Classroom: Jett Hall 283 (lecture)

Class Schedule: Lecture: Monday, Wednesday, Friday 12:30 a.m. – 1:20 p.m.
Lab & Office Hours: Thursday 5:30 – 8:00 p.m. (Labs in Jett Hall Rm 169)

No class Jan. 19 (Martin Luther King Holiday), Mar. 23 – 27 (Spring Break), April 3 (Spring Holiday).

Catalog Description:
Theory of mass transport. Mass transfer coefficients. Analysis of chemical engineering unit operations involving mass transfer and separations. Equilibrium stage concept. General design and operation of mass-transfer equipment and separation sequences. Chemical engineering majors must earn C or better in this course. Prerequisite(s): CH E 302, CH E 306.


Please bring your textbook and any supplementary material to each class and lab session.

Audience: This class is intended for chemical engineering undergraduate students. It is one of the core courses.

Instructor: Dr. Tom Manz
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Phone: 575-646-2503

Teaching Assistant: Bo Yang, Office: Jett Hall 157, Email: phoityang@nmsu.edu

Office hours: The Instructor and TAs will be available during Recitation/Office Hours:
Thursday 5:30 – 8:00 p.m. except Mar. 23 – 27 (Spring Break).

Final Exam: 2 hours, comprehensive, Friday, May 8, Jett Hall 283, 1:00 p.m. – 3:00 p.m.

Course Objectives:
Chemical separations play a key role in the chemical process industries. Chemical reactions often produce a mixture of products that need to be purified to produce commercial products. Natural resources like oil, natural gas, and air are also purified to produce commercial products. Important separation processes include distillation, liquid-liquid extraction, absorption and stripping, membrane separations, adsorption, chromatography, ion exchange, re-crystallization, washing, leaching, and supercritical extraction. This course will teach students the major separation processes used in chemical engineering and introduce students to concepts used to evaluate and design units for achieving desired separations.

At the end of this course you will be able to:
- Determine which kind of separation (e.g., distillation, adsorption, membrane, etc.) is best suited to separate a particular mixture
- Design various kinds of separation units to achieve a target flow rate and purity
- Evaluate the cost effectiveness and energy requirements of a separation
- Perform McCabe-Theile analysis
- Include efficiencies and mass transfer effects in the design of separation units
Topics Covered:

- Single equilibrium stages and flash drum calculations
- Continuous and batch distillation columns
- Packed and staged distillation columns
- McCabe-Thiele analysis
- Absorption and stripping
- Extractive separation
- Membrane processes
- Adsorption processes

Grading:

Homework will be based on the problems at the end of each chapter. There will be one midterm exam and several quizzes. The final examination will be two hours in length and will be comprehensive.

Homework will be coordinated with lectures and will be due approximately one week after assignment. Late homework may be submitted for grading before the solution is posted, but will be assigned 60% credit. Homework cannot be turned in late after the solution is posted or given in class. Homework can be turned in early if a student expects to be absent.

The total point accumulation and final grade distribution for this course will be as follows:

- In-class Quizzes: 20%
- Homework: 30%
- Midterm Exam: 20%
- Attendance: 10%
- Final: 20% (open book, in class, comprehensive)

Grading Scale:

- 90-100% A;
- 80-89% B;
- 70-79% C;
- 60-69% D;
- below 60% F

Online resource: Course related content will be posted on canvas, which is accessed via nmsu.instructure.com.

Withdrawals: Students will not receive an automatic drop for persistent absences or persistent failure to complete assignments. The responsibility for withdrawals is completely up to the student.

Working together on assignments:

Teamwork on homework is encouraged for learning purposes. However, all assignments turned in by the student must show the student's own work. All examination answers must be strictly one's own work. Copying homework or allowing others to copy your homework is strictly forbidden and both parties will receive a zero for the assignment. See the Common Syllabus Addendum for more details.

Incomplete Grades: A grade of Incomplete (I) is given only if the student is passing and cannot complete the required work for reasons beyond the student's control that develop after the last day to withdraw from the course.

Extra Credit: There may be opportunities over the course of the semester to earn extra credit points. These opportunities will be announced in class. The extra credit will be considered when assigning final grades.

Common Syllabus Addendum: This syllabus also contains the Department of Chemical & Materials Engineering, Common Syllabus Addendum, Spring 2015, that describes Attendance Policy, Disabilities, Misconduct, Re-grades, Student Work Products, Etiquette, Fundamental of Engineering Exam Supplied Reference Handbook, and Video Surveillance. This Common Syllabus Addendum can be found at http://chme.nmsu.edu/academics/syllabi/chme-common-syllabus-addendum/.