B2. PROGRAM EDUCATIONAL OBJECTIVES

B2.1 Mission Statements

The fundamental mission of UW-Platteville and the entire UW System is to serve the people of Wisconsin. This basic goal is expressed in detail in the mission statement adopted in 1988 and revised in 2002. In those statements, UW-Platteville pledges itself to:

1. Enable each student to become broader in perspective, more literate, intellectually more astute, ethically more sensitive, and to participate wisely in society as a competent professional and knowledgeable citizen.

2. Provide baccalaureate degree programs which meet primarily regional needs in arts and sciences, teacher education, business, and information technology.

3. Provide baccalaureate degree programs and specialized programs in middle school education, engineering, technology management, agriculture, and criminal justice which have been identified as institutional areas of emphasis.

4. Provide graduate programs in areas clearly associated with its undergraduate emphases in education, agriculture, technology management, engineering and criminal justice.

5. Provide undergraduate distance learning programs in business administration and graduate online programs in project management, criminal justice, and engineering.

6. Provide agricultural systems research programs utilizing the Pioneer Farm in partnership with businesses, universities and agencies.

7. Expect scholarly activity, including applied research, scholarship and creative endeavor, that supports its programs at the baccalaureate degree level, its selected graduate programs, and its special mission.

8. Seek to serve the needs of all students and in particular the needs of women, minority, disadvantaged and nontraditional students. Furthermore, the University seeks diversification of the student body, faculty and staff.

9. Serve as an educational, cultural and economic development resource to southwestern Wisconsin.

These statements, along with the UW System and University Cluster mission statements, provide a guide to UW-Platteville in what it attempts and does not attempt to accomplish as an institution of higher education.

After the university reorganization in 1994, the Mathematics, Chemistry, and Physics Departments joined the College of Engineering forming the College of Engineering, Mathematics and Science (EMS). The college embarked on a strategic plan that was finalized in 1997. In October 2004, the faculty reaffirmed the strategic plan that has the vision of:

The College will be recognized as a leader in undergraduate and on-line graduate education in engineering, mathematics and science. The College will provide challenging curricula in a supportive learning environment.

The College will provide a strong foundation for life long learning, enabling its graduates to practice their professions with proficiency and integrity.

The College will serve as a resource for economic, industrial, and community development.

The College of EMS Strategic Plan can be seen at the college’s WEB site.
The Department of Electrical Engineering mission statement is:

The mission of the Electrical Engineering Department is to provide a quality electrical engineering education with extensive hands-on and laboratory experience that will enable our graduates to practice their profession with proficiency and integrity.

The mission statement was developed in 1997 and reviewed periodically. It has been in the university catalog and published on the EE web pages at http://www.uwplatt.edu/ee/goals_obj.htm since 2000.

**B2.2 Program Objectives**

These program objectives are reproduced below.

The Educational Objectives of the Electrical Engineering Program are to graduate engineers who:

1. have the ability to use modern analysis and design techniques and have the laboratory skills to use state-of-the-art equipment to solve practical engineering problems.

2. have the professional skills to function effectively in the work environment as well as in the community.

3. have a solid understanding of professional and ethical responsibility.

4. have a broad education in order to understand contemporary issues and the impacts of technology on society and the environment.

5. have the ability to engage in life-long learning and recognize its importance.

The program mission statement and educational objectives are consistent with the university mission of “enable each student to become broader in perspective, …, ethically more sensitive, and participate wisely in society as a competent professional and knowledgeable citizen.” The program’s mission statement and educational objectives also support the College’s vision. The first program objective is consistent with the programs’ mission of “providing quality education with extensive hands-on and laboratory experience…” The other program objectives support the program’s mission of “graduating engineers…… to practice their profession with proficiency and integrity.”

These objectives are consistent with the ABET accreditation criteria through the program outcomes. Each of the objectives is supported by a selection of our program outcomes as outlined in Section B3 of this document. Each of our program outcomes is related to one or more of the ABET Criterion 3 outcomes as outlined in Section B3 of this document.

**B2.3 Constituencies**

The Curriculum Committee identified students, alumni, faculty, and employers as our major constituencies in fall 1997. The faculty added ABET as a constituent. Each of these constituencies has a different focus on the mission and the program objectives. The following
B2.4 Development of Program Objectives and Periodic Review.

The program mission statement was developed in 1997. The faculty reviews the mission statement yearly. The College of EMS Advisory Board (AB) also reviews the mission statement at least every 5 years.

