

University of Guelph
School of Engineering
ENGG3470: Mass Transfer Operations
Winter, 2011

1. INSTRUCTOR: Sheng Chang

Office: Room 219, **Extension:** 56619,

Email: schang01@uoguelph.ca

Office hrs: Tuesday and Thursday 1:30-2:30 or by appointment.

2. TEACHING ASSISTANTS: Mohammad Showkatul

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3. TEXT BOOK/ RECOMMENDED READINGS:

The required text is a course reader that has been printed by the University of Guelph Bookstore: "ENGG*3470 Mass Transfer Operations - Winter 2011 Course Reader"

This reader contains relevant material from textbook: Christie John Geankoplis, Transport processes and separation process principles, 2009 (Fourth Edition), Prentice Hall, Professional Technical Reference, Upper Saddle River, ISBN 0-13-101367-X

Note: The reader will be allowed as an aid during quizzes and exams but only if the reader has been purchased from the University of Guelph Bookstore (i.e. with copyright permissions).

4. PREREQUISITES: ENGG*2230, ENGG*3260, MATH*2270

CO-REQUISITE (S): ENGG*3430

Note: if you do not meet these requirements, see the instructor immediately

5. SCHEDULE:

Lectures: MACK 226

Tuesday: 10:00 AM - 11:20 AM

Thursday: 10:00 AM - 11:20 AM

Labs: SCIE 2101

Two labs will be conducted through this course. The lab1 and lab2 will be conducted during the period of 31/1/2011 to 11/2/2011 and 28/2/2011 to 11/3/2011, respectively, on the following days:

Section 0101: Monday. 02:30PM - 04:20PM

Section 0102: Thursday 02:00PM - 03:50PM

Section 0103: Friday: 01:30PM - 03:20PM

Tutorials:

Start in the second week

Day and location: TBD

Quiz and Midterm

Midterm will be conducted during the week of Feb 14, 2011 (Day and location: TBD)

Quiz will be conducted during the week of March 14, 2011 (Day and location: TBD)

Final EXAM: Tues, 07:00PM - 09:00 PM, April 18, 2011, location (TBD)

6. COURSE CONTENTS

Calendar Description: Application of mass transfer principles in natural and engineered systems; mass transport in the multi-media fate of contaminants in and between air, water, and land; design and analysis of separation processes for emission control and pollution prevention.

Tutorial & Assignments: The main purpose of the tutorials is to help students to enhance their understanding of the lecture materials through additional examples; answering questions, group discussion, and conducting labs. The main tutorial topics and review problems will be given to the students on a weekly basis before the scheduled tutorials. All students are strongly encouraged to complete the given problems individually or in groups.

Labs: Two laboratory assignments are required to complement the lecture material; the lab scheduling will be confirmed in early January. Students are required to attend the labs, collect and analyze the data, and write a report. The specific requirements and marking criteria will be outlined in advance of each lab.

Safety in the laboratory is a prime concern. University policy forbids working alone in a lab; this will be strictly enforced.

Topics outline**Part I: Basic principles of mass transfer**

- Diffusion and Fick's law
- Convective mass transfer
- Film theory and Inter-phase mass transfer

Part II: Applications of mass transfer theories

Adsorption/stripping operation

- Introduction
- Gas-liquid phase equilibrium
- Gas-liquid Mass transfer
- Adsorption and stripping operation
- Adsorption/stripping equipment: packed tower
- Tower design calculation
- Applications of absorption and stripping

Adsorption

- Introduction

- Solid water distribution equilibrium
- Mass transfer in fixed beds
- Granular bed adsorption operation
- Powder activated carbon adsorption
- Applications of adsorptions processes

Membrane processes

- Introductions
- Filtration with UF/MF membranes
- RO/NF processes
- Other Membrane Processes

7. GRADE EVALUATION:

Evaluation:	Value
Midterm (1)	25%
Quizzes (1)	15%
Labs (2)	20% total
Final Exam	40%

Note: You are allowed to bring the course reader, lecture notes, and non-communicating calculator for the quiz, midterm, and final exam.

8. IMPORTANT NOTES

Student responsibilities

- Attend lectures, tutorial, and group meeting in order to obtain all the course materials that you are responsible for.
- Submit lab report on time.
- Submission of reports for re-marking must be done within a week of being returned.
- Communications regarding this course will frequently involve the course web page and email. Students are responsible for checking the course website and the university email account for all instructions and announcements.

Late Assignment/project report policy:

- Generally, when you find yourself unable to meet a course requirement such as the lab, lab report, or a test as a result of compassionate, illness or physiological reasons, a formal explanation must be made in writing to the instructor and (where possible) proper documentation must be provided. This should be done prior to an exam or assignment (if possible) or as soon as possible but definitely within a week after the exam or assignment due date.
- If no explanations are provided, exams receive a grade of zero and project reports are subject to the following deductions:
 - 25% will be deducted if the assignment is up to 24 hours late,
 - 50% will be deducted if the assignment is 24 to 48 hours late,
 - No assignments will be accepted after that.

University policy on academic misconduct:

Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph. Please consult the Undergraduate Calendar 2008-2009 and School of Engineering programs guide, for offences, penalties and procedures relating to academic misconduct.

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Disclaimer:

The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to the University of Guelph Academic Regulations