

(12) 9714

ROWAN COLLEGE  
CURRICULUM COMMITTEE

PROPOSAL TITLE: Principles of Chemical Processes II 0906-202 <sup>302</sup>

UNDERGRADUATE       GRADUATE      2.0 CREDIT HOURS

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

DEPARTMENT & TELEPHONE# Chemical Engineering, x 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 style="text-align: center;"><u>N/A</u></p> <p>DEPT. CURRICULUM CHR. _____</p> <p>REVIEWED/DATE: _____</p> <p style="text-align: center;"><u>N/A</u></p> <p>DEPT. CHR. _____</p>	<p>SCC# <u>95-96-179</u></p> <p>DATE RECEIVED: <u>3-8-96</u></p> <p style="text-align: center;"><u>Ronald J. Godwin</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 style="text-align: center;">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:
<p><input checked="" type="checkbox"/> RECOMMEND</p> <p><input type="checkbox"/> NOT RECOMMEND</p> <p><input type="checkbox"/> CONDITIONALLY RECOMMEND (SEE COMMENTS)</p> <p>DATE &amp; SIGNATURE, DEAN OF SCHOOL _____</p>	<p style="text-align: center;"><u>[Signature]</u>      <u>3/6/96</u></p>

STEP #5 (SENATE CURRICULUM COMMITTEE)
<p>DATE OF OPEN HEARING <u>9/25/96</u></p> <p>APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) <u>9/23/96</u></p> <p><input type="checkbox"/> RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS: _____</p> <p>_____</p> <p>_____</p>

STEP #6 (SENATE)
<p>DATE PRESENTED TO SENATE <u>9/25/96</u>      <input checked="" type="checkbox"/> APPROVED      <input type="checkbox"/> NOT APPROVED</p> <p>NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) <u>9/30/96</u></p> <p>SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE <u>Ronald J. Godwin</u>      <u>9/30/96</u></p>

X  
**ROWAN COLLEGE  
 CURRICULUM COMMITTEE**

ROPOSAL TITLE: Principles of Chemical Processes II 0906-262-

UNDERGRADUATE       GRADUATE      2.0 CREDIT HOURS

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

DEPARTMENT & TELEPHONE# Chemical Engineering, x 4631

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

STEP #1 (DEPARTMENT)	STEP #2 (RECEIPT)	STEP #3 (SCHOOL)
APPROVED/DATE: _____ NOT APPROVED/DATE: _____ <u>N/A</u> DEPT. CURRICULUM CHR. _____  REVIEWED/DATE: _____  <u>N/A</u> DEPT. CHR. _____	SCC# <u>4590-114</u> DATE RECEIVED: <u>3-14-96</u>  <u>Ronald J. Gordon</u> SENATE CURRICULUM CHR. _____	REVIEWED DATE:- <u>2-14-96</u> <input checked="" type="checkbox"/> RECOMMEND TO APPROVE <input type="checkbox"/> RECOMMEND NOT TO APPROVE FORWARD FOR OPEN HEARING <input checked="" type="checkbox"/> WITHOUT RESERVATIONS <input type="checkbox"/> WITH RESERVATIONS COMMENTS: _____  <u>[Signature]</u> SCHOOL COMMITTEE CHR. _____

STEP #4 (ACADEMIC DEAN) <input checked="" type="checkbox"/> RECOMMEND <input type="checkbox"/> NOT RECOMMEND <input type="checkbox"/> CONDITIONALLY RECOMMEND (SEE COMMENTS) DATE & SIGNATURE, DEAN OF SCHOOL	COMMENTS:  <u>[Signature]</u> <u>3/6/96</u>
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STEP #5 (SENATE CURRICULUM COMMITTEE) DATE OF OPEN HEARING <u>9/25/96</u> APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) <u>9/27/96</u> RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS: _____ _____
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STEP #6 (SENATE) DATE PRESENTED TO SENATE <u>9/25/96</u> <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> NOT APPROVED NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) <u>9/30/96</u> SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE <u>Ronald J. Gordon</u> <u>9/30/96</u>
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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 \_\_\_\_\_

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 Nov 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0916-202

DATE/SIGNATURE OF REGISTRAR B. J. Kelly

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 II  
**b) Sponsor:** School of Engineering Curriculum Committee;  
 Dr. C. Stewart Slater, Chemical Engineering  
**c) Credit Hours:** 2 credit hours  
**d) Course Level:** Sophomore (0906.202)  
**e) Curricular Effect:** Requirement for ChE, Elective for EE, CE, ME  
**f) Prerequisites:** Principles of Chem. Processes I, 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 energy balances.
4. Apply 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.

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

Computer-aided balance calculations

- Degree of freedom analysis
- Sequential modular simulation

Balances on transient processes

Material and energy balances applied to transient conditions

**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 II (0906.202)**

*Prerequisites: Principles of Chemical Processes I, Chemistry II, Calculus II*

This course is a continuation of Principles of Chemical Processes I. It will describe energy concepts for chemical processes. This course presents energy balances for chemically non-reacting and reacting systems and will show students how to use of property tables and diagrams. Computer-aided material and energy balance calculations will be performed. Transient material and energy balances will be introduced. Demonstrations will be integrated throughout course.