Electrical Engineering Assessment Report

For 2008-2009 Academic Year

This Annual Assessment report summarizes the assessment activities for the academic year 2008-2009. We continued to use the new assessment process adapted from Spring 2006, which continues to work well. There was 58% and 43% compliance respectively in submission of assessment reports for all undergraduate courses that were taught during Fall 2008 and Spring 2009 semesters. Concerns and action items from the current 2008-2009 academic year assessment process are discussed first in Section 1. Progress on action items from the previous year is summarized in Section 2.

A summary of the present BSEE assessment process together with the course assessment template is presented in Appendix A. A flow-chart has been developed for the EE curriculum and is enclosed in Appendix B. This is followed by an itemized review of different assessment measures in Appendices C through G. The appendices provide the details on various assessment measures as well as recommendations from faculty.

Following up on the main action item identified in the last assessment report (item 2008.A1 in 2007-2008 report), we developed four specialization tracks within the EE curriculum: systems track, power track, microelectronics track and a general track. During the process, we performed a comprehensive review of the EE Curriculum and made suitable changes to streamline the offering of our required courses and elective courses within the specialization tracks. As a result, the following changes to the EE curriculum were proposed and approved by the EE faculty:

1. Programming courses: We replaced the programming courses CptS 251 and EE 221 with CptS 121 and Cpts 122. This now provides a total of 8 credits of programming compared to the current 5 credits. Students will take a placement test for CptS 121 and, if necessary, will take CptS 111, before getting into Cpts 121. Those having to take Cpts 111 will have Engr 120 waived.

Student experience/preparation with programming was found to be insufficient based on exit interviews and performance in Senior design project. The current change allows for a more rigorous introduction to programming based on two four-credit courses, each with a significant lab component. EE 221, which introduces matlab was eliminated; matlab will be introduced through basic exercises in early circuits courses and reinforced in 300-level courses.

1. EE 262 will be combined with EE 261; this will increase 261 to 4 credits.
Students would have a better experience with a combined theory/lab course in circuits I. This change will insure better coordination between classroom lectures and laboratory exercises, as well as force students to take them concurrently.
2. EE 351, 362, and 489 are no longer required for all EE majors. Instead, we will have four EE specialization tracks: power, microelectronics, systems, and general. Each track nominally requires 15 credit hours of electives specific to that area. Faculty from each area prescribes a list of courses to choose from to satisfy the track requirement (the list was subsequently approved by the curriculum committee).

Having different tracks within the EE program would allow students to focus more of their 300-400 level courses within the area of specialization.

1. EE 362 will have an additional one credit of lecture, for a total of 3 credit hours. Currently it is a 2 credit course (six lab hours per week).
2. With the above changes, the total number of credit hours for the EE program will be reduced from 128 to 123.

Current total of 128 credit hours is high compared to many other EE programs nationwide (120-125 is more typical).

The above changes will go into effect starting Fall 2010. The revised program of study and the track requirements are included in Appendix C and D, respectively.

Syllabi for the courses are largely the same as those from last year. The syllabi are available along with the list of approved technical electives, and the area specific assessment plans at the EECS website

 <http://school.eecs.wsu.edu/Undergraduate/ElectricalEngineering/EESyllabi/>

The main action item identified by CC for the next academic year is summarized first. Detailed discussion of these action items and the measures and concerns that led to these action items is presented in the first section on assessment activities.

(2009.A1) With the introduction of specialization tracks, there are less number of required courses and more elective courses. The curriculum committee should properly coordinate the offering of required and elective courses (Fall vs. spring semester) so that students can properly meet the track requirements as well as the appropriate pre-requisite courses in a streamlined manner.

(2009.A2) Monitor the impact of changes in programming courses on student retention.

A summary of the EE curriculum activities in addressing the topics from previous year is presented next:

(2008.A1) Introduce specialization tracks within EE curriculum: As explained above, the Curriculum committee did a comprehensive review of the EE curriculum and made changes to better streamline required and elective courses. Specialization tracks were introduced to facilitate this.

