


Fall, 2004

PROCESS A NON-GENERAL EDUCATION ~ CURRICULUM PROPOSAL

SCC #02-03- 112 

Deadlines:

Regular proposals: October 18, 2002 to be implemented Fall 2003
Short-term proposals: December 6, 2002 to be implemented Fall 2003
Regular proposals: February 14, 2003 to be implemented Spring 2004
Short-term courses to be implemented Spring 2004

PROPOSAL TITLE: Membrane Processes

Sponsor(s): C. Stewart Slater E-Mail: slater@rowan.edu Ext: 5312

DEPARTMENT: Chemical Engineering

COLLEGE: Engineering

If Liberal Arts & Sciences CHECK : History/Humanities Math/Sciences Social/Behavioral Sciences

UNDERGRADUATE GRADUATE

THE ATTACHED **NON-GEN-ED** PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

- New non-gen-ed course
- Short-term non-gen-ed course
- Minor curricular changes (fewer than three)
- Existing non-gen-ed course
- Non-gen-ed degree requirements
- Major
- Minor, specialization, concentration, track, certificate program

The following signatures REPRESENT APPROVAL

Department Chair: [Signature] Date: 2/5/03

Department Curriculum Chair: [Signature] Date: 2/10/03

Academic Dean: [Signature] Date: 2/5/03

College Curriculum Chair: [Signature] Date: 5/5/03

College Curriculum Committee OPEN HEARING Date: 4/11/03 Approved Not Approved

UNIVERSITY CURRICULUM COMMITTEE

Senate Curriculum Chair Signature: [Signature] Date: 6/10/2003

Comments: _____

EXECUTIVE VICE PRESIDENT/PROVOST Signature: [Signature] Date: 9/26/03

Approved ~ Not Approved due to the following: Student Cr Hrs Faculty Load Hrs Equalized Cr Hrs

REGISTRAR

Date: 9/29/03 Course Description Received & Approved ~ Hegis Taxonomy & Course #: 0906486

Registrar Signature: [Signature]

NOTIFICATION FORWARD

SCC Chair C.A.P. Academic Dean IR Department Chair 10/1/03 Registrar ru Sponsor(s)

Course Proposal

1. Details:

- a) **Course Title:** Membrane Processes (suggested HEGIS 0906-486)
b) **Sponsor:** Dr. C. Stewart Slater, Chemical Engineering Dept
c) **Credit Hours:** 3 credit hours
d) **Course Level:** Senior
e) **Curricular Effect:** Technical Elective for Chemical Engineering students
f) **Prerequisites:** Adv College Chem I, 1906-105 or Chem I, 1906-100; and Calculus II, 1701-131
g) **Suggested Time/**
Scale of Implementation: Fall 2004
1 section
h) **Resources:** No new resources required. Course will be folded into current rotation of department electives with no effect on faculty workload, the department already possesses equipment for demonstrations, and no library resources are needed.

2. Rationale:

The proposed course is an undergraduate elective in the Chemical Engineering Department. The course will address membrane process technology beyond the diffusion fundamentals taught in a mass transfer or separations course. This course is a good elective for students to provide the added depth to the program, complementing other courses, labs and clinic projects. Process engineering learned in this course will enable students to be better prepared to develop and design modern membrane separation systems for industries from food processing, specialty chemical manufacturing and water purification. Membrane processes are utilized in many industries for product and process stream concentration, purification and fractionation.

3. Essence of the Course:

a) Objectives:

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

1. Understand the fundamental transport mechanism of membrane processes.
2. Determine the difference between various membrane operations in terms of the driving force utilized and the components being separated.
3. Comprehend various membrane manufacturing and characterization techniques.

4. Select the appropriate membrane material for the separation desired.
5. Specify module configuration and overall system design.
6. Understand the theory, design and application of reverse osmosis, nanofiltration, ultrafiltration, microfiltration, dialysis, electromembrane processes, gas permeation, and pervaporation.
7. 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

- History
- Definition of a membrane
- Nomenclature

Membrane process overview

- Components separated
- Driving force
- Mechanism of transport

Membrane materials and structure

- Porous and non porous materials
- Polymers, ceramics and metallic material properties
- Membrane characterization
- Membrane fabrication

Membrane process design

- Module configuration
- System design arrangements

Principles, design and applications of unit processes to various industries

- Reverse osmosis
- Nanofiltration
- Ultrafiltration
- Microfiltration
- Dialysis
- Electromembrane processes
- Gas permeation

Pervaporation
Liquid membranes
Novel and hybrid systems

Laboratory demonstrations

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 based on student evaluations and curriculum review by appropriate faculty.

4. Results of Consultations:

There is no impact on other departments and no consultations have been requested.

Catalog Description

Membrane Processes (Suggested Hegis Number: 0906-486)

Principles of membrane processes: reverse osmosis, ultrafiltration, microfiltration, electrodialysis, pervaporation, gas permeation, and their application to traditional and emerging fields. Membrane materials and structure. Mass transfer and design aspects for both liquid and gas separation systems.

