

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

PROPOSAL TITLE: FOOD ENGINEERING SYSTEMS

SPONSOR(S): STEPHANIE FARRELL

DEPARTMENT: CHEMICAL ENGINEERING

COLLGE: ENGINEERING

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

Check one: Undergraduate Graduate

0906-582

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 *[Signature]* *Ravi Krish Panicker 02/24/00*

Dept. Chairperson/Date *[Signature]* *2-25-00*

ACADEMIC DEAN

Approved Not Approved Comments:

Dean's Signature/Date *[Signature]* *2/24/00*

COLLEGE CURRICULUM COMMITTEE
 Date of open hearing (if necessary) 2/28/01 Approved Not Approved
 Comments:
 Signature of College Chair/Date: [Signature] 2/28/01

UNIVERSITY CURRICULUM COMMITTEE
 Date Received/Processed 5/29/01
 Comments:
 Curriculum Chair Signature: [Signature] Date Announced At Senate 5/29/01

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]
6/5/01

REGISTRAR
 Date Approved Course Description Required _____
 Hegis Taxonomy & Course Number Assigned _____
 Registrar Signature/Date [Signature] 6/5/01

NOTIFICATION FORWARD

<input checked="" type="checkbox"/> Senate Curriculum Committee Chairperson	<input checked="" type="checkbox"/> Academic Dean(s) <u>8/13/01</u>
<input checked="" type="checkbox"/> Department Chairpersons	<input checked="" type="checkbox"/> Registrar _____ Sponsor(s) _____

Course Proposal

1. Details:

a) Course Title:	Advanced Food Engineering (0906.582)
b) Sponsor:	Dr. Stephanie H. Farrell and the Chemical Engineering Curriculum Committee
c) Credit Hours:	3 credit hours
d) Course Level:	Graduate
e) Curricular Effect:	Technical elective for engineering graduate courses
f) Prerequisites:	Graduate standing and approval of Graduate Advisor
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 course will address the areas of food engineering that are important multidisciplinary topics relevant to many areas of engineering and science. The industrial relevance of this course will benefit students and local industry. The course will describe the basic and advanced 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, graduate students will be able to:

1. Specify material and energy requirements for food engineering processes.
2. Design and analyze a food production process.
3. Perform advanced modeling and simulation of food engineering processes.

4. Perform in-depth analysis of the economics of a food production process.
5. Use computer software to analyze food problems.
6. Solve advanced, open-ended design problems in teams or individually

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 Reactions
- Kinetics
- 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 advanced, in-depth projects. The research project will require a survey and analysis of the current literature from professional journals. Graduate students will be required to mentor teams of undergraduates on projects related to food engineering. 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. Dr. Catherine Yang from the Department of Chemistry and Physics has been consulted and supports this proposal.

Catalog Description

Food Engineering Systems (0906.582)

Prerequisite: Graduate standing and approval of Graduate Advisor

This course introduces students to the application of fundamental and advanced chemical engineering principles to food processing systems. Students analyze and design food engineering processes. The basic and advanced chemistry and biochemistry required for an in-depth understanding of food systems is presented. 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.

Stephanie Farrell

From: Catherine Yang [yang@rowan.edu]
Sent: Monday, February 26, 2001 3:46 PM
To: farrell@rowan.edu
Subject: Re: Food Engineering Proposal

To Curriculum Committee Memebers,
I fully support the course proposal on "Food Engineering Systems" by Prof. Stephanie Farrell after reading the proposal!

Cathy Yang

Cathy F. Yang, Ph.D.
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