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

Date: March 7, 2013
Course Number: BPE 435
Course Title: Unit Process Operations

☐ New Course OR ☒ Changes in existing course (check all that apply):

☐ Prefix
☐ Number
☐ Credits
☐ Title

☒ Description
☐ Pre-requisite(s)
☐ Co-requisite(s)

☐ Shared Resources
☒ Course Format
☒ Content
☐ Semester Offered

For new courses only, indicate if you would like approval as a course meeting the General Education standards in the following knowledge and skills area (check all that apply):

☐ American History
☐ The Arts
☐ Basic Communication

☐ Humanities
☐ Mathematics
☐ Natural Sciences

☐ Other World Civilizations
☐ Social Sciences
☐ Western Civilization

If changing an existing course, describe the change(s):
___________________________________________________________________________________
___________________________________________________________________________________

List any pre- or co-requisites here: Prerequisites: PSE 361, BPE 335, BPE 336

Institutional Impact:
Anticipated Enrollment: 25 per semester

Technology and Classroom Resource Demands: Projector, document camera, black or white board
Computing Resources: Microsoft Office, CHEMCAD, Internet
Library Resources: Journals and databases
Transportation Requirements: No
Forest Properties or Field Practicum Facilities Required: No

Proposer Contact Information:
Name: Siddharth Chatterjee Department: Paper and Bioprocess Engineering
Email: schatterjee@esf.edu Phone: 470-6517
Chair/Coordinator Signature: ________________________________
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? **No**

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.). **No**

4. **Will any radiation hazards be present during instruction?** (e.g., radioisotopes, X-rays, ultraviolet rays, lasers, etc.). **No**

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:

The class may be held during evening hours. This could be of some concern to students while coming to or leaving class. Students will be working in laboratory or pilot plant locations that may present physical hazards. Students are required to comply with all safety regulations and use all necessary safety equipment when required or when necessary for personal protection.

*A detailed course description must accompany the Course Proposal Form*
DETAILED COURSE DESCRIPTION

COURSE: BPE 435 – Unit Process Operations
3 Credit Hours – Fall Semester
2 Hours Lecture Per Week
3 Hours Laboratory and Seminar/Recitation Per Week
Prerequisite(s): PSE 361, BPE 335, BPE 336

SCOPE:

1. Level of Instruction:
   a. BPE 435 is a senior-level undergraduate course intended to fulfill a required core component in the Bioprocess Engineering program

2. Relation to curriculum or to other ESF or Syracuse University courses:
   a. BPE 435 is a senior undergraduate course offered by BPE Faculty. This course is open to all disciplines at ESF and SU if space allows.
   b. Shared resource requirements: To be cross-listed with BPE 635 Unit Process Operations.

STUDENT LEARNING OUTCOMES:

After completing this course the student should be able to:

1. Perform analysis of staged mass-transfer operations;
2. Perform analysis of continuous contact (i.e. packed- bed or fluidized-bed) mass-transfer operations;
3. Carry out process design of staged and continuous contact mass-transfer operations;
4. Analyze fluidization;
5. Conduct experiments involving unit operations (e.g., column distillation, packed-bed gas absorption, and fluidization);
6. Use process simulation software (e.g., CHEMCAD).

MAJOR CONCEPTS OR METHODOLOGIES:

The course covers some of the unit operations that are common in the bioprocess and chemical industry like gas absorption, distillation, and fluidization. Topics include the equilibrium-stage concept, tray-tower operations and continuous contact or packed-bed / fluidized-bed operations. Students use process simulation software to complement hand-calculations in unit operations like distillation and absorption. Laboratory exercises that expose the students to some of the practical aspects of the unit operations (e.g., distillation, gas absorption, and fluidization) are also included.

CATALOG DESCRIPTION (Please provide using the precise format to be included in the ESF catalog, please do not exceed 1000 characters)

BPE 435 Unit Process Operations (3)

Two hours of lecture and three hours of laboratory and/or recitation. Performance analyses and design of tray columns and continuous contact or packed columns for mass-transfer operations like gas absorption and distillation. Analysis and design of fluidized-bed operation. Use of process simulation software to simulate unit operations like distillation and gas absorption. Laboratory exercises (e.g., distillation, gas absorption, and fluidization) are also included. Fall.

Prerequisite(s): PSE 361, BPE 335, BPE 336

Note: Credit will not be granted for both BPE 435 and BPE 635.
COURSE HISTORY:

This course was first proposed: 1/25/2011.
Last approved: 3/9/2011

Revised Draft: (form in protected format: 3/7/13)