

12

ROWAN COLLEGE CURRICULUM COMMITTEE

0906-463

PROPOSAL TITLE: Environmental an... Process Design

UNDERGRADUATE GRADUATE 3 CREDIT HOURS

SPONSOR(S): ... School of Engineering Curriculum Committee

DEPARTMENT & TELEPHONE# Chemical Engineering X 4631

CHECK ONE: COURSE MINOR PROGRAM CONCENTRATION SPECIALIZATION ACHIEVEMENT CERTIFICATE CERTIFICATION PROGRAM MAJOR PROGRAM

Table with 3 columns: STEP #1 (DEPARTMENT), STEP #2 (RECEIPT), STEP #3 (SCHOOL). Includes fields for APPROVED/DATE, REVIEWED/DATE, DEPT. CURRICULUM CHR., SENATE/CURRICULUM CHR., SCHOOL COMMITTEE CHR., and RECOMMEND TO APPROVE/NOT TO APPROVE.

STEP #4 (ACADEMIC DEAN) COMMENTS: RECOMMEND NOT RECOMMEND CONDITIONALLY RECOMMEND (SEE COMMENTS) DATE & SIGNATURE, DEAN OF SCHOOL [Signature] 3/16/96

STEP #5 (SENATE CURRICULUM COMMITTEE) DATE OF OPEN HEARING 7/23/96 APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) 9/11/96 RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS:

STEP #6 (SENATE) DATE PRESENTED TO SENATE 9/25/96 APPROVED NOT APPROVED NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) 9/25/96 SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE [Signature] 9/25/96

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED 11 29

APPROVED: YES NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS _____

FACULTY LOAD HOURS _____

EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE) _____

SIGNATURE, EXECUTIVE VICE PRESIDENT/PROVOST [Signature]

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 MAR 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0906-463

DATE/SIGNATURE OF REGISTRAR B. Kelly

NOTIFICATION FORWARD:

___ SENATE CURRICULUM COMMITTEE CHAIRPERSON

___ DEPARTMENT CHAIRPERSON(S)

___ ACADEMIC DEAN(S)

___ REGISTRAR

___ SPONSOR(S)

Course Proposal**1. Details:**

- a) Course Title:** Environmental Considerations in Process Design
b) Sponsor: School of Engineering Curriculum Committee;
 Dr. C. Stewart Slater, Chemical Engineering
c) Credit Hours: 3 credit hours
d) Course Level: Senior (0906.463)
e) Curricular Effect: Technical Elective for Chemical Engineering majors
f) Prerequisites: Reaction Engineering, Separation Processes
**g) Suggested Time/
 Scale of Implementation:** Spring 2000
 1 section
h) Resources: Faculty will be hired consistent with Engineering School
 multi-year budget.
 Library acquisitions will be required.

2. Rationale:

The proposed course is part of the Engineering Curriculum Proposal approved by the College Senate in December 1994. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February 1995.

The proposed course is Technical Elective for all Chemical Engineering majors and satisfies the Engineering Topics credit requirements of the Chemical Engineering program as required by the Accreditation Board for Engineering and Technology (ABET).

The course will address strategies for designing environmentally sound processes. This course will augment the information provided in previous courses about traditional unit operations and present information on novel processes and plant design methodology. This course is an important elective and enhances the environmental engineering technology focus area of offerings.

3. Essence of the Course:**a) Objectives:**

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

1. Determine approaches to the environmentally conscience design of process and manufacturing facilities - source reduction and reuse/recovery.
2. Apply design information to modify existing processes to meet environmental regulations and to design overall production facilities.

3. Develop a process design to reduce byproduct generation.
4. Substitute environmentally benign raw materials in a process.
5. Develop a waste minimization, control and disposal strategy.
6. Understand process design applications in the process industries
7. Use computer software to analyze process design problems.
8. Work in groups 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 pollution prevention

Process and product modifications

Overall strategies for reducing gaseous, liquid and solid wastes

Process design and management

Source reduction

Recycle and reuse

Process modification to reduce byproducts

Alteration of reactions

Process unit operations

Operating conditions

Process chemistry

Substitution of environmentally-benign raw materials

Solvent substitution

Other process components

Recovery of wastes for economic gain

Recovery and conversion options

Recovery for resale

Recovery for reuse

Process engineering for environmental concerns

Environmental regulations

Economic incentives

Approach to source control problem strategy - air streams

- Factors in control equipment selection

- Source control of gaseous emissions

- Source control of particulate emissions

Recycling and reuse processes - liquid wastes

- Water conservation

- Solvent recovery

- Material recovery

- Waste segregation

- Zero discharge

Waste minimization - liquid waste

- Concentration processes

- Process stream modifications

- Hybrid systems

On-site handling, storage and processing

Heat recovery in processing

Process design applications in the process industries

- Organic chemicals

- Inorganic chemicals

- Petroleum / refining

- Food and beverage

- Pharmaceutical / biotechnology

- Electrochemical / electronics

- Pulp and paper

- Textile

- Agricultural

Case studies and student projects

- Life cycle and environmental impact analyses

- Student team projects

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 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:

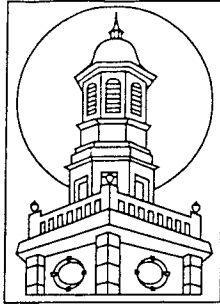
The proposed course is part of the Engineering Curriculum Proposal approved by the Faculty Senate in December 1994. Consultations were submitted with original proposal as specified by the Curriculum Committee. Consultations have been made with Chemistry faculty in the Department of Chemistry and Physics who have provided a letter of support.

Catalog Description

Environmental Considerations in Process Design (0906.463)

(Prerequisite: Reaction Engineering, Separation Processes)

This course evaluates process design techniques to minimize waste and by-products in the processing and manufacturing industries. Topics include: mass and heat recycling processes; technologies for process stream renovation, material reuse and recycling methods. Case studies of industrial applications are utilized.



Rowan College of New Jersey

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Department of Chemistry and Physics

To: Curriculum Committee
From: Robert Newland, Chairperson
Subject: Chemical Engineering Technical Electives
Date: February 15, 1996

A handwritten signature in black ink, appearing to read 'RN', located to the right of the header information.

I have examined the course proposals listed below and find them in accord with the previously submitted curriculum plan. I also have noted where courses require chemistry and /or physics prerequisites and am convinced there are no additional resources required to meet this demand for our courses. We fully support these proposals.

Electrochemical Engineering
Environmental Regulations in Technology Industries
Environmental Considerations in Process Design
Process Safety
Membrane Process Technology
Advanced Separation Technology
Process Heat Transfer
Fluid Flow in Processing and Manufacturing
Advanced Reactor Design
Bioprocess Engineering
Transport Phenomena