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**1. Assessment Activities**

All the EE course assessment reports for the 2008-2009 academic year can be seen from

<http://www.eecs.wsu.edu/~schneidj/Assessment/ee.html>

 According to our EE Assessment plan, the key courses that provide significant feedback on many of the BSEE program outcomes A through K are the senior design courses EE 415 and EE 416. These two courses were taught by Profs. Patrick Pedrow and Scott Campbell this academic year. The reports from the Prof. Pedrow are included in Appendix E along with the design course summary report from Prof. Pedrow (this is not there yet but Pat is working on it). The evaluators for the two courses include external industry members who then provide valuable assessment feedback from the industry perspective. In general, the course reports indicate that all the main outcomes assessed by the courses were met in the curriculum. Prof. Pedrow has made several specific recommendations and their main observations are listed first:

(Note: Concerns/recommendations below need updating after all course reports are in)

2008. 1

Concern: Weak teaming skills

CC Recommendation: CC encourages following up on this topic with the entire EE faculty. CTLT is also helping in this regard.

2008.2

Concern: Qualification of students entering EE415 and EE416.

CC Recommendation: CC recently modified the pre-requisites for EE415 to explicitly require all the required 300-level EE courses to be completed before a student can enroll in EE415. We will monitor the effectiveness of the change.

2008.3

Concern: Weak programming skills

CC Recommendation: CC plans to revisit the programming requirements in the BSEE curriculum in the next academic year. A topic for discussion is whether to revert to the more rigorous computer science programming classes CS121 and CS122 in the BSEE program.

The systems area courses EE221 (Numerical methods), EE 321 (Electrical Circuits II), EE 341 (Signals and Systems), EE 451 (Digital Communication Systems), EE 464 (Digital Signal Processing) and EE 489 (Introduction to Control Systems), are discussed in the systems area report submitted by Prof. Sivakumar Krishnamoorthy in Appendix E. Again, the main recommendations are summarized next.

2008.4

Concern: Inadequate Matlab programming skills

CC Recommendation: CC encourages system faculty to explore the effectiveness of EE221 which has been specifically introduced into the EE curriculum for addressing this concern.

2008.5

Concern: Offering of EE441

CC Recommendation: CC recommends system faculty to either offer the course in the near future or to drop the course from the catalog.

In the area of electrophysics, the individual course reports and the summary can be seen at

http://www.eecs.wsu.edu/~schneidj/Assessment/ee.html

There was no summary report submitted for the electrophysics group.

The assessment material related to the microelectronics area can be seen in Appendix F. The assessment reports for the courses EE311 (Electronics), EE476 (Analog Integrated Circuits) and EE477 (Analog Integrated Circuits Laboratory) are available at

http://www.eecs.wsu.edu/~schneidj/Assessment/ee.html

The main recommendations are highlighted below.

2008.6

Concern: Coordination of EE311 and EE352.

CC Recommendation: CC recommends the microelectronics area faculty to discuss the coordination of topics in the two required core courses EE311 and EE352. This will be pursued as part of the curriculum revision planned for next academic year.

In the power systems area, the only available reports are from the power area course EE361 (Electrical Power Systems). Two instructors did not submit assessment reports. Prof. Tomsovic has since left WSU while Prof. Donolo was an adjunct faculty. The following list summarizes the main concern of the power area faculty.

2008.7

Concern: Phasor skills for students entering EE361

CC Recommendation: Power area faculty are encouraged to work with instructors of the pre-requisite classes EE261 and EE331 to include a better coverage of phasor problems in those classes.

2008.8

Concern: Writing in the Major (M course) requirements for EE362.

CC Recommendation: CC has changed the writing in the major requirement class to EE352 from EE362 effective Fall 2008.

Focus group reports used in the previous year assessment process have been replaced by a new assessment tool, Senior Curricular Debrief Session Report, starting this academic year. The Senior Curricular Debrief Session report, administered and prepared by CTLT, serves as a primary metric for the BSEE Program outcomes F, G, H, I and J. This report is presented in Appendix G. The main concerns from the debrief session report are stated below.

