NEW JERSEY INSTITUTE OF TECHNOLOGY – OTTO H. YORK DEPARTMENT OF CHEMICAL, BIOLOGICAL, AND PHARMACEUTICAL ENGINEERING

CHE 360 - – separation Processes I

Spring 2017

Instructor:	Dr. Alexandre Ermoline
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Official E-mail:	alexandre.ermoline@njit.edu
Office Hours:	By appointment
Class Meets:	Central King Building 314
Class Meeting Times:	W from 6:00 PM to 9:05 PM
Required Textbook:	Transport Porcesses and Separation Process Principles, by C. J. Geankoplis, published by Prentice Hall, Upper Saddle River, NJ. ISBN 0-13-101367-X. 4th edition, 2003.
Other Suggested Supplies:	Students are expected and encouraged to use a scientific calculator.
Course Prerequisite:	CHE 210, 240, 260, 342, 370
Course Description:	This is the first course in separation and examines traditional methods and technologies of separation and purifying mixtures. Emphasis is here on four methods that are currently practiced in Industry: distillation processing, absorption, liquid-liquid extraction, and membrane processing.
Course Goals:	Upon successful completion of this course, students will be able to strategically utilize stream variables combined with equilibrium relationships to synthesize and produce design level separation processes and associated equipment for application.
Course Outcome:	Students will be able to 1. Conduct stream balances on separation apparatus 2. Extend single stage separation concept to multistage operations 3. Conduct separation process modeling using both graphical and analytical techniques 4. Apply knowledge gained while obtaining learning outcomes 1 – 3 to multi-component separation processes.

Course Policy: Instruction will consist of a combination of lectures, presentation of sample problems, clarification of homework exercises and textbook material, general class discussion, and individual study. Homework and additional material will be posted on Moodle.

Students are expected to attend all classes and on time. Attendance will be taken.

The use of telecommunication devices (for any reason including texting and use as a calculator) is not allowed during class hours.

The final course grade is based on homework and three exams.

All exams are Open Textbook unless otherwise specified.

Grading:

Homework	10 %
Test 1	30 %
Test 2	30 %
Final Exam	30 %
Total	= 100 %

Letter Grades: **A** → 90 – 100% ; **B+** → 85 – 89% ; **B** → 80 -84%
C+ → 70 – 79% ; **C** → 60 – 69% ; **D** → 50 – 59%
F → 0 – 49%

Below is a TENTATIVE class session schedule. This schedule is subject to change at any time. Please be aware of any changes that are announced in class by either contacting a classmate or else by contacting me via e-mail.

CHE 360, Spring 2017, TENTATIVE SCHEDULE, Alexandre Ermoline

Wk Start	Class Material	Textbook Sections
Jan 18	General Introduction to Separation Processes. Principles of Mass Transfer.	10.1 , 6.1 – 6.3, 6-5.
Jan 25	Review of Phase Equilibria. Single and Multiple Equilibrium Stages.	10.2, 10.3, 11.1
Feb 01	Mass Transfer Between Phases. Absorption in Plate and Packed Towers.	10.4, 10.6
Feb 08	Packed Tower Design. Estimation of Mass Transfer Coefficients in Packed Towers.	10.6 - 10.8

FEB 15	**Test 1**	
FEB 22	Simple Distillation Methods. Distillation with Reflux.	11.3, 11.4
MAR 01	McCabe – Thiele Analysis. Distillation and Absorption Efficiencies.	11.4, 11.5
MAR 08	Fractional distillation. Distillation of Multicomponent Mixtures.	11.6, 11.7
MAR 22	Liquid - Liquid Extraction	12.5 - 12.7
MAR 29	**Test 2**	
APR 05	Membrane Separation Processes. Dialysis. Gas Permeation Membrane.	13.1 -13.3
APRIL 12	Complete Mixing Models. Cross – Flow Model for Gas Separation by Membrane.	13.4-13.7
APRIL 19	Reverse Osmosis.	13.9, 13.10
APRIL 26	Ultrafiltration and Microfiltration Membrane Processes. Course review.	13.11-13.12
MAY 06 – MAY 12	**Final Exam Week**	