graduation with UWF engineering degrees.

- I think the department should aggressively pursue interdisciplinary opportunities with other UWF departments and regional institutions. Push the envelope – why not developmental interfaces with communications, music, chemistry, biology, business, agriculture, or even other industries?
From: Carlan, Charles [mailto:Charles.Carlan@hatchmott.com]
Sent: Monday, January 31, 2005 2:49 PM
To: Sherry Whitlock
Subject: RE: REMINDER: Engineering Advisory Council Meeting/Feb. 4

Sherry: The reason I did not respond to the quality of graduates is that we haven't hired any. We offer civil, structural and environmental engineering. I did suggest that we add civil as soon as possible.

From: Hayes, Robert B [mailto:robert.b.hayes@boeing.com]
Sent: Wednesday, February 02, 2005 6:32 AM
To: Sherry Whitlock
Subject: RE: EAC meeting questions

Sherry,

These are also a bit late. Sorry. See you on Friday.

Robert
-----Original Message-----
From: Sherry Whitlock [mailto:swhitloc@uwf.edu]
Sent: Tuesday, January 18, 2005 4:26 PM
To: Hayes, Robert B
Subject: FW: EAC meeting questions

Dear Members,

The following questions need your consideration. Please send me your answers to these questions. Also in the previous e-mail your choice(s) by rank on another engineering field you would prefer offered at this institution. Include rationale for each choice.

1. What are the strengths of our graduates? Can't answer
2. What areas can be improved? Can't answer
3. What areas are most/least important to your company/the Northwest Florida region? Electrical Engineers, Computer Science, Mechanical, Systems
4. What additional experiences/preparations do you value? Intern experience is valuable (experience can distinguish a new grad from others)
5. What on-the-job training do you provide? The majority of our training is OJT through assigned work tasks with a mentor as guidance
6. Do you foresee any changes in the mission statement and the goals of the UF/UWF Joint Programs? Can't answer. I don't know the current mission statement
7. Do you see any changes that may need to be made or considered with the program objectives? If so, what would be your suggestion? None at this time
8. Do you see any changes that may need to be made or considered with the program outcomes? If so, what would be your suggestion? None at this time
9. Do you see any other issues that may need to be discussed? Is consideration being given to addition of other programs? If so, what area(s)?

Sherry,

Slightly late, but here are my responses to these questions.

Robert
-----Original Message-----
From: Sherry Whitlock [mailto:swhitloc@uwf.edu]
Sent: Tuesday, January 18, 2005 4:24 PM
To: Hayes, Robert B
Subject: FW: EAC meeting (Feb. 4) and survey

Appendix VI - 20
Hello Robert,

The EAC will be having a meeting on February 4. The topics will be 1) New Engineering programs, 2) Accreditations and program feedback, 3) update on campaign.

UWF should plan to add a new engineering program. Please list and give rationale in order of preference.

Engineering Program:  
1) __ Systems Engineering __________________________
2) __ Mechanical Engineering _________________________
3) ______________________________

Rational: __ Large need in industry for Systems engineers; Mechanical Engineering is a local need that is a good compliment to round out the current programs. _______________________________________
_________________________________________________________________

From: Laura Solari [mailto:lfs4@students.uwf.edu]
Sent: Thursday, January 20, 2005 3:13 PM
To: Sherry Whitlock
Subject: RE: EAC meeting questions

Sherry,

The questions are answered below. I can not guarantee that I answered the same way on the hardcopy.

1. What are the strengths of our graduates? 
   hardworking, teamwork skills

2. What areas can be improved? 
   technical writing skills

3. What areas are most/least important to your company/the Northwest Florida region? 
   n/a

4. What additional experiences/preparations do you value? 
   problem solving skills, using knowledge from a combination of classes to accomplish a design

5. What on-the-job training do you provide? 
   n/a

6. Do you foresee any changes in the mission statement and the goals of the UF/UWF Joint Programs? 
   no

7. Do you see any changes that may need to be made or considered with the program objectives? If so, what would be your suggestion? 
   The Computer Engineering program objectives should be converted into the format of the objectives for Electrical Engineering (bulleted list as opposed to paragraph format).