2008.9

Concern: Coverage of ethics in EE curriculum.

CC Recommendation: Students note that they cannot recall which EE courses involved discussion of engineering ethics. CC will monitor the coverage of ethics related topics in EE courses as part of the curriculum revision planned for next year.

2008. 10

Concern: Exposure of curriclular debrief to general EE faculty.

CC Recommendation: CC will share the results of curricular debrief report with all EE faculty and encourage similar assessment tools in other EE courses. EE 415 and EE 416 senior design courses have already started in this direction.

A compilation of assessment activities by CC in evaluating each of the A through K program outcomes is presented next. The recommendations by CC related to each of these outcomes is summarized below. Most of these recommendations are related to one or more of the concerns (2008.1) to (2008.11) as noted below, and they are repeated below for the sake of completeness.

Outcome A: Ability to apply knowledge of mathematics, science and engineering.

1. EE 261 and EE 262 will be merged into a single 4 credit course. Core contents remain the same; three phase circuits has been dropped from the syllabus.
2. CC will work with the Dean’s office on possibly strengthening the mathematical skills learned by our students in the basic mathematics classes.

Outcome B: Ability to design and conduct experiments as well as analyze and interpret data.

1. EE 261 and EE 262 will be merged into a single 4 credit course for better lab-lecture coordination.

Outcome C: Ability to design a system, component, or process to meet desired needs.

1. Outcome measures do not indicate any specific weakness in this area for the EE students. CC will continue to monitor the coverage of design topics in the revised EE curriculum.

Outcome D: Ability to function on multidisciplinary teams.

1. Presently, our EE senior design teams contain only EE students and computer engineering students. EECS is moving toward more interdisciplinary teams within EECS. Soon the computer science students will participate in a required two sequence senior design program similar to the EE415/416 sequence presently required for all EE and computer engineering students. In addition, EECS students will be able to “crossover” and participate in either the EE senior design projects or the computer science senior design projects. In addition to this, the Dean of Engineering has endorsed a scheme by which seniors within any engineering school or department can “intermingle” and join each other’s design projects. This use of broader spectrum interdisciplinary teams is encouraged by CC; however, all ABET outcomes must continue to be assessed properly.
2. To strengthen our students’ experience in the teaming environment, teaming skills should be introduced early in the curriculum and reinforced at each level throughout the EECS curriculum. Teaming skills include effective communication with spoken and written English. EECS should measure student proficiency with spoken and written English, especially when English is the student’s second language. In some cases an accent reduction class or equivalent should be required of some students before they enter the EE415/416 sequence. CC should ask one of the design instructors, Scott Campbell, to make a DVD presentation that can be shown to EE415/416 classes. The focus would be on teaming skills, team dynamics, and efficient techniques for engineering teams. The material would be a mix of textbook theory and personal observations from teaching EE415/416. A team of former students could be invited to participate. By having the information on DVD the burden for presenting the material every semester would be lessened. Industry Advisory Board members should also be surveyed regarding successful seminar series that are used to train their employees on modern engineering teaming skills.

2008.12

 Concern: Interdisciplinary engineering design courses.

CC Recommendation: CC will work with the Dean’s office in the development of interdepartmental engineering design classes as well as Computer Science design classes as alternates to the EE design courses.

Outcome E: Ability to identify, formulate, and solve engineering problems.

1. CC will recommend the electro physics area faculty to discuss the syllabi for EE 331 and EE 351 towards better coordination.
2. CC will recommend system area faculty to consider introduction of contemporary industrial design concepts into EE 489, which will also address concerns on Outcome J on knowledge of contemporary issues.

Outcome F: Possess an understanding of professional and ethical responsibility.

1. CC will work with instructors of EE 415 and EE 416 to incorporate discussions of ethics more explicitly into EE415 and 416. CC will identify other EE courses where discussion of ethics can be incorporated more explicitly.
2. In senior design classes, there should be more explicit discussion of standards and their relevance in engineering practice. CC will identify other EE courses where explicit discussion of standards and their relevance in engineering practice can be introduced.

