Monthly Faculty Meeting  
Department of Electrical Engineering

Present:  Roger Dougal, Chair  
Andrea Benigni  
Charles Brice  
MVS Chandra Shekhar  
Yinchao Chen  
Herbert Ginn  
Asif Khan  
Krishna Mandal  
Enrico Santi  
Grigory Simin  
Xiaofeng Wang  
Bin Zhang

Absent:  Mohammed Ali, Paul Huray, David Matolak, Guoan Wang  
Recorder:  Nat Paterson

The meeting was called to order by Dr. Roger Dougal at 3:30 p.m. in EE Conference Room 3A75 on May 7, 2015.

1. Announcements –

- Minutes from last month were approved electronically via email
- Don’t forget to attend CEC’s Faculty & Staff Award Ceremony – May 8 at 2 PM in Courtyard
- Plan to attend CEC’s Cording Ceremony – May 8 at 5:30 PM at Seawell’s
  o Student Speaker is EE’s own – Andrew Patterson
- End of Semester F/S Social Event – May 14 at 6 PM at Dr. Dougal’s house
- Reminder -- Peer Evaluation of Teaching -- both reports are now due
- Reminder – Use Blackboard to record assignments, rubric, and grades for assessments. All grade records should be on Blackboard starting next academic year.

2. Committee Reports --

I. Undergraduate Committee --

Motion #1 – to remove CSCE 146 from EE undergraduate curriculum as a required course and replace with options to take one of these courses:

- CSCE 146 -- Algorithmic Design II
- CSCE 206 - Scientific Applications Programming
- EMCH 201 - Introduction to Applied Numerical Methods
- MATH 300 - Transition to Advanced Mathematics
- PHYS 306 - Principles of Physics III

Rationale –

CSCE 146 –Algorithmic Design II - is Java language based course focusing on data structures and business web applications. This course does not anymore appear to build the skills that are needed in the subsequent Electrical Engineering courses.

The analysis of the EE course outcomes shows that students had difficulty in achieving the outcomes “Ability to apply mathematics, science and engineering principles”, “Ability to design and conduct experiments, analyze and interpret data” and “Ability to use the techniques, skills and modern engineering tools necessary for engineering practice” mainly due to insufficient knowledge and skills in mathematics, physics and programing using C, C++ and other engineering-oriented programming languages.
The need for better knowledge and skills in those areas was also strongly supported by our constituents: in the Senior Exit Interviews, by Student Advisory Board and Industrial Advisory Board.

**Discussion:**

- The choice among recommended courses seems too broad and there may be some question whether or not they addressed the actual deficiency of engineering programming skills.
- At the time students need to choose one of the options, they may not be sufficiently informed to make a wise choice. It is still early in the program and they may not yet realize what they need most.
- Courses offered by other departments do not seem to fill our need in C/C++ programming.
- Essentially courses available as an option need to address the issue of programming skills and not just knowledge and skills in Physics or Mathematics.
- The option of developing a new course to address this deficiency ourselves is not viable at this time due to lack of funding and personnel.
- ELCT 350, when taught by Dr. Monti, included C/C++ in the syllabus but since then it’s been different. Should this course’s syllabus be revised to include C/C++? That would help the transition from CSCE 145 Java, but might not address issues related to embedded controllers.

**Next actions:**

- The Undergraduate Committee will further review course options and narrow the option list to only 3 courses.
- The revised list of courses will be presented at the 1st Faculty Meeting of AY 2015-2016.

**Demonstration – Using Course Outcomes and Rubrics on Blackboard**

Dr. Simin exhibited proposed revisions to ELCT 221 course outcomes as an example of what the department expects for all ELCT undergraduate courses. Course Outcomes should be defined, assessed, and should contribute to achieving Program Outcomes.

**Course Outcomes:**

- They are essential to evaluate students’ performance, therefore, they need to be specific and measurable.
- Clear course outcomes help students understand what is expected of them.

**Rubric:** Using rubrics to grade assessments and exams creates consistency and transparency. See Appendix A for an example rubric.

**Assessment process:**

- With updated course outcomes, the next step is to identify which homework, tests, or exams (or question on an exam) demonstrates achievement of each outcome. See Appendix B for an example.
- Use Blackboard’s grade center to record grades for each assignment assessed using appropriate rubrics as a means to show an audit trail for outcome achievement.

**Next actions:**

- The Undergraduate Committee will assist instructors in a review and revision of all undergraduate level course outcomes.
- The Undergraduate Director will continue assisting the faculty in their transition to using Blackboard.

**II. Graduate Committee –**

**Motion #1 –**to change the ME Comprehensive Exam to a project based format. See Appendix C for details.
Discussion:

- A standard report format should be created and provided to students, with instructions, and a rubric for evaluating exam reports should be developed.

**Vote:** all voted in favor

**Next actions:**

- Develop documentation for the new exam format – report format, instructions, and evaluation rubric.
- Post information about the new exam format on the EE web pages
- The Graduate Director will submit a new course proposal to create ELCT 897P (or another appropriate course number) to the graduate council for it to be effective in Spring 2016.

Motion # 2 – to change the PhD Qualifying Exam from oral to written format. See Appendix D for details.