8. Do you see any changes that may need to be made or considered with the program outcomes? If so, what would be your suggestion? 
   no

9. Do you see any other issues that may need to be discussed? 
   The requirements for honors graduation after the program is turned over to UWF need to be addressed because the current UWF requirement for honors graduation is just GPA without any kind of project. I believe that the project requirement should remain in effect because it enhances the meaning of graduation with honors and is an excellent learning opportunity for students. Also, the UWF honors GPA cutoffs are different from that of UF and the GPA is based off of a student's overall GPA rather than their departmental GPA. The impact of these changes needs to be discussed and resolved as soon as possible because there are students currently at UWF who will be graduating with UWF engineering degrees.
Laura Solari

-----Original Message-----

From: Sherry Whitlock
Sent: Thu 1/20/2005 10:11 AM
To: Laura Solari
Cc:
Subject: RE: EAC meeting questions

The Director would like a soft copy of your answers. Is that possible?

From: Laura Solari [mailto:lfs4@students.uwf.edu]
Sent: Tuesday, January 18, 2005 3:12 PM
To: Sherry Whitlock
Subject: RE: EAC meeting questions

Sherry,

Below are my answers to the EAC questions. I answered the other questions on the hardcopy that was mailed to me.

Future engineering programs in preferred order:

1. Mechanical Engineering - This is the second most popular engineering discipline (next to Electrical Engineering), so it would be most likely to attract the most students. It would benefit our existing engineering programs the most by providing additional resources for our robotics program. An aerospace program could spawn from it in the future.

2. Environmental Engineering - Existing environmental laboratories and professors could be utilized. This would enhance UWF’s growing environmental science programs. This is a relatively new engineering discipline that is generally offered at larger universities, so UWF, a smaller school, may attract students who want the small-school atmosphere.

3. Chemical Engineering - This is one of the more popular engineering disciplines. Many existing chemistry laboratories and professors could be utilized, and the program would supplement UWF’s existing chemistry program.

Laura Solari

From: Skinner, Tom [mailto:Tom.Skinner@reichhold.com]
Sent: Tuesday, January 18, 2005 5:23 PM
To: ‘Sherry Whitlock’
Subject: RE: EAC meeting questions

1. What are the strengths of our graduates? I believe UWF Graduates have had access to more individual attention that students at other schools and therefore can receive a better education.

2. What areas can be improved? Don’t know - haven’t been a student or worked with a student recently.

3. What areas are most/least important to your company/the Northwest Florida region? Engineering, Business, Scientific/Technical

4. What additional experiences/preparations do you value? Managing and completing projects in which students must apply principles of the course of study, evidence that the student can apply the principles creatively and successfully, some appreciation of safety and environmental impacts of their work

5. What on-the-job training do you provide? Safety training, business system training, project handling

6. Do you foresee any changes in the mission statement and the goals of the UF/UWF Joint Programs? Only if necessary to incorporate the values above.

7. Do you see any changes that may need to be made or considered with the program objectives? If so, what would be your suggestion? Only if necessary to incorporate the values above.

8. Do you see any changes that may need to be made or considered with the program outcomes? If so, what would be your suggestion? Only if necessary to incorporate the values above.

9. Do you see any other issues that may need to be discussed? I think the department should aggressively pursue interdisciplinary opportunities with other UWF departments and regional institutions. Push the envelope - why not developmental interfaces with communications, music, chemistry, biology, business, agriculture, or even other industries?

Appendix VI - 22
Hello Everyone,

The EAC will be having a meeting on February 4.
The topics will be 1) New Engineering programs, 2) Accreditations and program feedback, 3) update on campaign.

UWF should plan to add a new engineering program. Please list and give rationale in order of preference.

**Engineering Program:**

1) Mechanical ____________________________

2) Chemical ____________________________

3) Biotech _____________________________

**Rational:** Mechanical would have good interdisciplinary potential with electrical; chemical has good interdisciplinary potential with electrical, computer and chemistry; and biotech is hot with synergies with chemistry, biology, and UF Agricultural at PJC Milton Campus.

Please confirm your attendance at the meeting for the Engineering Advisory Council (EAC) on February 4, 2005. The meeting will begin at 8:00 a.m. and end at approximately 9:00 a.m. (coffee and doughnuts will be available).