Outcome G: Ability to communicate effectively in written and oral formats.

1. CC will coordinate with instructors of EE352 on the assessment of writing skills in that course.
2. CC will explore the option of introducing oral communication components such as seminars in any EE course other than EE 415 and EE 416.

2008.12

 Concern: Oral communication components in EE curriculum

CC Recommendation: CC will monitor the coverage of oral communication components in EE curriculum (CC monitoring needed).

Outcome H: A broad education to understand the impact of engineering solutions in global, economic, and societal context.

1. CC will recommend the instructors of EE 415 and EE 416 to work with CTLT to improve the assessment of Outcome H in the courses. Compared to last year curricular debrief report, in the 2008 report, there is much better consistency of evaluator scores between EE faculty evaluators and CTLT evaluators.

Outcome I: Recognize the need for, and have the ability to engage in life-long learning.

* 1. The course assessment report for EE 234 needs to clarify how Outcome I is being assessed in the course, and provide details on the assessment measures. Curriculum committee will work with instructor of EE 234 to require submission of course assessment report for every time the course is taught.

Outcome J: Have a broad education and knowledge of contemporary issues.

1. CC will work with instructors of EE 415 and EE 416 as well as a few specific EE technical elective courses to improve the coverage of contemporary issues in EE curriculum. CC will recommend the instructors of EE 415 and EE 416 to work with CTLT to improve the assessment of Outcome J in the courses. Work is already in progress in this report as discussed in Appendix D.

Outcome K: Ability to use techniques, skills and modern engineering tools necessary for engineering practices.

1. Some assessment reports lack details on how the course metrics are related to the outcome being assessed. CC should hold training sessions so that faculty and instructors will write assessment reports that more clearly assess Outcome K.

**Appendix A**

**Assessment Plan**

BSEE Assessment Plan

An assessment plan has been developed and put in place to ensure that graduates have achieved the educational objectives and the program outcomes of the BSEE degree program.

Our assessment process has four distinct but related purposes:

1. Assessing the achievement of program educational objectives.
2. Assessing the achievement of program outcomes.
3. Aligning our program objectives and outcomes with the changing needs of our constituencies.
4. Improving EECS programs.

Four sub-processes, one for each of these purposes, constitute the assessment process used for each of the EECS programs. Some inputs are shared between the sub-processes, but the sub-processes have different time scales reflecting the practicalities of acquiring different inputs and the inertia of the educational processes that are being monitored and improved. The School's assessment committee, comprising the Director and the three curriculum committee chairs, monitors the assessment process itself.

Sub-process 1. Assessing the achievement of program educational objectives


Objectives Flowchart

Overview: Achievement of program objectives is measured as described above using alumni surveys and through interactions with the IAB and industrial recruiters. The Electrical engineering curriculum committee and the School’s assessment committee use these inputs in advising the faculty regarding changes to the curriculum to address identified problem areas. The School’s assessment committee (the Director and the chairs of the curriculum committees for all the programs) consider these inputs as well as changes in University and ABET requirements to formulate proposed changes to the objectives.

Time Scale: Alumni surveys are conducted every three years. IAB and recruiter interactions occur twice a year. The curriculum committee incorporates assessment of program objectives in its annual report in years in which alumni surveys are conducted.

Required Documentation: Alumni survey results; IAB and recruiter notes.

Responsibilities:

* Development officer and Corporate Relations Officer– identify alumni and request survey participation
* School director – plan and conduct IAB meetings
* Faculty – meet with recruiters
* Electrical Engineering curriculum committee – evaluate data and report recommendations concerning the objectives in the annual report
* School assessment committee – recommend changes to the objectives to meet changing needs of the constituents and changing external requirements
* The objectives and outcomes of the program and the curriculum by which they are achieved are the responsibility of the Electrical engineering faculty as a body; changes are adopted by vote of the faculty.

