

Spring 2020

CHE 496-002: Chemical Engineering Lab II

Robert Barat

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MEMORANDUM

To: ChE 496
Date: January 21, 2020

From: Prof. Robert Barat
Re: Introduction, v.1

Pre-requisite Courses: ChE 349, ChE 360, ChE 495, Chem 339, Math 225
Co-requisite Courses: ChE 489

Class Meetings:

Times: Tues, Thurs 1-4 PM
Places: Tiernan labs B-7, 311
No sign-in required, but attendance is mandatory. If you need to miss lab class, let me know in advance. Make sure your group knows, even before me! Make sure you keep up with the work, and do your fair share (see Peer & Self Evaluation below).

Instructor Information:

Office Hours: Mondays 1-2:30 PM --- I'm around most days except Fridays.
Stop by, or make an appointment. If I'm in my office, the door is open.
Location: 374 Tiernan Hall -- Individual or group visits / appointments OK.
Office Phone: (973) 596-5605 Fax: (973) 596-8436
Email (preferred contact): robert.b.barat@njit.edu

Teaching Assistant: TBA

The TA supports student running of the experiment as directed by the instructor. The instructor does all course grading.

Course Requirements and Grading:

Four experiments will be assigned to each group. All reports and presentations are to be group efforts and group submissions. First-drafts are collected for Scholarly Paper and Industrial Memo. A draft grade is assigned, along with comments. You then submit a revised final draft for an updated grade. Penalties are applied to very late submissions. Your final grade will also potentially be impacted by the Peer & Self Evaluation.

- Scholarly paper (written) - Exp. #1 25 %
- Peer audience PPT** (oral) – Exp. #2 25 %
- Industrial Memo (written) – Exp. #3 25 %
- Management audience PPT** (oral) – Exp. #4 25 %

** No written report; only PPT slides required.

Grading Scale (*historical – subject to change*): Total points normalized to 100

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

Peer & Self Evaluation: Each student will fill out a confidential assessment of their own performance, and that of their partners, after the 2nd and last experiments. This will impact your final course grades!! Do NOT ignore this. Your contributions to your group count!

Required Textbook:

Lab Manual for ChE 496 – Spring 2020; broken up into multiple parts: Introduction; Individual Experiments – each available for **free** download from the course Canvas site. Check often for updates!! *Always check for the latest version before you begin planning and executing a new experiment.* Supplements will be provided by the instructor as needed on the Canvas site.

Canvas Site:

This course uses the NJIT Canvas site <http://canvas.njit.edu>. I will use the Canvas site for:

- ☞ Class emails (check daily)
- ☞ Course master schedule (subject to revision)
- ☞ Important files to be downloaded and reviewed
- ☞ Lab manuals for all experiments – download and review as needed
- ☞ Required Peer & Self Evaluations – download, fill out, then upload

Groups:

Determined on the first class meeting – then posted on Moodle site for semester assignments. Number per group: 3 (one group of 4). Rotating group leader - Self-policing (PROFESSIONAL BEHAVIOR EXPECTED).

Math Solver:

You will definitely need access to a math software package to solve equations (ODEs and algebraic), and to do regressions including those not easily done with Excel. *Polymath* is available on all ChE PC's, can be downloaded to your laptops (site license), and is easy. But you can use whatever package you like! Note that I can only help you with Polymath.

Specific Goals (Learning Attributes) for the Course:

Students will be able to:

- Plan, develop, conduct an experiment, critically analyze and interpret data, leading to conclusions and suggestions on further work
- Successfully apply theoretical models appropriate to simulate the experiment performed
- Operate a chemical process that demonstrates process safety issues
- Operate a chemical process that demonstrates active feedback process control
- Ethically, correctly handle data; appreciate interplay between real data and models
- Report data and analyses according to the assigned reporting structure
- Conduct a technical literature review associated with the laboratory experiment
- Complete a hazards analysis and risk control prior to an experiment
- Work well in a team, assume responsibilities, and create a supportive and collaborative environment for each team member

This course specifically addresses the student outcomes: 1–7

Personal Safety:

Your safety is paramount; hence, a **mandatory** safety lecture is presented **today** by ChE Department staff. Guidelines are discussed at length in the Lab Manual – Introduction. Finally, specific hazards are described as needed in each experiment.

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 team members. These Peer & Self Evaluations will affect YOUR final grade.

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

Available Experiments for this Term:

Room 311 Tiernan

- Continuous Stirred Tank Reactor (CSTR) – reaction, dynamics
- Non-Catalytic Batch Reactor (NCBR) – reaction, dynamics, safety
- Tubular Flow Reactor (TFR) – reaction
- Catalytic Batch Reactor (CBR) – reaction, dynamics, safety, control
- Semi-Batch Reactor (SBR) – reaction, dynamics, safety
- Membranes Separation (MemS) – separation

Room B-7 Tiernan

- Continuous Distillation (CD) – separation, dynamics, control
- Batch Distillation (BD) – separation, dynamics
- Reactive Absorption (RABS) – separation
- Packed Column Absorption (PCA) – separation, dynamics, control, safety

See the *Master Schedule* posted on the Canvas site for specific scheduling.

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. Note that unique discussions will be required since this course occurs in a laboratory setting.

Master Schedule:

- Posted on the Canvas site – must be consulted by each group.
- Four experimental cycles, including Planning, Experimental, and Review sessions

Planning Sessions:

- First session of each of the four experimental cycles.
- Read the Manual chapter for your experiment **before** the planning session.
- During Planning, the instructor will discuss with each team the objectives, specifics about the experimental equipment and procedure, and highlight any safety issues.
- Each team will fill out and submit a Planning Exercise sheet due at the end of the Planning Session.
- Each team will fill out and submit a Laboratory Experiment Risk Assessment form due by the start of the first experimental session (after the Planning Session).
- Both of these forms will be available on the Canvas site.

Review Sessions:

- Officially, the last two sessions of each experimental cycle before the first draft (Scholarly Paper, Industrial Memo) or PPTs due or scheduled, respectively.
- Mandatory attendance by each team at least once to review and discuss the experimental data and calculations / modeling with the instructor.
- Additional time for a team to repeat the experimental measurements if needed.
- Meet with Ms. Joanne Dera (NJIT Library) if needed.