

(2)

ROWAN COLLEGE
CURRICULUM COMMITTEE

ROPOSAL TITLE: Safety in the Process Industries 0406-512-

UNDERGRADUATE GRADUATE 3 CREDIT HOURS

SPONSOR(S): C. Stewart Slater and School of Engineering Curriculum Committee

DEPARTMENT & TELEPHONE# Chemical Engineering 4631

CHECK ONE: COURSE MINOR PROGRAM CONCENTRATION SPECIALIZATION

ACHIEVEMENT CERTIFICATE CERTIFICATION PROGRAM MAJOR PROGRAM

STEP #1 (DEPARTMENT)	STEP #2 (RECEIPT)	STEP #3 (SCHOOL)
<p>APPROVED/DATE: _____</p> <p>NOT APPROVED/DATE: _____</p> <p>DEPT. CURRICULUM CHR. <u>N/A</u></p> <p>REVIEWED/DATE: _____</p> <p style="text-align: center;"><u>N/A</u></p> <p>DEPT. CHR. _____</p>	<p>SCC# <u>95-96-135</u></p> <p>DATE RECEIVED: <u>2-21-96</u></p> <p style="text-align: center;"><u>[Signature]</u></p> <p>SENATE CURRICULUM CHR. _____</p>	<p>REVIEWED DATE: <u>2-14-96</u></p> <p><input checked="" type="checkbox"/> RECOMMEND TO APPROVE</p> <p><input type="checkbox"/> RECOMMEND NOT TO APPROVE</p> <p>FORWARD FOR OPEN HEARING</p> <p><input checked="" type="checkbox"/> WITHOUT RESERVATIONS</p> <p><input type="checkbox"/> WITH RESERVATIONS</p> <p>COMMENTS: _____</p> <p style="text-align: center;"><u>[Signature]</u></p> <p>SCHOOL COMMITTEE CHR. _____</p>

STEP #4 (ACADEMIC DEAN) COMMENTS:

RECOMMEND

NOT RECOMMEND

CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL [Signature] 2/16/96

STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING 9/23/96

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) 9/23/96

RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS:

STEP #6 (SENATE)

DATE PRESENTED TO SENATE 02/25/96 APPROVED NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) 9/20/96

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE [Signature] 9/20/96

Course Proposal**1. Details:**

- a) Course Title:** Safety in the Process Industries
b) Sponsor: School of Engineering Curriculum Committee
 Dr. C. Stewart Slater, Chemical Engineering
c) Credit Hours: 3 credit hours
d) Course Level: Graduate (0906.512)
e) Curricular Effect: Technical Elective Engineering Graduate students
f) Prerequisites: Graduate Engineering standing and approval of Grad. Advisor
**g) Suggested Time/
 Scale of Implementation:** Fall 1997
 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 a graduate elective and is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February 1995.

The course will address the area of process safety that is important multidisciplinary topic relevant to many areas of engineering and technology. The course has its foundation in chemical process safety as applied to the operation of chemical plants and research facilities and is pertinent to many other manufacturing/production areas.

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

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

1. Understand the importance of safety, accident and emergency management to process/manufacturing industries.
2. Apply various toxicology models to living organisms.
3. Develop source/dispersion models for various process scenarios.
4. Design process systems to prevent fires and explosions.
5. Design safety relief and runaway process protection systems.

6. Perform hazard identification audits and risk assessment surveys.
7. Work as a teams to critically analyze an industrial case study.
8. Use computer software to analyze process safety 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

- Safety programs and engineering ethics
- Accident and risk management

Toxicology

- Effects of toxicants on biological organisms

Industrial Hygiene

- Government regulations
- Identification, evaluation, and control

Source Models

- Flow of liquids through holes and pipes
- Flow of vapor through holes and pipes
- Flashing liquids

Toxic release and dispersion models

- Source and dispersion models
- Pasquill-Gifford model
- Release mitigation

Fires and explosions

- Fires and explosions; the fire triangle
- Flammability of liquids and vapors
- Explosions
- Designs to prevent fires and explosions

Relief systems

- Relief types
- Sizing reliefs and relief operation

Hazards identification
Process hazards survey
Hazard and operability studies (HAZOP)
Safety reviews

Risk assessment
Event trees
Fault trees

Accident investigation and selected case histories
Static electricity cases
Chemical reactivity cases
System design cases
Procedure cases

c) Evaluation and Grading Procedure of Students:

Student grades will be based on examinations, homework and a required project. 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:

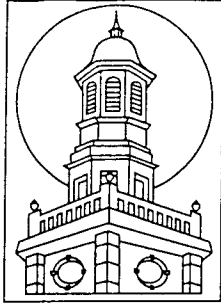
Consultations have been made with Chemistry faculty in the Department of Chemistry and Physics who have provided a letter of support.

Catalog Description

Safety in the Process Industries (0906.512)

(Prerequisite: Graduate standing and approval of Graduate Advisor)

This course presents the basic principles, guidelines, and calculations necessary for the safe design and operation of chemical plants and related manufacturing facilities. Topics include: toxics and human exposure, fires and explosions, vessel relief systems, hazard identification and risk assessment, source and dispersion models. Accident investigation is discussed along with a review of actual case histories.



Rowan College of New Jersey

Glassboro, NJ 08028-1701 • 609/256-4855

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