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ROWAN COLLEGE CURRICULUM COMMITTEE

PROPOSAL TITLE: Principles of Chemical Process I 0966-201

X UNDERGRADUATE GRADUATE 2.0 CREDIT HOURS

SPONSOR(S): J. Howard Dwyer and School of Engineering Curriculum Committee

DEPARTMENT & TELEPHONE# Chemical Engineering, x 4631

CHECK ONE: X 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, and signatures of DEPT. CURRICULUM CHR., SENATE CURRICULUM CHR., and SCHOOL COMMITTEE CHR.

STEP #4 (ACADEMIC DEAN) COMMENTS: RECOMMEND NOT RECOMMEND CONDITIONALLY RECOMMEND (SEE COMMENTS) DATE & SIGNATURE, DEAN OF SCHOOL J. M. Carey 3/6/96

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: Notes: This replaces Chemical Process Principles AC

STEP #6 (SENATE) DATE PRESENTED TO SENATE 9/28/96 APPROVED NOT APPROVED NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) 9/28/96 SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE Ronald J. Gocher 9/30/96

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED _____

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 0906-201

DATE/SIGNATURE OF REGISTRAR B J Kelsey

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSON(S)

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

*Course Proposal***1. Details:**

- a) Course Title:** Principles of Chemical Processes I
b) Sponsor: School of Engineering Curriculum Committee;
 Dr. C. Stewart Slater, Chemical Engineering
c) Credit Hours: 2 credit hours
d) Course Level: Sophomore ((0906.201)
e) Curricular Effect: Requirement for ChE., Core Elective for EE, CE, ME
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. It has been modified into a two, 2-credit course sequence. 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 balances.
4. Apply material 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

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

Principles of Chemical Processes I (0906.201)

Prerequisites: Chemistry II, Calculus II

This course presents an introduction to chemical engineering calculations; processes, process variables, and design. Material balances for chemically non-reacting and reacting systems are described. Single-phase and multi-phase systems; property tables and diagrams are reviewed. Demonstrations will be integrated throughout this course.