(Prerequisites: Adv College Chem I, 1906-105 or Chem I, 1906-100; and Calculus II, 1701-131)

Rowan University
LIBRARY RESOURCES
 to

SUPPORT A NEW COURSE or NEW PROGRAM PROPOSAL

The purpose of this form is to provide a channel of communication between the library and faculty designing new courses/programs. The information will be used to assess the resources available in the library, and to identify resources the library should acquire to support the course/program. The information will also provide rationale for institutional support for library acquisitions

This form should be completed in a coordinated effort between the course sponsor(s) and the academic department liaison librarian.

- The sponsor(s) complete parts A & D
 If assistance is required to complete parts A & D, please notify the liaison librarian.
- Forward this form to the librarian who will complete parts B, C, & E

This form must be completed and attached to the original curriculum proposal before being approved by the Senate Curriculum Committee

A. College Engineering Department Chemical Engineering

Proposed by: C. Stewart Slater Date: 4/23/03

Course Title: Membrane Processes

Anticipated Date for Course/Program Offering: Fall 2004

- B. Describe the resources available in the library to support this course/program, including reference, monographic, electronic databases, audio-visual materials, etc. A summary statement is sufficient. Campbell Library acquires monographs on the topic of membrane processes through an approval plan that automatically supplies new titles from the major publishers in this field. Conference proceedings are available upon request through the same plan. Numerous reference volumes will support this course to include: Dictionaries, handbooks, standards, and encyclopedias published by McGraw Hill, Wiley, and CRC. Electronic databases that will support the course are: *Science Direct*, which includes chemical engineering journal titles published by Elsevier; American Chemical Society Web editions; Engineering Village which includes Compendex; SciFinder Scholar; General Science Full Text; and the Applied Science and Technology Index. Audio-visual materials have not been systematically acquired in this subject area, but can be purchased as needed.
- C. List key periodicals available in the library to support this course/program.
 Separation and Purification Technology
 Chemical Engineering Journal
 Chemical Engineering Science
 Journal of Membrane Science
- D. List specific resources that should be acquired to support this course.
 The proposed course is an undergraduate counterpart to a graduate elective that already exists so no new resources are required.
- E. Librarian comments and recommendations: Monographs, reference works, databases, and journals holdings are adequate to support this course. If other materials should be needed, they will be purchased or acquired through document delivery services.

From: Slater, C. Stewart
To: Lewis, Phillip A.
Date: 9/17/03 10:20AM
Subject: FW: Letter of consultation for course proposal

Phil,
See attached letter of consultation (Biology) for Course Proposal SCC#02-03-402, Membrane Processes
Please add this letter of consultation to the file, I have an old letter from Bob Newland supporting the
course when it was originally proposed, and will send this to you. I also asked him for a new one.
Please let me know if you need anything else to get this course approved.
Stew

-----Original Message-----

From: Pat Mosto [mailto:mosto@rowan.edu]
Sent: Wednesday, September 17, 2003 10:00 AM
To: Slater, C. Stewart
Subject: Re: Letter of consultation for course proposal

Stew, attached is our department letter of consultation

Pat

September 16, 2003

Dr. Stewart Slater
Department of Chemical Engineering
Rowan University

Dear Stewart:

Members of my department and I have reviewed your course proposal for Membrane Processes, and we strongly endorse this proposal. The course content is unique, and specifically tailored to chemical engineering students.

Please do not hesitate to contact me if I can be of further assistance.

Sincerely,

Dr. Patricia Mosto
Chair and Professor
Biology Department
Rowan University
856-256-4834
mosto@rowan.edu



Office of the Executive Vice President / Provost

July 1, 2003

Dr. Phil Lewis
Chairperson Senate Curriculum Committee
Senate Office
Campbell Library

Dear Phil,

I have not approved the following courses and provide rationales:

Re-classify Problems in Contemporary Journalism as Writing-Intensive
(SCC#02-03-202, Journalism/Creative Writing Dept.)

- What is the impact on the number of students who enroll? If fewer students enroll per section, will this change require more faculty?

Introduction to Biomaterials (SCC#02-03-409, Mechanical Engineering Dept.)

- Signature of consultant required.

Introduction to Biofluids (SCC#02-03-408, Mechanical Engineering Dept.)

- Signature of consultant required..

Introduction to Biomechanics (SCC#02-03-404, Mechanical Engineering Dept.)

- Signature of consultant required.

Membrane Process (SCC#02-03-402, Chemical Engineering Dept.)

- Consultancy of Chemistry and Biology requested. [Can this course be used as an elective in these departments?]

Change of Master's Thesis from six to three credits (SCC#02-03-707, Psychology Dept.)

- Library Resource Requirement Form must be completed and signed by a librarian.

Cognitive-Behavioral Treatment Strategies (SCC#02-03-708, Psychology Dept.)

- Library Resource Requirement Form must be completed and signed by a librarian.
Need Consultancy letters attached from psychology and student personnel serves.

Certificate of Graduate Achievement in Mental Health Counseling (SCC#02-03-709, Psychology Dept.)

- Library Resource Requirement Form must be completed and signed by a librarian.
Need Consultancy letters attached from psychology and student personnel serves.