Spring 2020

CHE 496-004: Chemical Engineering Laboratory II

Irina Molodetsky

1. Chemical Engineering Laboratory II
ChE496-001
3 credits

2. Laboratory Experiments
Tuesday, 8:30 am-11:20pm; Friday: 1:00pm-3:50 pm Tiernan Hall: Labs B7, 206, 311

3. Instructor: Irina Molodetsky

Office hours: Room 350 Tiernan Hall
Tuesday 1:00 pm-5:00 pm
Please, contact by email for additional meeting
Email: Irina.Molodetsky@njit.edu
TA: TBD

4. Textbook
R. Barat and I.Molodetsky "Manual for ChE 496 Chemical Engineering Laboratory II" Otto H. York Department of Chemical and Materials Engineering, Newark, NJ 07102. The last version of the manual is uploaded to the Canvas page of the course http://canvas.njit.edu

5. Specific course information

a. Description:
In this second course in chemical engineering capstone laboratory, experiments are conducted in the areas of mass transfer, separations, reaction engineering, and process dynamics and control. Bench and pilot-scale equipment is used. Oral and written reports are prepared by the students.

b. Prerequisites: ChE 349, 360, 380, 396, Chem 339, Math 225A
Co-requisites: ChE 460, 489

c. Required, Elective, or Selective Elective – Required

6. Specific goals for the course

a. The student will be able to:
1. Plan, develop, conduct an experiment, critically analyze and interpret data, leading to conclusions and suggestions on further work
2. Successfully apply theoretical models (steady or unsteady) appropriate to simulate the experiment performed
3. Operate a chemical process which demonstrates process safety issues
4. Operate a chemical process which demonstrates active feedback process control
5. Ethically and correctly handle data, and appreciate the interplay between real data and models
6. Report the data and analyses in a manner consistent with the assigned reporting structure
7. Conduct a technical literature review associated with the laboratory experiment
8. Complete a hazards analysis and risk control prior to an experiment
9. Work in a team, assume various responsibilities, create supportive and collaborative environment for each team member

b. This course specifically addresses the following students outcomes: 1–7

7. Topics

1. Continuous Stirred Tank Reactor (CSTR) – reaction, dynamics
2. Non-Catalytic Batch Reactor (NCBR) – reaction, dynamics, safety
3. Tubular Flow Reactor (TFR) – reaction
4. Catalytic Batch Reactor (CBR) – reaction, dynamics, safety, control
5. Semi-Batch Reactor (SBR) – reaction, dynamics
6. Humidification (HUM) – simultaneous heat and mass transfer
7. Continuous Distillation (CD) – separation, dynamics, control
8. Batch Distillation (BD) – separation
9. Membranes Separation (MemS) – separation, safety
10. Reactive Absorption (RABS) – separation
11. Packed Column Absorption (PCA) – separation, dynamics, control, safety

8. Course Structure

- Laboratory experiments are completed in teams.
- Each team will conduct four experiments. Each laboratory experiment contributes 25% to your total grade.
- Each experiment requires Pre-Experiment Plan and Risk Assessment
- Three laboratory experiments require a written report in the format of a scholarly paper. Grading Rubric is on Canvas
- One laboratory experiment will be presented to your peers (team presentation; ppt format). Grading Rubric for Oral Presentation is on Canvas
- The laboratory experiments include modeling and prediction components. Completion of these components requires a math software package (for example, Polymath, which is available on all ChE computers).

9. Communication

This course will use the NJIT Canvas site accessed by http://canvas.njit.edu for all communications regarding changes in the schedule, status of the experiments, score rubrics, files and documents.

10. Grading

Above 90	A
Above 85	B+
Above 80	B
Above 75	C+
Above 70	C
Above 65	D
Below 65	F

11. Professional behavior

- You are expected to follow the laboratory safety standards.
    - General guidelines are discussed at length in the Lab Manual – Introduction.
    - Every laboratory experiment includes specific safety guidelines.
    - Every team will be required to complete a risks assessment prior to running a specific laboratory experiment.

- Participation of each member of the team is critical and will be evaluated by the team members, as well as by the instructor. These evaluations will affect the final grade.

12. Policy on Academic Integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at *dos@njit.edu*"

www.njit.edu/academics/pdf/academic-integrity-code.pdf

13. Accommodations due to a disability

If you need accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services, Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.