Sub-process 2. Assessing the achievement of program outcomes


Outcomes Flowchart

Overview: For each program, the School maintains a program of study with program outcomes mapped to courses. Course designs require students to demonstrate, through work products such as homework, examinations, lab exercises, projects, written and oral presentations, their achievement level on the mapped outcomes. As a direct measure of achievement of outcomes, courses are designed to ensure that successful completion requires achievement of program outcomes. Each instructor certifies that a grade of C or better represents achievement of minimum requirements. The school retains documentation in the form of the instructor’s certification and examples of student work as evidence that the certification is justified. The university-wide degree audit reporting system ensures that every graduating student meets the degree program requirements which include the condition that students achieve a grade of C or better in all courses in the major.

The assessment process collects documentation of the achievement of outcomes from each course as students progress through the program. The Course Assessment Report documents each instructor’s assessment of outcomes for each course instance. A template for the report, listing expected program outcomes and course topics, is maintained by the coordinator for each course. End-state assessments are conducted through consideration of students’ performance in senior-level courses, through exit-surveys and senior Curricular Debriefs, through alumni surveys and discussions with the IAB. The Curriculum Committee uses these inputs to formulate its annual assessment report which recommends curriculum and course changes to the faculty based on the results of assessment.

Time scale: this sub-process runs continuously.

Required documentation: For each course instance, a Course Assessment Report document that shows how the work products (hw, tests, etc.) relate to achievement of the program outcomes, signed by the instructor; for each course instance syllabus, sample student work, assignments, examinations, etc.; student course evaluations; student transcripts and degree audits; senior exit surveys and interviews, Curricular Debrief reports. Alumni surveys also enter into this process.

Responsibilities:

* Electrical Engineering curriculum committee maintains the program of study and mapping of program outcomes to required courses, subject to approval or modification by the program's faculty (see the program improvement sub-process.)
* Course instructors devise and assess assignments and examinations in which students demonstrate their achievement of the required outcomes. Instructors produce a Course Assessment Report for each semester that a course is taught. It details how that instance of the course assessed the expected outcomes and asked the instructor to comment on students’ preparation for the course.
* The School maintains course instance documentation and Course Assessment Reports in a central location.
* Until Spring 2004, graduating seniors were interviewed by a senior faculty member, but this activity has been supplanted by Curricular Debriefs (described previously) and senior surveys.
* The University Registrar maintains transcripts and provides degree audits that ensure that every student meets all the requirements of the program as a condition of graduation. Students can review their degree audit on-line at any time. The School's Undergraduate Advisor assists students in registering for required classes and meeting other graduation requirements.
* The School does not have direct access to initial career placement data for all the students. The senior survey collects this information but many students do not have jobs by the time they take the survey. The alumni survey queries students as to their career progress.
* The Electrical Engineering curriculum committee reviews the collected data and reports identified issues and suggested changes to the faculty for action. It also creates an annual program assessment report for the faculty and the Associate Dean.
* The school assessment committee reviews suggested changes to the outcomes, courses, and curricula for consistency across the programs offered by the school.
* As noted for sub-process 1, the objectives and outcomes of the program and the curriculum by which they are achieved are the responsibility of the Electrical Engineering faculty as a body; changes are adopted by vote of the faculty.

Sub-process 3. Aligning with constituencies' needs.


Aligning Flowchart

Overview: Our process for aligning our programs’ objectives and outcomes with industrial constituencies’ needs involves three main sources of input: our Industrial Advisory Board, alumni surveys, and surveys and interviews of graduating students. Additional constituency input comes in the form of the institutional mission of WSU, which reflects the interests of Washington's citizens, and the ABET accreditation criteria. The faculty desires good personal and institutional reputations. Faculty members take pride in producing qualified graduates. Faculty input comes from faculty meetings and retreats, daily e-mail, oral, and written communications. Input from these sources is synthesized into the objectives and outcomes for each program in the School.

Time scales: We fully review program objectives and outcomes with the IAB at least every three years, though IAB input on specific issues may also be solicited annually. Alumni surveys are conducted every three years. Surveys of all graduating students are carried out each semester and a subset of graduating students participate each year in a curricular debrief that elicits their opinions of the program (in addition to the formally assessed component addressed above). Faculty review is continual through faculty and curriculum committee meetings as well as other forms of communication. We expect that objectives and outcomes will be quite stable over periods longer than three years. However, we are prepared to make changes in response to identified issues on an annual basis if needed.