In fall 1997 the Curriculum Committee, with input from students, developed preliminary educational objectives for the department. These preliminary objectives were presented to the EE faculty in early spring 1998 and were also published in the spring 1998 EE Newsletter for alumni input. In the fall of 1998 the chair of the Curriculum Committee presented the program educational objectives to the EMS Advisory Board members with an electrical engineering background. With the suggestions from the AB members, the Curriculum Committee finalized its program educational objectives in November 1998. Faculty adopted the EE program educational objectives in fall 1998. The faculty reaffirmed these objectives with an editorial wording change in the first objective in fall 1999. They are published in the University catalog and on the Electrical Engineering web page.

The procedure that we use to review and change the program objectives is outlined here. Following the outline of the procedure is a more detailed discussion of how the constituents fit into the review process.

1. The Assessment Committee provides an annual overall summary of the assessment results from the previous academic year. The committee summarizes the input that it received from the various constituencies with respect to program objectives and outcomes.

2. If there are any recommendations with respect to possible modification of the program objectives, the curriculum committee seeks student input.

3. Recommendations collected by the curriculum committee are presented to the AB members. If the AB recommends some modifications, the modified objectives are printed in the newsletter and alumni are asked for additional input.

4. If four years pass without recommendations from the curriculum committee then in the fifth year the curriculum committee will meet with the AB to discuss changes in the industry and their implications on the mission and program objectives. Any changes recommended by the AB will be published in the newsletter with a request for comments by alumni.

5. After comments from the constituents have been completed, the faculty approves the modified program objectives and develops new assessment tools as required.

The involvement of the constituencies in the development and review of the program
objectives is outlined in more detail the following paragraphs.

**Students:** Students are naturally very important constituents of our program. It is their future that program mission and objectives are designed to shape. The faculty believes that student involvement is essential in determining the educational objectives as well as providing feedback in the assessment process. With that in mind, the Curriculum Committee had a student member (selected by the IEEE Student Branch) in developing the initial objectives from the beginning in Fall 1997. In 1998, the ABET Committee had a student member to finalize the objectives and develop assessment tools. In 1999, again, student members were included in Assessment, Curriculum, and Laboratory Committees of the department. The IEEE student branch now has their own committees in these areas and continues to appoint students to these three EE department committees.

**Alumni:** The faculty believes that alumni are uniquely qualified to provide feedback on the program objectives. After being away from school for a number of years and working in industry, alumni have a different focus than other constituencies regarding program objectives. Their involvement is important in establishing the objectives and providing feedback for program improvements.

After the development of initial program objectives in Fall 1997, alumni input was sought by publishing these initial objectives on the spring 1998 EE Newsletter. The objectives are also published periodically in the newsletter. In the future we will be inviting the alumni to comment on the objectives again. Also, the College of EMS Advisory Board reviews the Program Educational Objectives on a regular basis. Note that the AB’s involvement will be explained in a later section. They are included in this section because many of the board members are alumni.

**Employers:** Employers of our graduates are important constituents as they are the providers of jobs for graduates. They are also in a unique position to be able to compare our graduates’ performance to graduates of other schools. The department seeks employer input in developing program objectives and reviewing the program objectives in three main ways:

1) The College sends surveys to the supervisors of our two-year and five-year graduates in conjunction with the Alumni Surveys. The results of these surveys are reviewed by the Assessment Committee and reported to faculty at the yearly Program Educational Objective review. Although we do not ask for direct input from this group as a way to review the objectives we do get responses to more open-ended questions on the surveys that help us determine whether the objectives are still valid and current. A sample of the Alumnus Employer Survey can be found in the appendix.

2) In 1999 the Assessment Committee developed a survey for the prospective employers of our graduates to receive feedback from the employers. These surveys were delivered to interviewers by the Advising & Career Exploration Services office. We have had little success in receiving feedback in this way. It seemed that the surveys had to pass through too many hands to reach their target and then get back to us. Therefore in fall 2005 we changed our approach. Each semester the university sponsors a Career Fair. Before the fair the university sponsors a breakfast for the interviewers and other interested parties. We go to the breakfast with a stack of short surveys and ask for input from the
interviewers. We have gotten a much better response from the interviewers this way. We received eleven responses from the interviewers the first time we handed out the survey. That is more than double the response that we received for this sub-constituency in the past. In addition to asking about the quality of our graduates as their abilities relate to the program objectives we also ask them to rank the importance of the objectives to their companies. This is a new tool for us and we are in the process of determining what the results mean in terms of how we emphasize the material in our curriculum. A sample of the Employer Fair Survey can be found in the appendix.

