(2)

ROWAN COLLEGE
CURRICULUM COMMITTEE

ROPOSAL TITLE: Chemical Process Principles

X UNDERGRADUATE ___GRADUATE 3 CREDIT HOURS

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

DEPARTMENT & TELEPHONE# Chemical Engineering x4631

CHECK ONE: X COURSE ___MINOR PROGRAM ___CONCENTRATION ___SPECIALIZATION

___ACHIEVEMENT CERTIFICATE ___CERTIFICATION PROGRAM ___MAJOR PROGRAM

STEP #1 (DEPARTMENT)

___APPROVED/DATE:

___NOT APPROVED/DATE: N/A

DEPT. CURRICULUM CHR.

___REVIEWED/DATE:

N/A

DEPT. CHR.

STEP #2 (RECEIPT)

SCC# 95-96-54

DATE RECEIVED:

SENATE

OCT 23 1995

RECEIVED

SENATE CURRICULUM CHR.

STEP #3 (SCHOOL)

REVIEWED DATE:- 10-4-95

X RECOMMEND TO APPROVE

___RECOMMEND NOT TO APPROVE

FORWARD FOR OPEN HEARING

X WITHOUT RESERVATIONS

___WITH RESERVATIONS

COMMENTS:

SCHOOL COMMITTEE CHR.

STEP #4 (ACADEMIC DEAN)

COMMENTS:

✓ RECOMMEND

___NOT RECOMMEND

___CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL

STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE)

___RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS:

STEP #6 (SENATE)

DATE PRESENTED TO SENATE ___APPROVED ___NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE)

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED 12-4-95

APPROVED: ✓ YES ___NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS 3

FACULTY LOAD HOURS 3

EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE) 12/5/95

SIGNATURE, EXECUTIVE VICE PRESIDENT/PROVOST C. J. Morton

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 10 Jan 96

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0906.206

DATE/SIGNATURE OF REGISTRAR B Kelsey 10 Jan 96

NOTIFICATION FORWARD:

___SENATE CURRICULUM COMMITTEE CHAIRPERSON

___DEPARTMENT CHAIRPERSON(S)

___ACADEMIC DEAN(S)

___REGISTRAR

___SPONSOR(S)

\CURRIC2A.WPD\

Course Proposal

1. Details:

a) Course Title:	Principles of Chemical Processes
b) Sponsor:	School of Engineering Curriculum Committee; Dr. C. Stewart Slater, Chemical Engineering
c) Credit Hours:	3 credit hours
d) Course Level:	Sophomore
e) Curricular Effect:	Core Elective
f) Prerequisites:	Chemistry II, Calculus II
g) Suggested Time/ Scale of Implementation:	Spring 1998 1 section
h) Resources:	Faculty will be hired and equipment obtained 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 a requirement for Chemical Engineering majors and a Core Elective for the other engineering disciplines. The course is a Chemical Engineering Program Criteria requirement of the Education and Accreditation Committee (EAC) of the American Institute of Chemical Engineers (AIChE) for accreditation of the program by the Accreditation Board for Engineering and Technology (ABET).

The course is the essential introductory course for all chemical engineering majors. It provides the foundation in basic chemical engineering process concepts and their relationship to various industrial problems. The course is a viable elective for engineering majors in other disciplines and in particular the Manufacturing/Processing Engineering and Environmental Engineering technology focus groups.

3. Essence of the Course:

a) Objectives:

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

1. Apply basic calculation methods to chemical processes.

2. Understand various process parameters used in processes and how to quantify them.

3. Perform individual, multiple and complex material and energy balances.

4. Apply material and energy balances to chemical, petroleum, biochemical, food and beverage, consumer products production and other production processes.

5. Understand how to perform balances on reacting and nonreacting processes.

6. Utilize graphical and computer methods to solve process problems.

7. Work in groups to solve open-ended design problems.

8. Understand the implications of safety and environmental issues in chemical processes.

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 chemical engineering calculations
- Units and dimensions, systems of units
- Conversion of units
- Dimensional homogeneity and dimensionless quantities
- Process data representation and analysis

Processes and process variables
- Mass and volume
- Flow rate
- Chemical composition
- Pressure
- Temperature

Fundamentals of material balances
- Process classification
- Material balance calculations
- Balances on multiple-unit processes
- Recycle and bypass
- Balances on reactive systems
- Combustion reactions

Single-phase systems
- Liquid and solid densities

Ideal gases
Real gases

Multi-phase systems
Single-component phase equilibrium
Gibbs phase rule
Gas-liquid systems: one condensable component
Multicomponent gas-liquid systems
Solutions of solids in liquids
Immiscible and partially miscible liquids

Energy and energy balances
Kinetic, potential and internal energy
Energy balances on closed systems
Energy balances on open systems
Tables of thermodynamic data
Energy balance procedures
Mechanical energy balance

Balances on nonreactive processes
State properties and process paths
Changes in pressure and temperature
Phase change operations

Balances on reactive processes
Heats of reaction
Formation reactions and heats of formation
Fuels and combustion

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.

Catalog Description

Introduction to chemical engineering calculations; processes, process variables, and design. Material and energy balances for chemically non-reacting and reacting systems. Single-phase and multi-phase systems; property tables and diagrams. Demonstrations integrated throughout course.

Prerequisites: Chemistry II, Calculus II