IMPROVING THE ELECTRICAL SYSTEMS SERVICE COURSE

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Abstract *-- This Work in Progress describes one aspect of a project being undertaken at Rose-Hulman Institute of Technology (RHIT) to improve the effectiveness of electrical engineering service courses offered to mechanical engineering students. The authors had taught these courses several times and were dissatisfied with the outcomes. The delivery features of the new course will include: studio format; presentation of material from the viewpoint and in the context of the discipline being served; a variety of active learning strategies; and Web-based learning and assessment tools including on-line quizzes, lecture notes, multimedia simulations, and detailed problem solutions in an intuitive point-and-click format. For the duration of the project, a board will review the educational materials developed, provide information for their continuous improvement, and assure that the materials developed can serve as a model for the development of service courses in electrical systems.*

Index Terms - Service Courses, Studio Format.

STUDIO FORMAT

The purpose of this WIP is to describe the initial steps taken to establish a studio format for the service course "Elements of Electrical Engineering" which is offered to mechanical engineering students at RHIT.

The authors felt that one of the major reasons for lack of student motivation in service courses was their inability to relate the material presented in class to real world applications. The conventional approach to solving this problem is to add a laboratory component to the course; however, the lab component of service courses in electrical engineering at RHIT was dropped several years ago because it too failed to motivate students.

It was concluded that while conventional labs give students hands-on experience with equipment operation, the students often disconnect them from the classroom theory we are trying to reinforce. While there are many reasons for this disconnection, the authors felt that conducting the lab in a different place and at a different time from the classroom theory were the principal causes.

Additionally, conventional labs follow a set format in terms of time allocated in the weekly schedule. All too often, lab exercises are developed to fit into this schedule and as a result have to expand or contract to fill the time allocated.

The authors felt that a studio format would go a long way towards overcoming these difficulties and therefore set about developing a studio component where lecture and laboratory work take place in the same workspace. Rensselaer Institute of Technology has developed several engineering courses in the studio format, and we shall use the lessons learned there to inform this work. It is planned that the class will meet for 2 hours 3 times each week, with the longer class periods being effective in maintaining cohesion and allowing students to become immersed in the study of electrical systems. Since RHIT follows the quarter system, the class will be meeting for 10 weeks, resulting in a total of 60 hours contact time. Of course, it is essential that the longer class period be approached from a modular standpoint, where students are required to perform different learning tasks. This meshes well with the lecture-lab studio approach in which students are presented with theory in a classroom mode in a time segment that is judged to be appropriate for the material covered and then the material is reinforced by practical exercises.

The studio format permits an environment in which students learn technical content while gaining experience in important skills such as teaming and communication. What makes the studio approach particularly effective in entry-level courses is the fact that particular experimental difficulties in electrical systems such as inadvertent grounding through oscilloscope probes, wiring problems, inappropriate signal conditioning, or oscilloscope triggering problems can be handled in small steps and can be repeated and reinforced throughout the course. For students to really understand experimental technique, repeated use and periodic testing is essential.

Major modification of existing laboratory facilities was necessary, along with the purchase of new laboratory equipment. The renovation work began May 2002, with a target completion date of September 2002, in time for the start of the Fall quarter which will see the first offering of the newly configured course.

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