**DIRECTIONS:**

PENSACOLA: UWF distance learning classroom, building 70, room 106
(from University Pkwy campus stop light take a right and then a left at the next light.
After the red gas pumps on the left, take the next left which is the engineering and duplicating parking lot 33. If lot is full, you can park across the street in lot 37 which is in front of the soccer field.)

Car tags will not be needed on the Pensacola campus for this meeting. (Ticket writing will be suspended from 8am to 10am for P'cola campus, lot 33 and 37). If you do receive a ticket, please send it to me, and I will
take care of it.

or

FWB:UWF distance learning classroom, building 7, room 703

Car tags will not be needed on the FWB campus for this meeting. When entering campus, turn left and park in front of building 6. You will see a sign that reads "computer lab," leading you behind building 6, and that is where building 7 is located. Room 703 is on the 1st floor. If you do receive a ticket, please send it to me, and I will take care of it.

Attached are the minutes from the last meeting of Feb. 6, 2004, and the agenda for the meeting. Please RSVP at 474-3410 or e-mail: swhitloc@uwf.edu by Tuesday, Feb. 1, 2005.

Sincerely,

Sherry Whitlock
Academic Advisor
Electrical and Computer Engr.
Building 70, Room 116
11000 University Parkway
Pensacola, FL 32514-5754
850/474-3410
866/340-5886 (Toll Free)
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(softcopy location: c/form.ltr.ABEToutcomenewmajor.EACanswers.05)
C.3 Fall 2002 Survey Results

Date Sent: 9/24/02 Number Sent: Number of Response 4

1. Please rate your level of agreement with each of the following statements by circling the number in the column of your response: Highly recommended by firms which have graduates.

The graduates of the UF/UWF Joint Program in Florida Electrical and Computer Engineering program are well prepared to: 4 responses

<table>
<thead>
<tr>
<th>Ability</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of mathematics, science, and engineering skills</td>
<td>1 (25%)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>design systems, components or processes to meet my employer’s needs</td>
<td>1 (25%)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>function on multi-disciplinary teams</td>
<td>1 (25%)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>understand my professional and ethical responsibilities</td>
<td>1 (25%)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>understand the impact of engineering solutions in a global societal context</td>
<td>0 (%)</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>apply the techniques, skills and modern engineering tools necessary for good engineering practice</td>
<td>0 (%)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>understand contemporary engineering issues</td>
<td>0 (%)</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
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5. What do you consider to be the greatest strength of our undergraduate program?
   ♦ Mature graduate.
   ♦ Broad cross section of students, ex military.
   ♦ Strong background.
   ♦ Simply the fact that an undergraduate engineering program is offered in a small community. Now students can get a BS Engr., get a job, & continue engineering studies at the graduate level.

6. What do you consider to be the greatest weakness of our undergraduate program?
   ♦ Lack of other engineering disciplines...mechanical, civil, chemical.
   ♦ Power
   ♦ Trying to build a great technical reputation amongst established technical community with strong allegiance to Auburn, UF, MSU, etc.

7. What one or two specific curriculum changes would you recommend? Why?
   ♦ Computer Engineering – An overview of the real-time software development process (CMM/SEI) (System Engineering).
   ♦ Electrical Engineering – An overview of electrical systems development process (CMMI)
## SUMMARY OF ENGINEERING ADVISORY COUNCIL SURVEY
### QUESTIONNAIRES FOR PROGRAM OBJECTIVES

<table>
<thead>
<tr>
<th>Changes</th>
<th>No Changes (6)</th>
<th>No Response (6)</th>
</tr>
</thead>
</table>

### MISSION STATEMENT OR THE JOINT PROGRAM

**No comments**

<table>
<thead>
<tr>
<th>Changes</th>
<th>No Changes (5)</th>
<th>No Response (6)</th>
</tr>
</thead>
</table>

### 1. PROGRAM OBJECTIVES FOR ELECTRICAL ENGINEERING
- Possible enhancement of program to include training on software applications currently utilized by employers for graduates.
- Cannot emphasize the importance of general physics, chemistry knowledge.

### 2. PROGRAM OBJECTIVES FOR COMPUTER ENGINEERING
- Same as above
- Same as above

### 4. Relation to the Joint Program

**EAC Member (4)  Employer (2)  Co-op Employer (1)**