ESF Course Proposal Form
Committee on Instruction - ESF Faculty Governance
Office of Instruction & Graduate Studies

Date: January 15, 2010
Course Number: PSE 481
Course Title: Engineering Design

[ ] New Course  [ ] Changes in existing course (check all that apply):

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This course meets the General Education standards in the following knowledge and skills area (check all that apply):

[ ] American History  [ ] Humanities  [ ] Other World Civilizations
[ ] The Arts  [ ] Mathematics  [ ] Social Sciences
[ ] Basic Communication  [ ] Natural Sciences  [ ] Western Civilization

Prequisites or co-requisite requirements:

[ ] Prerequisites: PSE 371, PSE 372, PSE 480, BPE 335  [ ] Co-requisites: BPE 335

Institutional Impact:

Anticipated Enrollment: 5-10 per semester

Technology and Classroom Resource Demands:

Computing Resources:

Library Resources:

Transportation Requirements:

Forest Properties or Field Practicum Facilities
Required:
Health and Safety Considerations:

Conditions or situations present in association with the course?  

1. Will substances with any of the following properties be used during instruction: flammability, toxicity, corrosivity, reactivity, registered pesticide, legally controlled, or other characteristics with the potential to cause harm or injury?  
   Yes

2. Will any physical hazards be present during instruction? (e.g., machines that need safety guards; razor blades or syringes; compressed gases, etc.).  
   Yes

3. Will any biological hazards be present during instruction? (e.g., handling animals (rabies or hantavirus); cultures or stocks of infectious agents (fungal spores, viruses, bacteria, etc.).  
   Yes

4. Will any radiation hazards be present during instruction? (e.g., radioisotopes, X-rays, ultraviolet rays, lasers, etc.).  
   Yes

5. Will any electrical equipment that, due to its design, location, or method of use, pose any threat to safety during instruction? (Give considerable thought to electrical use outdoors, or any potentially wet location.).  
   Yes

6. Will there be any personal safety issues related to the class? (e.g., due to time of day or location, at the end of any organized class exercise, will students be in danger of physical assault, etc.).  
   Yes

7. Will any students be driving official state or research sponsored land or water vehicles during any class or instructional exercise?  
   No

8. Will any type of personal protective equipment be necessary during class exercises? (e.g., hard-hats, eye/face protection, hearing protection, hand/foot protection, lab coat, visibility clothing, etc.)  
   Yes

If the answer was “Yes” to any of the HEALTH AND SAFETY questions, please explain:

Generally, students will be working at a mill location that may present physical hazards. Students are required to comply with all safety regulations of the company and use all necessary safety equipment when required or when necessary for personal protection. The students are expected to undergo safety training at the mill site.

CATALOG DESCRIPTION  
(Please provide using the precise format currently used in the ESF catalog, please do not exceed 500 characters):

Three hours of lecture per week. Design-project procedure; data sources and development. Application of simulation and computer-aided design to process synthesis and plant layout. Formulation and solution of original design problems. Fall. Prerequisites: PSE 371, PSE 372, PSE 480. Pre- or co-requisite: BPE 335
DETAILED COURSE DESCRIPTION

COURSE: PSE 481 – Engineering Design
3 Credit Hours – Fall Semester
3 Hours Lecture Per Week
Prerequisites: PSE 371, PSE 372, PSE 480
Pre- or co-requisite: BPE 335

SCOPE:

1. Level of Instruction:
   a. This is a required undergraduate course for Paper Engineering students.

2. Relation to curriculum or to other ESF or Syracuse University courses:
   a. PSE 481 follows and extends PSE 480 into the formulation and solution of original, realistic design problems, in keeping with ABET engineering accreditation criteria. PSE 481 is required in the Paper Engineering option and open to other students as an elective.

STUDENT LEARNING OUTCOMES:

After completing this course the student should be able to:

1. Extend the study and application of engineering principles and methods to equipment design, experimental design, and process and plant design;
2. Learn design project procedure and provide experience in formulating and solving original design problems;
3. Conceptualize the main steps invoked in the execution of an engineering design project and gain confidence in engineering design by executing the class project.

MAJOR CONCEPTS OR METHODOLOGIES:

This capstone design course involves the execution of engineering design projects (engineering analysis/design and cost/profitability estimation). The design projects, which are conducted at a nearby paperboard mill, are actual engineering projects which concern improving the operating efficiency of the mill in some area and are concerned with some aspect of paper production. The successful solution of the design problem culminates in a final technical design report submitted by each team which makes concrete recommendations to the mill about project implementation. The three main guiding threads in a design project are scope, schedule and budget, which are progressively refined and made more detailed as the design progresses over the semester. Thus, at the very beginning of the design project, the students have to make a rough cost estimation and potential profitability analysis of their project (along with a preliminary scope and schedule) in order to arrive at decision of whether to proceed further or not. This is further assessed by in-class interaction and exploration with students on the future direction of the design project, and by evaluation of the design team’s weekly class presentations and written summaries and engineering log book, and weekly meetings with instructors. The overall progress of a design team is assessed from two mid-semester progress reports and the final technical design report. The design problem is undertaken in a group of two to three students in a team. It is emphasized in the first class handout that proper planning and scheduling, and equitable division of responsibilities within the team are essential for successful completion of the design project, and that effective communication is a major part of the course. Details of making technical presentations and report writing are given to the class and the design project also involves communicating with mill personnel and external vendors. Each design team presents its design and develops a poster of the design project at the end of the semester. The students also undergo safety training in the mill so that they can operate safely in an industrial environment.

CATALOG DESCRIPTION (Please provide using the precise format to be included in the ESF catalog, please do not exceed 50 words)
PSE 481. Engineering Design (3)

Three hours of lecture per week. Design-project procedure; data sources and development. Application of simulation and computer-aided design to process synthesis and plant layout. Formulation and solution of original design problems. Fall.

Prerequisites: PSE 371, PSE 372, PSE 480. Pre- or co-requisite: BPE 335.

COURSE HISTORY:

This course, was approved by Faculty Action on 5/5/88. Course title changed from Process and Plant Design II: Synthesis to Engineering Design by Faculty Action on 12/2/99.

Last approved:

Revised Draft: November 23, 2009 (form in protected format: 1/15/10)