PROPOSAL NUMBER: 99- 442 (R)

CURRICULUM PROPOSAL FORM

*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: Air Pollution Control 0906.570

SPONSOR/S: Robert P. Hesketh and Chem. Eng. Cur. Com.

DEPARTMENT: Chemical Engineering

CHECK ALL THAT APPLY:
____UNDERGRADUATE _X_GRADUATE

COLLEGE: _____
If LAS: ____History/Humanities
____ Math/Sciences
____Social/Behavioral Sciences

* * * * * * * * * * *

TYPE OF PROPOSAL *(Check ALL that Apply)*

____General Education
___*New Course in* _____ *Bank*
___*Existing course, Add To* _____ *Bank*
___*Multicultural/Global Designation*
___*Writing Intensive Designation*

_____ New Minor/Concentration/Specialization
_____ New Major/Degree Program
_____ Short Term Course Proposal

_X_ New Course (NOT Gen. Ed.)
_____ Name Change (Dept., School, Major)
_____ Changes in Degree Requirements
___*Changes Involve Gen. Ed. requirements*

_____Minor Changes to Existing Courses
____ *Course is NOT General Education*
____ *Course IS General Education*

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
X 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] 10/22/98
SIGNATURE (Academic Dean) DATE

SIGNATURE (Graduate Dean) DATE

UNIVERSITY CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 3/4/99 (College Level only)

✓ APPROVED

— NOT APPROVED

COMMENTS:

[signature] 3/4/99

SIGNATURE DATE

SENATE

Date announced at Senate 3/23/99

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 3906.52

DATE/SIGNATURE OF REGISTRAR [signature] 3/23/99

NOTIFICATION FORWARD:

✓ SENATE CURRICULUM COMMITTEE CHAIRPERSON

✓ DEPARTMENT CHAIRPERSONS

✓ ACADEMIC DEAN(S)

✓ REGISTRAR

SPONSOR(S) TM 3/31/99

curricul/curfrms.989/9899prop.wpd

Course Proposal

1. Details:

a) Course Title:	Air Pollution Control (0906.570)
b) Sponsor:	Dr. Robert P. Hesketh and 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 Advsior
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 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 a required semester project. 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

Air Pollution Control (0906.570)

Prerequisite: Graduate standing and approval of Graduate Advisor
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.