

CURRICULUM COMMITTEE

PROPOSAL TITLE:

Transfer Processes II - Mass 0906-30T 312 9114 (2)

UNDERGRADUATE GRADUATE 2.0 CREDIT HOURS

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

DEPARTMENT & TELEPHONE# Chemical Engineering, x4631

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.	SCC# <u>95-96-180A</u> DATE RECEIVED: <u>3-8-96</u>	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:
REVIEWED/DATE: <u>N/A</u> DEPT. CHR.	<u>Ronald J. Gochon</u> SENATE CURRICULUM CHR.	<u>[Signature]</u> SCHOOL COMMITTEE CHR.

STEP #4 (ACADEMIC DEAN) COMMENTS:

RECOMMEND
 NOT RECOMMEND
 CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL: J. M. Davey 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:

#6 (SENATE)

PRESENTED TO SENATE 9/25/96 APPROVED NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) 9/30/96

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE: Ronald J. Gochon 9/30/96

R O W A N C O L L E G E
C U R R I C U L U M C O M M I T T E E

PROPOSAL TITLE: Transfer Processes II - Mass 0906-301

UNDERGRADUATE GRADUATE 2.0 CREDIT HOURS

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

DEPARTMENT & TELEPHONE# Chemical Engineering, x4631

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>95-96-18D</u> DATE RECEIVED: <u>3-8-96</u> <u>Ronald J. Gochon</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>C. H. Cal</u> 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:

STEP #6 (SENATE)

DATE PRESENTED TO SENATE 9/25/96 APPROVED NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) 9/30/96

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE: Ronald J. Gochon 9/30/96

Course Proposal**1. Details:**

- a) Course Title:** Transfer Processes II - Mass
b) Sponsor: School of Engineering Curriculum Committee;
 Dr. C. Stewart Slater, Chemical Engineering
c) Credit Hours: 2 credit hours
d) Course Level: Junior (0906.302)
e) Curricular Effect: Requirement for ChE, Elective for CE, EE, ME
f) Prerequisites: Fluid Mechanics, Math for Engineering Analysis II
g) Suggested Time/
Scale of Implementation: Spring 1999
 1 section each semester
h) Resources: Faculty will be hired and equipment obtained
 consistent with Engineering School multi-year plan.
 Library acquisitions will be necessary.

2. Rationale:

The proposed course is part of the Engineering Curriculum Proposal approved by the College Senate in December 1994. The course has been modified slightly from the previously approved version in the number of semester hours and topics covered. 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 Core Requirement for Chemical Engineering and a Core Elective for Civil/Environmental, Electrical and Mechanical Engineering. The 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 Chemical Engineering program by the Accreditation Board for Engineering and Technology (ABET).

The course lays the foundation in the transfer process of mass transport and can serve several of the engineering disciplines. The course is vital to the Engineering School Core offerings and will provide students with an understanding of basic principles of mass transfer.

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

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

1. Understand the basic principles that govern transfer processes and the fundamentals of mass transport.
2. Apply the basic principles of mass transfer to design problems.

3. Understand the differences between the various modes of mass transfer.
4. Apply the principles of mass transfer to basic industrial processes.
5. 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 to transfer processes

General transfer equations for momentum, heat, mass transport

Principles of Mass Transfer

Molecular diffusion in gases, liquids, solids

Diffusion coefficients for gases, liquid, solids

Numerical methods for steady state diffusion in two dimensions

Principles of unsteady state mass transfer

Basics of unsteady state diffusion

Numerical methods for unsteady state diffusion

Convective mass transfer coefficients

Types of mass transfer coefficients

Methods to determine mass transfer coefficients

Mass transfer coefficients for various geometries

Derivations of mass transfer coefficients for laminar flow

Mass transfer relations for flow inside pipes

Mass transfer relations for flow outside solid surfaces

Diffusion of gases in porous solids and capillaries

Knudsen and molecular diffusion of gases

Vapor-liquid phase equilibrium

Form and sources of equilibrium data

Graphical representation of equilibrium data

Bubble-point and dew-point temperature calculations

Flash distillation

Binary flash distillation

Multicomponent flash distillation

Introduction to column distillation

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

Transfer Processes II - Mass (0906.302)

Prerequisites: Fluid Mechanics, Math for Engineering Analysis II

This course describes modes of diffusion of mass and chemical composition. This course includes mass transfer analysis; molecular diffusion in gases, liquids and solids and convective mass transfer. It will have an introduction to equilibrium-staged mass transfer operations. Demonstrations and laboratories will be integrated throughout this course.

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED _____

APPROVED: YES NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS 3

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 47

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0906-301

DATE/SIGNATURE OF REGISTRAR [Signature]

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSON(S)

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)