3) EMS Advisory Board (AB): The AB plays an important role in the quality of programs in the College. The membership includes representatives from industry that are truly interested in advancing education at UWP. The ultimate purpose of the AB is to provide advice/guidance to the College on matters pertaining to the teaching and professional practice of engineering. The members are appointed with consideration to the balance between various engineering disciplines, and the candidate’s professional stature and professional achievements. The AB meets twice a year. Our review process requires that the AB also review the program objectives at least every 5 years. After the faculty’s review of the objectives in Fall 2003, the AB reviewed and reaffirmed the objectives at their Spring 2004 meeting. In addition, AB members are asked to provide comments about the program through the AB web page. The department also seeks feedback from the AB on a regular basis. We have afternoon breakout sections with the electrical engineering members of the AB where we discuss curriculum issues, mission, objectives, outcomes and assessment procedures and results.

Faculty: EE faculty is naturally the most active constituent. The faculty is directly responsible for designing a curriculum that meets the program objectives and implementing any change in the curriculum. The faculty is responsible for evaluating the mission and educational objectives on an annual basis. The Assessment Committee summarizes the results of the previous year’s assessment and makes recommendations regarding possible improvement areas in September. (An Assessment calendar is displayed in Section B3 of this report.) With the input from the Assessment Committee, the Curriculum Committee, and constituencies, the faculty reviews the mission statement and Program Educational Objectives. If faculty believes that there is a need for change, the Curriculum Committee is asked to seek further input from the constituencies regarding possible changes in the Educational Objectives. After input from constituencies, the Curriculum Committee brings the recommendations to the faculty for approval by the end of that academic year. If the recommended change is in the wording rather than the content of an objective, faculty can make the change without additional input from all constituencies. This occurred in 1999 when a minor reordering of the words in Objective #1 was approved by the faculty. Since then the review process has not resulted in any modification of the mission or the objectives. Most recently, the faculty reaffirmed the program objectives in the fall of 2005.

ABET: The Criteria for Accrediting Engineering Programs and the Self-Study Questionnaire were used as guidelines in the development of the Program Objectives and in the design of the assessment process. As these documents are revised and changed they in turn drive revisions and changes in our assessment process. In addition, members of the Assessment Committee have attended ABET sanctioned accreditation workshops.
Even if the faculty does not see a need to revise the objectives, our review process requires that the objectives must be reviewed and discussed by the AB members in five-year cycles. We feel that the AB members, having a vested interest in the quality of our program and having a better view of changes in the qualifications of EE graduates, may provide guidance with respect to possible changes in the program objectives. Hence, although the faculty indicated that there was no need to change the program objectives in Fall 2003, the faculty charged the Curriculum Committee to discuss the program objectives with the AB members. In Spring 2004, the program objectives and possible modifications were discussed at the AB meeting. Members felt that the objectives were appropriate and recommended no modifications.

B2.5 Process That Ensures the Achievement of Objectives

The department assures the achievement of the program objectives by designing an appropriate curriculum and by an assessment process that aims for continuous quality improvement of the program.

The faculty has developed a curriculum designed to provide a quality education that emphasizes a strong background in mathematics, physics, and engineering sciences and which is complemented with extensive hands on and laboratory experience. Laboratory and design experiences are distributed throughout the curriculum rather than concentrated in a few courses. The faculty believes that it is not only what students know but also what they are able to do with that knowledge that is very important for a quality education. Having laboratory and design content distributed throughout the curriculum provides significant opportunities for students to enhance their non-technical as well as technical skills.

In order to assure that program educational objectives are appropriately addressed in the curriculum, the faculty has developed a set of expected learning outcomes for each electrical engineering course. As shown in course syllabi in Appendix I, Section B, these expected learning outcomes correspond to certain program educational objectives and outcomes. These relationships are summarized in Tables B3.2 and B3.3 on page EE - 17 and EE - 18 of this self-study report. The Curriculum Committee reviews the expected learning outcomes of the EE courses. During the last week of each semester, the Curriculum Committee surveys students in each EE class to receive feedback regarding how well the expected learning outcomes in that particular class were addressed. In addition, the Curriculum Committee regularly reviews the course folders to see if the course topics and expected learning outcomes are appropriately addressed.

The Assessment Committee continuously reviews the assessment results and reports to the faculty. Following the assessment activity schedule shown in Table B3.5, every September the Assessment Committee summarizes the assessment results from the previous academic year and makes recommendations to the faculty regarding any curriculum suggestions to improve the program. The Curriculum Committee can also recommend program improvements as a result of its assessment of course portfolios/outcome analysis. If the faculty approves the recommendations from the Assessment or Curriculum Committees, the Curriculum Committee is asked to prepare an implementation plan for the recommended improvements and bring it to the faculty. In the end, the faculty approves the implementation plan and executes it.
In addition to the assessment tools that are related to the curriculum and the program outcomes, the Assessment Committee uses the Alumni Survey, the Alumnus Employer Survey, and the Employer Fair Survey as measurements of how well our graduates are achieving the program objectives. All of these surveys can be seen in the appendix of this report.

