

CURRICULUM PROPOSAL FORM 1999-2000

NON-GENERAL EDUCATION PROCESS A

*DEADLINES: Deadline dates for 1999/2000 submissions: Regular proposals: October 22, 1999 to be implemented in fall 2000; Short-Term proposals: December 10, 1999 to be implemented in fall 2000; Regular proposals February 18, 2000 to be implemented in Spring 2001; March 24, 2000 for short-term courses to be implemented in Spring 2001

0906.482

PROPOSAL TITLE: PRINCIPLES OF FOOD ENGINEERING (0906.482)

SPONSOR(S): STEPHANIE FARRELL

DEPARTMENT: CHEMICAL ENGINEERING

COLLGE: ENGINEERING

IF LAS CHECK ONE: History/Humanities Math/Science Social/Behavioral Sciences

Check one: Undergraduate Graduate

THE ATTACHED *NON-GEN-ED* PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

New non-gen-ed course

Short-term non-gen-ed course

Minor curricular changes (fewer than three) to:

existing non-gen-ed course

non-gen-ed degree requirements

major

minor, specialization, concentration, track certificate program

DEPARTMENT

(Signature indicates approval)

Dept. Curriculum Chair/Date *10-22-99*

Dept. Chairperson/Date *10/25/99*

ACADEMIC DEAN

Approved Not Approved Comments:

Dean's Signature/Date *[Signature]*

COLLEGE CURRICULUM COMMITTEE

Date of open hearing (if necessary) 12/5/97 Approved Not Approved

Comments:

Signature of College Chair/Date: Ravi Rishi Ramachandran

UNIVERSITY CURRICULUM COMMITTEE

Date Received/Processed 2/9/00

Comments:

Curriculum Chair Signature: [Signature] Date Announced At Senate 2/9/00

EXECUTIVE VICE PRESIDENT/PROVOST

Approved Not Approved If no, reasons are as follows:

Student Credit Hours: _____ Faculty Load Hours: _____ Equalized Credit Hours: _____

Official Copy & Approval Sheet Filed (Date): _____ Executive VP/Provost Signature/Date [Signature]
2/4/00

REGISTRAR

Date Approved Course Description Required _____

Hegis Taxonomy & Course Number Assigned C900.4E2

Registrar Signature/Date Robert A. Helot 2/15/00

NOTIFICATION FORWARD

_____ Senate Curriculum Committee Chairperson _____ Academic Dean(s)

_____ Department Chairpersons _____ Registrar _____ Sponsor(s)

Course Proposal

1. Details:

- | | |
|--|--|
| a) Course Title: | Principles of Food Engineering (0906.482) |
| b) Sponsor: | Dr. Stephanie H. Farrell and
Chemical Engineering Curriculum Committee |
| c) Credit Hours: | 3 credit hours |
| d) Course Level: | Senior |
| e) Curricular Effect: | Technical elective for engineering majors |
| f) Prerequisites: | Chemistry I, Calculus II |
| g) Suggested Time/
Scale of Implementation: | Fall 2000
1 section |
| h) Resources: | Faculty will be hired consistent with the College of Engineering multi-year budget. No computer software beyond what is currently being acquired for approved course will be necessary. Laboratory equipment will be obtained consistent with the College of Engineering capital budget. Library acquisitions will be required consistent with current acquisition plan. |

2. Rationale:

The proposed course is a new offering consistent with other courses in the Engineering Curriculum Proposal approved by the College Senate in December 1994. The proposed course is consistent with the establishment of the College of Engineering approved by the Board of Trustees in February 1995.

The proposed course is a Technical Elective for all Engineering majors and satisfies the Engineering Topics credit requirements of the Education and Accreditation Committee (EAC) of the American Institute of Chemical Engineers (AIChE) for accreditation of the Chemical Engineering program by the Accreditation Board for Engineering and Technology (ABET). This course will have sufficient advanced chemistry to count towards the Advanced Chemistry requirement for Chemical Engineering majors.

The course will address the areas of food engineering that are important multidisciplinary topics relevant to many areas of engineering and science. The course will describe the basic principles of industrial food processing. This will include an introduction to materials and product safety requirements, process analysis and design, and process operation and control.

3. Essence of the Course:

a) Objectives:

Upon completion of the course, students will be able to:

1. Specify material and energy requirements for food engineering processes.
2. Design and analyze a food production process.
3. Model and simulate food engineering processes.
4. Analyze the economics of a food production process.
5. Use computer software to analyze food problems.
6. Work in teams to solve open-ended design problems.

b) Topical Outline:

The topics to be covered are listed below. The instructor will supply the students with a syllabus during the first week of classes. The instructor will assess any technology advances in the subject matter prior to the course and make topic changes as deemed appropriate to maintain the level and currency of instruction.

Introduction to food systems

- Interdisciplinary nature of food systems
- How Chemical Engineering Principles apply to Food Engineering
- Mass Transfer
- Heat Transfer
- Fluid Flow
- Chemical Reaction
- Process Economics

Fluid Mechanics

- Laminar and turbulent flow in food systems
- Dimensional analysis applied to food systems

Heat Transfer

- Conduction in food systems
- Heat transfer in flowing systems
- Practical aspects of heat exchange in food systems

Mass Transfer and Biosystems

- Equilibrium
- Diffusion
- Unsteady-state systems
- Flowing systems
- Interphase mass transfer
- Aeration
- Mass transfer limitations

Rheology

- Non-newtonian fluids
- Viscometric flows

Process Design

- The process plant
- Second Law analysis
- Heat and process integration in the food industry

Process Control

- Control problems in food systems
- Process dynamics
- Controller action
- Control systems for food production

Reactors and Reactions

- Types of reactors for food processing
- Chemistry of food reactions
- Analysis of reactor systems

Thermal Treatment

- Continuous processing
- Fouling and cleaning

Mixing

- Mixing equipment for food systems
- Power consumption
- Scale-up from pilot trials

c) Evaluation and Grading Procedure of Students:

Student grades will be based on examinations, homework and/or projects. A course syllabus with a stated method of arriving to the final grade, e.g., number of exams, projects, homework, percentage of grade, will be distributed to students the first week of classes.

d) Course Evaluation:

The proposed course will be evaluated on the basis of student evaluations and curriculum review by appropriate faculty.

4. Results of Consultations:

The proposed course is part of the Engineering Curriculum Proposal approved by the Faculty Senate in December 1994. No consultations are relevant.

Catalog Description

Principles of Food Engineering (0906.482)

Prerequisite: Chemistry I (1906.100), Calculus II (1701.131)

This course introduces students to chemical engineering fundamentals applied to food processing systems. Students analyze and design food engineering processes. The basic chemistry required for understanding of food systems is presented. Basic principles of mass transfer, heat transfer, fluid flow, chemical reaction, process control, and mixing are used to analyze or design food production systems. Computer simulations will be used for the design of food processing systems. Laboratory experiments and demonstrations will be integrated throughout the course.