Undergraduate Research Project

Contact:
Dr. Tim Haskew, Assoc. Professor
Electrical and Computer Engineering Dept.
thaskew@coe.eng.ua.edu

Many engineering faculty, both nationally and locally, have long recognized the significant educational benefits of undergraduate experiences in research environments. In fact, the National Science Foundation allocates a large sum of funding for their Research Experience for Undergraduates program. The project proposed here is designed to develop a self-supporting mechanism to make this opportunity available to a large percentage of the undergraduate engineering population at The University of Alabama. The concept and approach is briefly described on the following pages. The primary participating faculty are listed below:

Dr. David W. Arnold, Chemical Engineering
Dr. Tim A. Haskew, Electrical and Computer Engineering
Dr. Teik C. Lim, Mechanical Engineering
Dr. Beth A. Todd, Mechanical Engineering
Dr. Thomas A. Zeiler, Aerospace Engineering and Mechanics

Project Goals
The specific goals of the undergraduate research experience program to be introduced into the junior and/or senior years are to provide the following:

- Practical and hands-on experiences for students
- Continuing experience in a team environment
- Student exposure to the newest and highly specific laboratory equipment
- Student exposure to open-ended problems
- Closer working relationships with faculty and graduate students in and across the various departments (inclusive learning community)
- Closer working relationships between teaching and research faculty
- Increased motivation for teaching faculty to pursue research activities
- Increased motivation for research faculty to be involved in undergraduate education

Project Description
At this stage in the planning, it is anticipated that the target student population will be those engineering students who have completed at least 32 semester credit hours and maintain a cumulative GPA of at least 3.0. Eligible students who participate in the engineering practicum will be awarded a Practicum Certificate upon graduation. In light of the additional certification that the students will receive, the practicum will be comprised of a sequence of two 3-credit hour courses in addition to the standard degree requirements. Hence, no existing curriculum changes will be required in any department. In addition to the certification pathway for practicum participation, students will also be allowed to sign on for student pay. This agreement will be contractual between the student and professor, but will be required to meet
guidelines established for the program. It is imperative to point out that this description is based on present planning and is under study for meeting University policy. Thus, changes are likely to occur.

**Project Tasks**
In order to establish the proposed engineering practicum, the following task list was defined. At this point, Task 1 has been accomplished. Tasks 2-4 are presently underway.

1. Define number of academic terms and amount of credit or salary for student participants
2. Develop a syllabus for the undergraduate research course or contract for hired participants
3. Determine feasible of creating certificate program
4. Establish funding avenue for undergraduate projects
5. Establish an interactive web site for student interests and faculty projects
6. Identify faculty involvement incentives
7. Identify incentives for teaching faculty to assume some of the educational responsibilities
8. Identify incentives for student participation
9. Develop brochure to solicit faculty participation

Task 3 is the most critical item at this juncture. University policy is under study to validate the certificate program plan. Task 4 represents a significant issue in terms of salary support for paid students and for additional expenses that will be incurred by involving undergraduate researchers. The University of Alabama has an existing Undergraduate Research Scholars program from which funds may be directed to the proposed program. This issue is under investigation such that contract work is not financially burdened.

Task 7 represents a golden opportunity for faculty advancement. The University of Alabama is dedicated to advancing our research productivity. To do so will require a massive effort on behalf of the total faculty. It is hoped that this program will provide an avenue for research activities on behalf of those faculty whose primary interest is undergraduate education. Furthermore, we expect that those faculty who are heavily involved in research will be more likely to participate on a grand scale if other faculty are responsibly for maintaining the academic integrity of the program and providing the undergraduate student supervision.

**Summary**
The engineering practicum under development has the potential to provide a significant number of improvements to the College of Engineering undergraduate program. Furthermore, the program will help to advance the research productivity of the college while involving a greater number of faculty than ever before. Our student participants will gain increased marketability, and the college will have a unique calling card for student recruiting. All of this can and will be accomplished without curriculum revision of any sort.

The effort is well underway, and final details should be established during the Fall ’99 semester. A pilot program may be available by Spring 2000 or Fall 2000. Initial feedback from college faculty has been very positive.