Documentation: results of surveys and interviews; agendas and minutes of IAB meetings; agendas and minutes of faculty meetings; published objectives and outcomes; minutes of curriculum committee meetings.

Responsibilities:

* The Electrical Engineering curriculum committee maintains surveys administered to graduating seniors and alumni. The survey questions attempt to elicit individuals' perspective on both the importance to their current work of various aspects of the curriculum and the preparation that they received in that aspect.
* The School's Undergraduate Advisor conducts the survey of graduating students.
* The School's Development Officer and Industry Relations Officer identify alumni 2, 5 and 10 years past their graduation and solicit their participation in the alumni survey, which is administered every three years.
* The Director plans the IAB review of objectives and outcomes with the help of the curriculum committees.
* EE curriculum committee reviews all the collected data to determine if any changes to the program objectives and outcomes are indicated. Changes are recommended to the School Director who will present the proposed changes to the faculty for deliberation and approval

Sub-process 4. Improving the Programs

Overview: Improving the programs is the major reason behind the existence of the other two sub-processes. In the figures above, program improvement is indicated by the closed feedback loops from assessment data collection to changes in the curriculum, outcomes, and objectives. The School's programs are expected to lead students to achievement and attainment of the program outcomes. To this end, the curriculum committee for each program maintains a program of study and a mapping of outcomes to specific courses within that program. The program improvement sub-process will, over time, lead to increases in both the average levels achieved by our students and the percentage of students reaching the minimum achievement level. The program improvement sub-process uses inputs from a variety of sources: the course documentation collected by the School for each course (Course Assessment Reports) including student work; student course evaluations; instructors' reflections on the level of preparation of students entering their classes and their achievement on leaving classes; retention rates from semester to semester; placement of graduates; alumni surveys; IAB input; and the annual curricular debriefs described above.

Time scale: The program improvement process at this level is the continuing responsibility of the curriculum committees, consuming most of their attention at several meetings each year. Many of the inputs are available each semester and aspects may be reviewed at any time. However, changes to the program of study are recommended to the faculty once a year. Adoption by the faculty is followed by publication of changes in the University catalog. The changes become requirements for students subsequently certifying in the major.

Documentation: published mapping of outcomes to courses; curriculum committee and faculty meeting minutes; the annual assessment report.

Responsibilities:

* The EE curriculum committee (CC) establishes and maintains, subject to advice and concurrence by the faculty, the program of study and mapping of program outcomes to courses. The CC also reviews the inputs for problems or opportunities throughout the year.
* The EE curriculum committee evaluates progress toward achievement of the program objectives and outcomes and reports to the faculty on what has been achieved.
* The EE CC annually reviews new and previously identified issues. For new issues a recommended plan of action is brought to the faculty. For previously identified issues the results of actions taken are assessed and the plan updated or the issue closed.
* The faculty acts on the CC’s recommendations or on its own initiative.
* The Undergraduate Advisor maintains the School's files of course materials, survey results, and other raw data inputs for the improvement process.

**Appendix B**

**EE Curriculum Flowchart**



**Appendix C**

**EE Program of study (Effective Fall 2010)**

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**Appendix D**

**Track Requirements (Effective Fall 2010)**

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**Appendix E**

**EE Senior Design**

**Assessment Reports**

**Pat Pedrow is working on this**

**Appendix E**

**Systems Area Assessment Summary Report**

Individual course assessment reports can be seen at http://www.eecs.wsu.edu/~schneidj/Assessment/ee.html

**EE Systems Area ABET report for Academic year 2007-2008**

**Courses covered:** EE221, EE321, EE341, EE451, EE464, and EE489.

**Observation from reports**

All the reports indicate that the students successfully completing one of the above courses have achieved the intended ABET assessment outcomes for that course. For the most part, the instructors were satisfied with the overall preparation of the students entering the course and performance of the students at the end of the course.

