

ChE 495 Chemical Engineering Laboratory I

1. Chemical Engineering Laboratory I ChE495-001 (Fall 2023)
Tiernan Hall: 411, B7, 311
Tuesday 10:00 am – 12:05 pm; Thursday 10:00 – 12:50 pm

2. Credits and contact hours 0-5-2
(0 lecture hr/wk-5 hr/wk-2 course credits)

3. Course Coordinator or Instructor: Irina Molodetsky
<https://njit.webex.com/meet/molodetsnjit.edu>
email: Irina.Molodetsky@njit.edu

4. Textbook

R.B. Rankin, adapted from prior version by S. Basuray and Bob Barat “Manual for ChE 495 Chemical Engineering Laboratory I” 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 first course in chemical engineering capstone laboratory, experiments are conducted in the areas of fluid mechanics and heat transfer. Bench and pilot-scale equipment is used. Oral and written reports are prepared by the students.

b. Prerequisites: ChE 312.360,370, Eng 352 Math 225A

Co-requisites: n/a

c. Required, Elective, or Selective Elective – Required

6. Specific goals for the course (CLO)

The student will be able to:

- Operate fluid flow applications (pipe flow, packed tower), and collect quality data, including pressure drops
- Operate heat exchangers (transient (if time allows), steady state), and collect quality data, including fluid stream temperatures
- Analyze data, and apply appropriate theoretical models in fluid flow and heat transfer
- Plan an experiment and take enough data to get meaningful results
- Handle their data ethically and correctly, and appreciate the dynamic between data and models
- Present their results critically, and draw useful conclusions
- Present their results using quality plots and tables that reveal key relationships
- Analyze audiences and tailor their reporting for optimal communication
- Report their data and analyses consistent with the assigned reporting structure
- Operate and perform their work in a feedback-driven self-reporting and self-evaluating team dynamic.

- b. This course specifically addresses the following students outcomes: 1,3,5,6,7

7. Topics

- Compressible Fluid Flow (CFF)
- Incompressible Fluid Flow (IFFIP)
- Packed Towers (#2) (PT2)
- Continuous Heat Transfer (#2) (CHT2)
- Continuous Heat Transfer (#1) (CHT1)
- Transient Heat Transfer (THT)
- Written Reports
- Oral Presentations
- Data Analysis
- Modeling
- TeamWork

8. Course Structure

- Six laboratory experiments are completed in teams. Personal effectiveness and competencies are assessed during the planning sessions, team discussions and using CATME tool. Instructor may overwrite a CATME coefficient.
- Each experiment requires preparation (Pre-Experiment Plan and Risk Assessment)
- REPORTING
 - Two laboratory experiments require a written report: laboratory report and scholarly paper formats, following CME guidance.
 - Draft version (annotated) to be submitted on Canvas
 - The final version is to be submitted on Canvas no later than 1-week after feedback from the instructor. Rubrics are on Canvas
 - Three laboratory experiments (including the final experiment) will be presented to your peers (team presentation; ppt format). Grading Rubrics for Oral Presentation are on Canvas
 - One experiment – your choice of the reporting format
- Team discussions of the experimental data with the instructor are mandatory and contribute to the grading of each experiment (see Rubrics).
- The laboratory experiments include modeling and prediction components. Completion of these components requires a math software package (for example, Polymath, Matlab) available for all students
- Your physical presence in the class according to the team's schedule is MANDATORY

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.
- All online communications are done on webex <https://njit.webex.com/meet/molodetsnjit.edu> unless other address is specified

- Additional online individual or team discussions will be scheduled on Canvas and require you to sign up to a specific slot.
- If circumstances require online communication with the entire class, it will be done through **Webex** hosted by the instructor

10. Grading

- Grading rubrics help you in assessment of your professionalism. If my expectations in the rubrics are unclear for you – it is YOUR responsibility to discuss them with me BEFORE your first submission.
- The number of points awarded to a student for a specific experiment is a composite of the preparation (10%), team discussion (10%) and completion of the project, including written submission or oral presentation (draft version 8% and final version 72% of the final grade). A CATME coefficient is calculated for each experiment. Instructor reserves the rights to overwrite CATME coefficient.

Above 90 A

Above 85 B+

Above 80 B

Above 75 C+

Above 70 C

Above 60 D

Below 60 F

11. Professional Behavior

- You are expected to follow the laboratory safety standards.
- 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

12. 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.