1 Introduction

The undergraduate assessment committee is responsible for gathering information regarding the undergraduate curriculum and teaching in the Electrical and Computer Engineering Department. Sources of assessment information include:

- The Industrial Advisory Committee
- Alumni surveys
- Senior exit interviews
- Faculty course assessments
- ABET reviewer visits

The primary purpose of this document is to describe observations made over the last year, and recommend changes and directions for further discussion.

2 Work accomplished over the last year

Over the past year, the undergraduate assessment committee has performed the following:

- Put together a flowchart for the majors and graduate programs.
- Put together an extensive proposal for the president’s initiative to improve department teaching. This proposal is 34 pages long, and represents many of the aspects that we consider to be positive about the department.
- Organized the collection of end-of-semester faculty assessment reports.
- Worked with ABET reviewers on-campus, and further in responses to the ABET review.
- Held committee meetings approximately monthly throughout the academic year.
- Put several changes through EPC for the university catalog, to straighten out some prerequisite issues.

Throughout the year, some of the issues that were discussed in our meetings were:

- How the electronics program should be improved. (How much electronics, order of teaching.)
- How the teaching of programming should be improved.
- Questions to ask the IAC in a survey.
- What should the freshman experience be?
- What should be done to strengthen the teaching of circuits.
- Discussion of end-of semester faculty assessment, and senior exit surveys.
- Raising the level of admission standard for the pre-professional program.
- Consolidation of courses in areas such as microwave engineering/electromagnetics.
3 Outstanding and upcoming issues

As continuation of issues left over from last year, and in response to issues identified in the end of course evaluations, the following issues are on the docket for work this year.

- Responding to ABET issues about the computer engineering degree. Given the need to submit a report next summer, this will be our first priority this year.

- Senior design/English. While English and communication issues are a part of the ABET concern, we have been considering, on our own, a new senior design sequence which would have closer ties to the English department. Kevin Moore has been working out some of the issues, and a pilot program is underway this year. If this is successful, we may expand this to a bigger subset of our students in both majors.

- Circuits. With the change in schedule a few years ago, there are topics that are not being covered as thoroughly which are regarded as being quite important. We need to address the curriculum and make some changes.

- Electronics. We receive feedback from interviewers that our students should be more conversant in FET transistor design. We have also learned of desires for significantly better familiarity with semiconductor processing. A new version of the book for the electronics classes reorders some of the material in a way that should be beneficial. We are considering other order-of-teaching ideas, and exploring whether there is material that needs to be removed or added.

- Programming. Our students get a full year of programming, but as freshman. Conversing with the CS faculty (in particular, Dan Watson), I have been assured that when the students come out of the sequence they “are programmers,” having learned all of the fundamental ideas necessary to be effective. The reality is, we have students that still struggle with programming, particularly on the EE side. We have gotten feedback from some recruiters that they would like more programming ability.

  This is an interesting problem — we would all certainly like the students to learn more. We wish there were time for more electronics, and for more programming. But there simply isn’t time for both. In soliciting feedback from the IAC, and addressing the particular question of whether they would prefer students to have more electronics or more programming, the responses were pretty evenly split. (One could argue on this basis that the amount of course material is about right; we just need to fine-tune the details.)

- Freshman course. The college is working out a new freshman course, working for significant input from the education-oriented faculty making a transition from the technology department. This is intended to serve students interested in engineering, but with an undeclared major. As part of this course (or in addition to it) the college is exploring a course in which certain extra-course university and/or accreditation topics are covered, such as the CIL exam, the safety exam, etc.

  At the same time, Paul Wheeler has developed a freshman course that provides a solid survey of the field of electrical engineering. He has started this year with a new book.

  We will be interested to see what the college develops, and how students feel about our own freshman course.

- Laboratories. With class sizes growing, scheduling of labs becomes increasingly difficult. There are instances when too many students are in the lab area for anything to be accomplished. Paul Wheeler has suggested that for large courses which are taught twice a year (such as 2410 or 2530), that a lab room be dedicated to those courses particularly. We need to explore whether that is feasible, possibly by opening up additional lab space (and acquiring new equipment)

- There seem to be a plethora of microwave and EM courses following the core undergraduate course. It seems that an established second course would be desirable and more efficient. We have had preliminary discussions on the point with Randy Jost, but have taken no action yet.