**Vote:** all voted in favor

**Next action:**

- Post information about the new exam format on the EE web pages
- The Graduate Committee will collect questions from the faculty and develop a PhD Qualifying exam question bank in Fall 2015

**III. Report of the Chair – End of Semester Status Summary**

**Accomplishments –**

- One new faculty hired – Dr. Seongtae Bae
- Initiated significant revisions to assessment and improvement processes for undergrad program
- Improved documentation of committee duties and planning as all documents are located in EE’s SharePoint site
- Produced net income from summer course program
- Developed process for scheduling, billing, maintaining electronic materials and devices shared facilities. Will hire staff this summer
- Nearly finalized “standard” CEC senior design project sponsorship docs – in discussions at Executive Committee to coordinate college-wide.

**Continuing efforts**

- Expect new faculty search in Fall 2015 for possible 1 to 2 positions
- Finalize and implement improved assessment processes
- Increase collaboration among the faculty, focusing on multi-million dollar grants
- Increase quality of our students, both undergraduate & graduate

Meeting adjourned at 5:20 pm
# Formalizing the assessment process: RUBRICS

<table>
<thead>
<tr>
<th>Levels of Achievement</th>
<th>Unacceptable</th>
<th>Poor</th>
<th>Acceptable</th>
<th>Competent</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
<td>30 %</td>
<td>50 %</td>
<td>65 %</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td>Student demonstrates skills in using appropriate technique to solve the problem</td>
<td>The student can hardly identify the problem; the answers are not produced or most of them are erroneous.</td>
<td>The student understands the technique to solving the problem but the results are incorrect.</td>
<td>The student is able to apply the technique and correctly solve the problem.</td>
<td>The student correctly solves the problem, produces detailed report and results analysis. The student justifies the technique used to solve the problem and evaluates it against other applicable approaches.</td>
<td></td>
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</tbody>
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Rubrics is the USC officially recommended grading tool
Assessments

All course outcomes must be assessed.
Example from ELCT 221:

1. Students will be able to solve problems on DC and AC linear circuit analysis using nodal, mesh and source transformation (Thevenin and Norton) techniques.

   Test 2 – DC nodal analysis
   Test 3 - DC mesh analysis
   HW5 – Thevenin and Norton (DC)
   Midterm – Thevenin (DC)
   Final exam – AC mesh, nodal, Thevenin

2. Students will be able to find the impedance of and power in R, L, C network components.

   Test 4 – Impedances

3. Students will be able to use MATLAB (or equivalent) tool to solving mesh and nodal matrix equations, calculating voltages, currents, impedances and powers in linear circuits.

   Quiz 3 – MATLAB + MATLAB portion of all the above

4. Students will be able to use SPICE simulations to build the schematics and generate frequency dependencies of currents and voltages in linear circuits.

   Test 6 - SPICE
APPENDIX C

Project Based ME Comprehensive Exam

Motion:
The Graduate Committee proposes that a project format be used for the ME comprehensive exam. The exam requirement will be met through completion of a three credit hour project based course with the following requirements:

- 3 credit hours
- integration of subject matter from two or more graduate courses
- approval of the project topic by the course instructor
- 20-30 page final project report

The EE graduate director will request a course instructor for each ME student based on the student's program of study. Each course instructor will assign a Pass/Fail grade for the course based on the instructor’s evaluation of the final report in conjunction with one reader. The reader will be selected from among the CEC faculty by the project course instructor.

Rationale:
The core courses were eliminated resulting in an ad-hoc procedure for the ME comprehensive exam. It is currently impossible to ensure an appropriate level of consistency with the lack of a format requirement. Furthermore, the comprehensive assessment requires a student to synthesize and integrate knowledge acquired in coursework. A project based exam meets the needs of that assessment.

Proposed Actions:

- Addition of the project course and modification of the ME program to replace 3 credit hours of ELCT897 (directed individual study) with ELCT897P (or other appropriate course designator)
- Post the exam requirements on the EE web pages

Proposed Effective Semester: Spring 2016
Motion:

The Graduate Committee proposes a written format for the PhD qualifying exam in place of the current oral format. The exam will be a three hour written exam providing approximately 1 hour for questions in each of three general areas. The exam will be closed book, however, calculators will be allowed. The student will answer two questions from three of the following four areas selected by the student prior to the exam:

- Signals System and Controls
- Circuits and Electronics
- Semiconductor Devices
- Electromagnetics and Communications

The EE Graduate Director will request a bank of questions from the EE faculty that tests the students’ foundation in each of the four areas. The exam will be populated each semester randomly from that question bank. Each question will be tagged with the submitting faculty member’s name and he or she will be expected to grade that question following the exam. Grading for each question will be pass/fail. Five out of six questions must be passed in order to pass the exam. The level of difficulty for each question should not be above material covered in 500 level courses and is expected to be at least at the 300 level. The students will not have access to the question bank. A list of topics by area will be provided to students to focus their study within each area. Students must take and pass the exam within the first three semesters in the doctoral program. There will be a maximum of two attempts.

Rationale:

A survey of peer institutions revealed that the PhD qualifying exams in most EE or ECE programs is a written format exam. The oral exam may skew results due to student anxiety in from of the examination panel. Students will have time to develop presentation and oral examination skills later in the doctoral program so it is not necessary to conduct an oral exam this early in the program.

Proposed Actions:

- Collection of exam question bank
- Post the exam requirements on the EE web pages

Proposed Effective Semester: Spring 2016