Significant variation in student programming skills was a concern in EE221. Change in EE graduation requirements (programming courses) could have contributed to this; this variation has improved in Fall 2008.

Inadequate matlab skills were again a concern expressed in some courses, though an improvement (over previous years) was noted. The introduction of EE 221 (Numerical Computing for Engineers) seems to have helped in this respect.

The math background of some students was again a concern in many courses. Application of concepts learnt in prerequisite courses was also a concern in some cases. On the positive side, students were better able to assimilate different concepts when applied to a course design project.

Communication skills (written and oral) were generally adequate; providing appropriate feedback based on interim reports helped the students learn to prepare a good final report.

**Recommendations**

* EE441: It was generally agreed that EE441 (or a controls laboratory) needs to be offered as a senior elective in the near future. Instructor resource continues to be a concern. There is strong student interest and instructor willingness to offer the course. Hopefully the School can provide additional resources to offer this in the near future.

**Follow up with Changes**

* EE221: The experience so far has been positive. Students have generally better matlab skills than in previous years. We will continue to monitor the progress and make changes in EE221 as required.
* EE341: Stat 360 has been added as a co-req. to EE341 and a probability application has been added to EE341 (starting Fall 2007). Frequency modulation has also been dropped. So far, the changes have been reasonably well received.

## Appendix F

## Microelectronics Area Assessment Summary Report

Individual course assessment reports can be seen at http://www.eecs.wsu.edu/~schneidj/Assessment/ee.html

To: Curriculum Committee

From: George La Rue

Subject: Microelectronics Area Committee Recommendations

The microelectronics area committee met November 20, 2008 with Professors Heo, LaRue and Osman present. Input from Professor Ringo was received on November 21 and all professors reviewed the recommendations. The committee has the following recommendations based on the assessments for the 2007-2008 academic year for courses EE311 and EE476 and EE477.

For EE311:

* With recent changes in the students’ curriculum too much is being asked of EE311 to provide a proper understanding of electronics. Today, no associated electronics laboratory and no course in either electronic materials or elementary device physics are required by electrical engineering students. Many students have no practical grasp of the material without an associated lab. Last year we agreed that a more closely coupled co-requisite lab course EE352 would help students understand the circuits and concepts better. We now recommend that students be required to take EE352 concurrently with EE311 and we will work with the EE Curriculum Committee to modify the requirements. We will work with the EE352 instructor to modify EE352 to coordinate the lab experiments to better help student understanding of EE311 material. Computer engineering students currently are not required to take EE352. This change in requirements will need to be addressed by the Computer Engineering Curriculum Committee.
* The average percentage of students failing EE311 dropped to about 10%, which is down from 20% last year and 35% the year before. We will continue to monitor this.
* EE311 emphasizes problem solving skills, with which the students seem not to have experience. Many students coming into EE311 have trouble with resistor divider problems. We recommend continuing to spend time in lecture at the beginning of the semester reviewing basics and/or having problem solving sessions starting early in the semester. In addition, we also recommend that EE311 instructors give a 10 question exam on material they should have learned in EE261 that is critical to doing well in EE311. Students are required to get 9 correct answers in order to stay in the class. Students will have 5 attempts.
* Some students have complained about the book. We tried a different book a couple years ago, which did not work out well, and we went back to a newer edition of Sedra and Smith. We will continue looking for a better book.

For EE476

* There were only 5 undergraduates that took the course in Fall 2007 compared to 10 and 11 the previous 2 years. Student performance was good and the third exam scores improved to a reasonable value. It is recommended to keep the weighting of time spent on each topic the same and see if the third exam scores remain elevated over a larger sample of students.
* Enrollment in Fall 2008 increased to 12 undergraduate students so the enrollment drop seems to be a one time event.

For EE477

* EE477 was not taught this year. Due to lack of microelectronics faculty, it is not expected to be taught in the next year or two and has been removed from the course catalog. It may be resurrected and offered as a combination graduate/undergraduate lab in the future.

**Appendix G**

**EE Senior Curricular Debrief Session Report**

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