

CURRICULUM PROPOSAL FORM

***DEADLINES:**

ANNUAL COURSE PROPOSALS: OCTOBER 23, 1998 FOR FALL, 1999 AND FEBRUARY 19, 1999 FOR SPRING, 2000
SHORT-TERM COURSE PROPOSALS: DECEMBER 11, 1998 FOR FALL, 1999 AND MARCH 26, 1998 FOR SPRING 2000

PROPOSAL TITLE: *Fluid Flow Applications in Processing and Manufacturing*
SPONSOR/S: *Dr. Zenaida Otero Keil and Chemical Engineering Curriculum Committee* 0906.528
DEPARTMENT: *Chemical Engineering*

CHECK ALL THAT APPLY:

UNDERGRADUATE GRADUATE

COLLEGE: Engineering

If LAS: History/Humanities
 Math/Sciences
 Social/Behavioral Sciences

TYPE OF PROPOSAL. (Check ALL that Apply)

<input type="checkbox"/> General Education	<input checked="" type="checkbox"/> New Course (NOT Gen. Ed.)
<input type="checkbox"/> New Course in _____ Bank	<input type="checkbox"/> Name Change (Dept., School, Major)
<input type="checkbox"/> Existing course, Add To _____ Bank	<input type="checkbox"/> Changes in Degree Requirements
<input type="checkbox"/> Multicultural/Global Designation	<input type="checkbox"/> Changes Involve Gen. Ed. requirements
<input type="checkbox"/> Writing Intensive Designation	<input type="checkbox"/> Minor Changes to Existing Courses
<input type="checkbox"/> New Minor/Concentration/Specialization	<input type="checkbox"/> Course is NOT General Education
<input type="checkbox"/> New Major/Degree Program	<input type="checkbox"/> Course IS General Education
<input type="checkbox"/> Short Term Course Proposal	

DEPARTMENT (SIGNATURE INDICATES APPROVAL)

Robert P. Hedbreth 12/8/98 *[Signature]* 12-8-98

DEPT. CURRICULUM CHAIR / DATE DEPT. CHAIRPERSON / DATE

COLLEGE CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 2/9/99

APPROVED
 NOT APPROVED

COMMENTS:

Robert P. Hedbreth 2/9/99
SIGNATURE DATE

ACADEMIC DEAN (& GRADUATE DEAN, for New Graduate Programs Only)

APPROVED
 NOT APPROVED

COMMENTS:

[Signature] 12/8/98
SIGNATURE (Academic Dean) DATE

[Signature] _____
SIGNATURE (Graduate Dean) DATE

UNIVERSITY CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 2/9/99

APPROVED

NOT APPROVED

COMMENTS:

Tracieta Reed
SIGNATURE

3/4/99
DATE

SENATE

Date announced at Senate 2/23/99

Voted upon at Senate:

Approved

Not Approved

Date:

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): _____

DATE/SIGNATURE EXECUTIVE VICE PRESIDENT/PROVOST

C. J. Matthews

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED _____

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED C900.532

DATE/SIGNATURE OF REGISTRAR Robert U. Kubat 3/25/99

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSONS

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

110 3/31/99

Course Proposal

1. Details:

- a) Course Title:** Fluid Flow Applications in Processing and Manufacturing (0906.528)
- b) Sponsor:** Dr. Zenaida Otero Keil and
Chemical Engineering Curriculum Committee
- c) Credit Hours:** 3 credit hours
- d) Course Level:** Graduate
- e) Curricular Effect:** Technical elective for graduate engineering students
- f) Prerequisites:** Graduate standing
- g) Suggested Time/
Scale of Implementation:** Fall 1999
1 section
- h) Resources:** Faculty will be hired consistent with the College of Engineering multi-year budget. Computer software required is available or will be acquired with approval of the College of Engineering Computer Committee. Laboratory equipment purchases will be consistent with the College of Engineering capital budget. Required library acquisitions will be 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 advanced engineering aspects of fluid flow as related to chemical and other process industry applications. Complex fluid mechanics industrial applications will be covered using the foundation provided by an undergraduate course in fluid mechanics. The course will provide graduate students with advanced mathematical techniques to analyze complex fluid flow problems and examine important processes such as fluidization and multiphase transport and processing.

3. Essence of the Course:

a) Objectives:

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

1. Analyze advanced fluid flow in processing / manufacturing industries.

2. Apply advanced concepts of fluid mechanics to complex flow problems.
3. Analyze and design multiphase fluidized bed systems.
4. Analyze and design single and multiphase mixing systems.
5. Use computer software to analyze multiphase fluid flow problems.
6. Solve open-ended design problems in design teams.

b) Topical Outline:

The course will cover the topics listed below. The instructor will supply 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 topical changes as deemed appropriate to maintain a high level of currency.

Fluid flow applications

- Processing and manufacturing industries
- Commercial development trends
- Materials transport / transport alternatives

Advanced flow concepts

- Single and multiphase flow
- Creeping flow
- Lubrication
- Turbulence
- Perturbation and numerical solutions
- Viscoelasticity

Gas-solid fluidized bed systems

- Phase diagrams
- Equipment types
- Fluidization parameters

Design of fluidized bed systems

- Fluidization vessels
- Experimentation and scale-up
- Temperature effects and control
- Solid and gas mixing
- Solids feeders and solids flow control
- Industrial applications of fluidized beds

Mixing technologies: liquid-liquid systems and gas-liquid systems

- Mixer-settler equipment
- Flow or in-line mixers
- Mixing in agitated vessels
- Sparger design
- Gas-liquid mixing parameters and flow behavior

Mixing technologies: solid-liquid systems

- Mixing equipment
- Fluid behavior in mixing vessels
- Design of agitation equipment
- Dispersion and uniformity of mixing

Mixing technologies: paste and viscous materials

- Batch mixers
- Continuous mixers
- Process design considerations

c) Evaluation and Grading Procedure of Students:

Student grades will be based on examinations, homework and a required project. The course syllabus with the grading procedure 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 with consultations. No additional consultations are required.

Catalog Description

Fluid Flow Applications in Processing and Manufacturing (0906.528)

(Prerequisite: Graduate standing and approval of graduate advisor)

This course will cover the foundation principles of applied fluid mechanics with an emphasis on industrial applications. Topics in mixing, multi-phase fluid flow and processing, and fluidization will be covered. Key technologies from chemical, civil, and mechanical engineering applications will be used to illustrate concepts. The course will provide a strong background in the application of fluid mechanics principles to industrial processing and manufacturing operations.

My documents/courses/fluid528.doc