

PROPOSAL NUMBER: 99-453
②
98-99-453

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: *Fundamentals of Particle Technology 0906.474*

SPONSOR/S: *Dr. Zenaida Otero Keil and Chemical Engineering Curriculum Committee*

DEPARTMENT: *Chemical Engineering*

CHECK ALL THAT APPLY:

UNDERGRADUATE GRADUATE

COLLEGE: *Engineering*

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

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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. Heppeth 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. Heppeth *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 (Graduate Dean) DATE

UNIVERSITY CURRICULUM COMMITTEE

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

APPROVED

NOT APPROVED

COMMENTS:

Francis Rector 3/4/99
SIGNATURE 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 CFM

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED _____

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED 0906-174

DATE/SIGNATURE OF REGISTRAR Robert A. Kulot 3/25/99

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSONS

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

TMM 3/31/99

Course Proposal

1. Details:

- a) Course Title:** Fundamentals of Particle Technology (0906.474)
b) Sponsor: Dr. Zenaida Otero Keil 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 (1906.100) and Calculus II (1701.131)
**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 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 multidisciplinary topics in particle technology that are relevant to many areas of engineering and science. The course will include the fundamental principles of particle properties and technology. This will include particle synthesis and manufacturing processes, and commercial chemical industry processes involving particles.

3. Essence of the Course:

a) Objectives:

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

1. Understand the fundamental principles governing particle properties
2. Understand particle flow and the thermodynamics and kinetics associated with major industrial processes involving particles
3. Design particle manufacturing processes and chemical processes involving particles
4. Model and simulate processes involving particles
5. Use computer software to assist in problem synthesis and analysis of processes involving particles
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.

- I. Introduction and Basic Principles
 1. Particle Properties
 2. Particle Behavior in Chemical Processes
 3. Thermodynamics
 4. Flow, Heat and Mass Transport
 5. Kinetics
- II. Particle Manufacturing
 1. Chemical Manufacturing
 2. Physical Processes
 3. Novel Techniques
- III. Fundamental Physical Processes
 1. Motion of Particles in a Flowing Medium
 2. Flow Through Packings
 3. Mechanics of the Fluidized Bed
 4. Continuum Mechanics of Packings
 5. Deformation and Fracture of Solids
 6. Adhesion
 7. Particle Metrology

IV. Processes

1. Separation Processes
2. Mixing Processes
3. Agglomeration and Coagulation Processes
4. Comminution Processes
5. Conveying, Storing and Feeding of Bulk Solids
6. Novel Processes

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 with consultations. No additional consultations are required.

Catalog Description

Fundamentals of Particle Technology (0906.474)

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

This course introduces students to the chemical engineering fundamentals of particle technology. Students analyze and design chemical industry processes involving particles. The basic chemistry of particle synthesis and manufacturing is presented. Principles of mass and heat transfer, fluid flow and chemical reaction kinetics are used to analyze a wide range of industrial processes involving particles. Processes involving fluidization, pneumatic conveying, multi-phase mixing and catalysis will be discussed. Laboratory experiments and demonstrations will be integrated throughout the course.