- The outcomes for 3620/3640 are not necessarily matched to the semesters they are taught, but they are being taught. We will explore adjusting the outcomes so that different faculty members have flexibility in they order they teach, while still ensuring that the desired principles are taught.
- There is a feeling that with the way computer engineering is going that computer engineers need more E&M than they are getting in a one-hour course. We need to address this (e.g., what are the priorities?)

- Ever since we relinquished teaching our own probability course (with the switch to semesters), we have heard complaints on the part of the students that they are not learning useful material, and evidence in following class that that is actually the case. We have been discussing teaching the probability class on our own, but have been waiting both for the most interested faculty members to return from sabbatical, and for the hiring of new faculty. Since both of these have now occurred, it is time for us to re-address the issue.
Issues Observed from Course Assessments  
Fall 2002/Spring 2003.

In the following, brief summary information gathered from the course assessments is presented. In particular, if the information seems to be of a nature that the committee should be aware of this and/or act upon it, then it is noted here. But if an instructor makes a comment relevant to in class issues, it is not noted here. The intent is to provide a document that will help us close the loop on the assessment process.

1010 (Wheeler)
A very strong part of this was his survey exploring preparation, position in program, and plans of students, and impressions of the text. Where the freshman course is undergoing revision, this is valuable information to have.

2200 (Baker)
(The assessment was not in the same format as the others, but provided a lot of information.)
Comments from the instructor:
- The textbook must be changed.
- He recommends that physics should be a pre-requisite.

I have contacted Doran to get follow-up on these two issues.

2410 (Swenson)
This has only the discussion portion of the assessment, not the full assessment. We will be getting better assessments in the future!

He points out the problem of unprepared students, and overwhelming material. We have also had ongoing (seemingly) endless discussion about teaching power. With the switch to semesters, and dropping 1020, we have had a crunch at the next level. On Aug. 29, we floated the idea to add another hour to the class, making it (with its lab) a 5-hour course. This might give time to amplify the topics better, as well as cover material which has been dropped.

2530/2540 (Shaw)
Missing evaluation.

3170 Also known as 3870/3860 this year. (Moon)
Incoming students showing effect of only one semester of circuits prior to this class, lacking the maturity that used to be present.

Students commented on the workload, which was exacerbated by having weekly quizzes and homework.

There was not time to cover some of the desired topics (such as antennas).

A follow-on course at the senior level as a technical elective would be nice.

3260 (Wheeler)
No significant issues noted.

3410 (Baker)
Baker has noted some items which would improve the class. The first is more instructional help (he suggests an assistant professor with industrial experience.) He also suggests that a four-hour credit assignment would be more representative of the workload for faculty and students. While the former issue seems too large to deal with, the latter issue will be examined in the committee.

3620 (Moon)
There were some outcomes which received scores of 0. As explained, however, this is due to the fact that the sequencing of the material is different, not that it is not to be covered.

In fact, as determined from the evaluation in Spring semester, all of these outcomes were retro-actively scored with outcomes of 2.

A topic which never did get covered is power and complex power.
There seemed to be an issue with dysfunctional hardware, but the workaround seemed appropriate.

There seems to be an effective improvement in clarifying the guidelines for the co-op.

This assessment shows effective improvement based on responses from previous years’ assessments. The course is nearing a “steady state,” with a good mix of modeling and transfer functions.

Gunther points out deficiency in preparation in the area of probability and linear algebra. Some of the deficiency in linear algebra has been addressed in 3620/3640.
Both of these deficiency areas have to do with our expectations of what the students should get from the math department.

The design class has been modified under Moore’s direction, with a raising of the level of expectation. This has resulted in some 0 scores, but it is expected that these are due to the transition, and should disappear in future semesters.

Due to smallish class size and changing directions, it seems appropriate to eliminate this course from our offerings.

It was observed that students were not well prepared with linear systems theory concepts. In part, this is a reflection on our undergraduate student preparation.

A dedicated computer lab time is desired — the course seems to be falling through the cracks.
The course is turning into its own textbook project, as appropriate textbooks are not available.

No significant issues were reported.

The issue of preparation in C++ is brought up, since some students were prepared with only C.