

DEPARTMENT OF

ELECTRICAL & COMPUTER

ENGINEERING

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Re: Advisory Board for NSF DUE Project EMD-0088904

Dear Advisory Board Members,

Cliff Grigg and I appreciate your willingness to serve on the advisory board for our NSF project to bring effective practices to the engineering service course. This letter is our first formal communication to the review board.

The project is in its first year. The broad outlines of our present plans for the course design are coming into focus. Below are listed the major items associated with the course and the work to date regarding each item. We have included specific requests and questions for your response. Each of you need not feel that you need to address each item; please feel free to stay within your area of expertise and/or experience. Having said that, please do contribute any useful information or materials, even if not specifically requested or even mentioned.

Our goals in this course are simple. They are to 1) engage the students' interest in electrical systems--recall they are MEs, 2) develop tools to encourage students to come to class prepared and to work outside of class, 3) develop an effective and efficient learning environment both in and out of the classroom, and 4) measure student learning and student learning outcomes.

For this first year, we have allocated 2 days for each of you to prepare a thoughtful response to this letter. We plan to compensate each of you at \$500/day. Next year, after we have constructed the studio classroom and after we have taught the class for one quarter, we will invite each of you to Rose-Hulman. We have not yet developed plans for the following year.

If possible, please respond to the items in this letter by *January 1, 2002*.

Classroom

Plans

The class is being designed for a studio format. The classroom will be constructed in the spring and summer of 2002, and it will be populated with equipment late in the summer of 2002. A partial list of equipment to be included is enclosed. We plan to rack-mount the laboratory equipment in 19" racks that will be part of specially designed laboratory benches.

In particular, note the data acquisition unit. We plan to include transducers and data acquisition content into the course, and this unit will facilitate the work.

Attached: partial equipment list, plan view of classroom layout, lab bench design.

Questions

Do you have any suggestions for the classroom equipment including AV equipment, etc?

Course

Plans

1. We plan to use on-line quizzes as tools to help ensure students come to class prepared. Our hope is that we can encourage first exposure to material before students come to class.

The quizzes will not be one-shot affairs, but rather will provide students two or three chances to do well. Quizzes will be coupled to appropriate on-line tutoring resources.

Gloria has already noted that this on-line quizzing tool could be useful in assessment.

2. We plan to construct detailed and multileveled problem solutions in a point-and-click format. We will employ a student for the next 3 years in the development of this resource as well as the development of a tutoring aid. Our object here is to increase the effectiveness of student learning outside of class.
3. These students will be MEs learning about electrical systems. In such a course, we feel that nothing can replace the value of student time-on-task. We plan to use a stick-and-carrot approach to achieve this end.

The stick is that we will hold the students accountable. We feel that many short-time feedback loops can be constructed via the on-line quizzes formed by the short feedback loop as well as frequent in-class quizzes will demonstrate to the students that they must prepare for class.

The carrot, as well as the stick, is present in several aspects of the course. The first is the gentle nature of the on-line quizzes. We hope the students will learn to appreciate their role in learning. The second is the on-line learning resources. These include detailed problem solutions as well as a JiTT (Just in Time Teaching) strategy

identifying those topics that students find difficult or unclear and then addressing these difficulties in class.

4. If we can place first-exposure outside of the classroom, we can gain adequate time in the classroom for discussion, for JiTT, and a variety of active learning activities.

Questions

1. Do you have suggestions on which on-line quizzing software to use? This summer, one of our colleagues looked into on-line quizzing software and suggested that Questionmark (www.questionmark.com), Test Pilot (www.clearlearning.com), and QuizFactory 2 (www.learningware.com) have suitable software packages with Questionmark being favored overall.

Can you provide any guidance? Our goals are to be able to construct problem diagrams on-line, together with numerical and/or multiple-choice questions. We would also like to employ the software in our assessment plans.

2. Can you provide a very few of the very best JiTT strategies?
3. Can you provide a very few of the active learning activities that might prove most effective in the studio format?
4. Can you provide educational materials that have worked well for you in similar courses that you have taught?

Assessment

Plans

To date, we have initiated baseline assessments on the existing course (the before picture).

Gloria Rogers has designed an assessment strategy for the course. We will send out these plans with the other responses for the other items requested in this letter so that the advisory board has an overall picture of the plans regarding this course.

Dissemination

The first dissemination activity will be this summer, at the 2002 *ASEE Annual Meeting*. The second will be at the 2002 *ASEE/IEEE Frontiers in Education Conference* in Nov. 2002.

We thank you in advance for your kind guidance and advice.

Sincerely,

Ed Wheeler and Cliff Grigg