

CURRICULUM PROPOSAL FORM

PROPOSAL NUMBER: 99-

446 (2)

***DEADLINES:**

REGULAR 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: Principles of Air Pollution Control 0906.470

SPONSOR/S: Robert P. Hesketh and Chemical Eng. Curr. Com.

DEPARTMENT: Chemical Engineering

CHECK ALL THAT APPLY:

UNDERGRADUATE GRADUATE

COLLEGE:

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. Hesketh 10/21/98

DEPT. CURRICULUM CHAIR / DATE

[Signature] 10-21-98

DEPT. CHAIRPERSON / DATE

COLLEGE CURRICULUM COMMITTEE

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

APPROVED

NOT APPROVED

COMMENTS:

Robert P. Hesketh 2/9/99
 SIGNATURE DATE

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

APPROVED

NOT APPROVED

COMMENTS:

[Signature] 10/23/98
 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:

Jametta Rivers 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 [Signature]

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED _____

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED 0966.476

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

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSONS

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

TIM 3/31/99

Course Proposal

1. Details:

- a) Course Title:** Principles of Air Pollution Control (0906.470)
b) Sponsor: Dr. Robert P. Hesketh 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. 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 area of air pollution control engineering that is important multidisciplinary topic relevant to many areas of engineering and science. The course will describe the basic principles of controlling air pollution. This will include an introduction to regulatory standards, atmospheric and applicable process chemistry, and control mechanisms and devices for particulates and gases.

3. Essence of the Course:

a) Objectives:

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

1. Understand the fundamentals of thermodynamics, kinetics and mass transfer as related to air pollution control.
2. Design air pollution control devices.
3. Model and simulate air pollution control processes.
4. Understand the basic mechanisms of gas and particulate control.
5. Use computer software to analyze air pollution 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 air pollution control

- Air Pollution
- Particulates
- Gases
- Standards
- Risk Assessment
- Indoor Air Quality
- Atmospheric Dispersion

Basic concepts

- Energy and Conservation
- Combustion of fuels: Coal, Oil, Gas, Motor Fuels, Waste, Incineration
- Combustion Fundamentals: Heating Value, adiabatic flame temperature, flashback
- Emission Minimization from Combustion Processes

Chemistry and thermodynamics applied to air pollutants and control systems

- Atmospheric pollutant chemistry
- Sulfur Oxide chemistry
- Nitrogen Oxide chemistry

Particulate Control mechanisms

- Particle dynamics
- Forces on particles
- Particle Collection

Gas Control Mechanisms

- Diffusion and mass transfer
- Gas absorption
- Gas adsorption
- Chemical removal processes

Control Devices

- Mechanical Collectors
- Electrostatic Precipitators
- Filters
- Scrubbers
- Absorbers
- Adsorbers
- Novel / hybrid technologies

Control System Design

- Upstream and downstream of the control system
- Electrostatic Precipitators
- Filters
- Scrubbers
- Adsorbers
- Incinerators
- Operating Costs

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 Air Pollution Control (0906.470)

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

This course introduces students to air pollution control theory. Students design air pollution control processes and specify equipment related to the control of particulate, gaseous, and toxic air emissions. The chemistry required for pollution control process design is presented. The environmental impacts due both to controlling and not controlling emissions are considered. Students design control equipment, specify and troubleshoot control systems and predict the impacts for each major type of control system.