B2.6 Evaluation of the Level of Achievement of the Objectives

The College conducts annual surveys of the two-year and five-year alumni. Although the College conducts the surveys, the department has total control over what goes into the surveys. In the past the surveys focused on program outcomes. We were concerned about the rate of return on these surveys. In the fall of 2003 we decided to call the alumni before the surveys were sent out so that we could do an address check and impress the students with the importance of the survey. In Spring 2004 the return rate was almost three times higher than in previous years. Results of those surveys are described in Section B3.

The objectives are supposed to “…. describe the career and professional accomplishments …” of our graduates. We feel that alumni and employers are best suited to judge the achievement of the educational objectives. For the Spring 2005 alumni and employer surveys, we changed the format of the surveys so that they focus on the program educational objectives. This makes the surveys shorter and we expected a higher return rate for the surveys. That year we got about the same number of returns as the previous year. We are approaching a 40 % return rate. The Alumni and Employer Surveys are included in the appendix of this report.

In addition to the alumni and employer surveys we have added the Employer Fair Survey as described above as a tool for evaluating the achievement of the program educational objectives. We received eleven responses from the interviewers the first time we handed out the survey in Fall 2005. In addition to asking about the quality of our graduates as their abilities relate to the program objectives we also ask them to rank the importance of the objectives to their companies. This is a new tool for us and we are in the process of determining what the results mean in terms of how we emphasize the material in our curriculum. A sample of the Employer Fair Survey can be found in the appendix of this report.

Since these surveys are new, they are the first set of measurements we have accomplished directly related to the objectives. Our surveys typically have five choices for answers; with 1 being the lowest score and 5 the highest. For assessment tools where surveys are used, the responses to individual questions are converted to numerical numbers whenever possible and average values and standard deviations are calculated. Also, the percent of the respondents who give “poor” (1), or “below average” (2) ratings to individual survey questions are calculated. The Assessment Committee uses the following test to decide whether or not an objective as measured by a question in a survey is being met.

TEST 1: If more than 20 % of the respondents give “poor” or “below average” rating to a question the objective measured by that question will be accepted as not being satisfied and the Assessment Committee will present this as an area that may require corrective action by the
In the years previous to 2004 the Alumnus and Employer Surveys were all about program outcomes. During those years no outcomes failed test #1. Because the outcomes map to the objectives as shown in Section B3.1 we have always inferred that the program educational objectives were also satisfied.

The first year that we directly surveyed the alumni and their employers about the program educational objectives was spring 2005. The Electrical Engineering Alumnus Questionnaire had 14 responses to 5 Objective questions for a total of 70 questions answered from 1 (low) to 5 (high). There were only 2 twos and only 2 threes. All other scores were 4 or above. All averages were above 4.2. The Electrical Engineering Alumnus Employer Questionnaire had 11 responses to 5 Objective questions for a total of 55 questions answered from 1 (low) to 5 (high). No one recorded a 1 or a 2. There were only 6 threes. All other scores were 4 or above. All averages were above 4.0.

In our first year the Employer Fair Survey had 11 responses to 5 Objective questions for a total of 55 questions answered from 1 (low) to 5 (high). No one recorded a 1 or a 2. There were only 10 threes. All other scores were 4 or above.

In the three surveys of the objectives none of the objectives failed Test #1.

An objective-by-objective breakdown of the results of the Spring 2005 Electrical Engineering Alumnus Questionnaire and Electrical Engineering Alumnus Employer Questionnaire and the Fall 2005 Employer Fair Survey follows.

Objective 1)
have the ability to use modern analysis and design techniques and have the laboratory skills to use state-of-the-art equipment to solve practical engineering problems.

The Alumni, their employers and the interviewers have indicated that this objective is satisfied.

Objective 2)
have the professional skills to function effectively in the work environment as well as in the community.

The Alumni, their employers and the interviewers have indicated that this objective is satisfied.

Objective 3)
have a solid understanding of professional and ethical responsibility.

The Alumni, their employers and the interviewers have indicated that this objective is satisfied.
Objective 4)  
have a broad education in order to understand contemporary issues and the impacts of technology on society and the environment

The Alumni, their employers and the interviewers have indicated that this objective is satisfied. This objective has the lowest overall score of the five objectives. This means that we are watching this objective and the outcomes related to it closely. The university as a whole is moving toward outcome based assessment. In particular the courses that count for general education credits in the areas of historical perspective, social sciences and fine arts will soon implement outcome-based assessment. That leads us to expect that the results for this objective will continue to improve.

Objective 5)  
have the ability to engage in life-long learning and recognize its importance.

The Alumni, their employers and the interviewers have indicated that this objective is satisfied.

As a consequence of the results of these surveys we conclude that our alumni have met our Educational Objectives. However we will continue to look into ways that may improve the performance of our alumni on objective #4.