Unit Operations Management

ECH6905 Section 09H1

Class Periods: TBA

Location: TBA

Academic Term: Fall 2025

Instructor: *Dr. Fernando Mérida*

- Email: fmerida@ufl.edu
- Office Hours: *Virtual Only* (link here)
  F 12:30 – 1:30 pm
- You can call me Prof./Dr. Mérida, or "Fernando" if you feel comfortable doing so.

Instructor: *Dr. LiLu Tian Funkenbusch*

- Email: lilu.funkenbusch@ufl.edu
- Office hours: *Virtual Only (link here)*
  W/F 9am-11am
- Please call me Prof./Dr. Funkenbusch or LiLu. Please do not call me Miss, Ms., or Mrs.

Contacting course instructors:

- E-mail is the preferred communication platform. Please make sure the subject line of your e-mail message has the label "UOM - *Question*". You should expect a response within 48 hours (M-F) and 72 hours (weekend). Students must always be responsive to email communications.
- Announcements will be posted on Canvas. All students must sign up to receive Canvas notifications.

Course Description: 3 credits. Student instruction, experiment supervision, and management of the Chemical Engineering Unit Operations Laboratory for undergraduate students. These are responsibilities of students registered in this course in their role as *peer tutors*. Depending on the number of credits, students can also conduct a technical project dealing with improvements of unit operations experiments.

Course Pre-Requisites / Co-Requisites: Instructor permission.

Course Objectives: This course will introduce students to supervision and management of bench- and pilot-plant scale unit operations typical within the chemical industry. Students taking this course will guide experiments of small groups of undergraduate students, troubleshoot equipment problems, and perform a detailed analysis of the lab experiments. The goal is to provide students with fundamentals of lab management and the solid operating principles of unit operations by assisting undergraduate students during experiments thus fostering troubleshooting, decision making, safety, and other management-oriented skills.

Recommended Materials

- Geankoplis, C. J., Transport Processes and Unit Operations [On reserve, Science Library].
- Incropera, F. P. and D. P. DeWitt, Fundamentals of Heat and Mass Transfer [On reserve, Science Library]
- Gerhart, Philip M., Gerhart, Andrew L., and Hochstein, John I, Munson's Fluid Mechanics [On reserve in the
- Science Library]
- McCabe, W. L., J. C. Smith, and P. Harriet, Unit Operations of Chemical Engineering [On reserve, Science Library]
- Perry, R. H., D. W. Green, and J. O. Maloney, Perry's Chemical Engineers' Handbook [E-book available through UF Library website]

Required Computer

Recommended Computer Specifications: https://it.ufl.edu/get-help/student-computer-recommendations/
HWCOE Computer Requirements: https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/

Peer Tutor Responsibilities:

- Have a good understanding of both the fundamentals and technical operating principles of the operation of the assigned experiment(s).
- Provide undergraduate students taking either of the Unit Operation Labs (ECH4224L or ECH4404L) with a good understanding of the operating principles prior to conducting the experiment.
- Supervise undergraduate students in the execution of experiments, helping them conduct experiments safely and troubleshooting when problems arise.
- Review (but not grade) preliminary calculations and data analysis with the undergraduate students.
- Guide undergraduate students to think and communicate as engineers.

- Participate in weekly meetings (outside of the schedule of experiments) with the course instructors, lab engineer, and other lab assistants with the objectives of discussing the progress and improvement of experiments, troubleshooting technical problems, assessing safety issues, revising standard operating procedures (SOPs) and other technical documents. The first meetings of the semester are extremely important as students will be provided with effective teaching practices, right before they start assisting students with experiments.

Course Schedule

Week	Dates	Meeting Plan†	Assignment
1	August 18-22	**No meeting** (experimental trainings)	-First-Week Paperwork (experiment trainings, online trainings, -GatorTRACS hazard assessment)
2	August 25-29	**No meeting** (experimental trainings)	- HW-1: General Safety - First-Week Paperwork
3	September 1-5	Introduction, class info and policies, and overview of UO1 & UO2 schedule	
4	September 8-12	Lab Safety and basic routines in experiments	
5	September 15-19	Emergency Shutdown Procedures, and Intro to Troubleshooting	
6	September 22-26	Troubleshooting Examples, Confidence, Authority, and Ethics	
7	September 29-October 3	Experiment Discussion/Experiment checkup	HW-2: Confidence, authority, and ethics
8	October 6-10	Review on New Experiment Theory	HW-3: New Experiment Theory Outline: First Draft
9	October 13-17	PT and other UG professional experiences (Internships, Co-Op, REU, Study Abroad)	
10	October 20-24	Training on New Experiments	
11	October 27-31	Review on New Experiment SOP	HW-4: New Experiment Theory Outline: Final Version
12	November 3-7	**No meeting** (Instructors at AICHE)	
13	November 10-14	Former Peer Tutor Testimonials	
14	November 17-21	Management wrap-up and suggestions for future semesters	HW-5: suggested peer-tutors
15	November 24-28	**No meeting** (Thanksgiving)	
16	December 1-5	**No meeting** (Training new peer tutors)	HW-6: Training of new peer tutors

Homework, due dates, format, and policies

Instructions to prepare assignments will be available on Canvas. Assignment deadlines will be Fridays until 11:59pm via Canvas according to the table above; students must check the course schedule available in the Canvas Home Page for any adjustment or modification throughout the semester. Additional instructions will be given via Canvas announcements or by e-mail. A brief description of assignments is provided below.

Assignment descriptions:

- **First Week Paperwork**: This is a set of four individual activities as described below. Note that students cannot start as lab assistants if the assignments below have not been completed.

- Experiment Training: peer tutors will be trained in their corresponding experiments by course instructors of ECH4224L and ECH4404L (or former peer tutors). This in-person training will be offered during the first week of the semester.
- Online training (FERPA and EH&S): Peer tutors must complete online training required by EH&S and the College of Engineering. There are three required trainings: **a) UF_PRV802_OLT–FERPA Basics, b) UF_EHS869_OLT–Chem Hygiene Plan (1.4), and c) UF_EHS809_OLT–Hazardous Waste Management (1.3).** These are available via "My Training" via MyUFL and must be completed before experiments start. Evidence of completion or training transcripts must be submitted to the course instructor.
- In-Person HF Safety Training (EH&S): Students supervising experiments located in the Nanoscale Research Facility (the SM sequence) must complete an in-person HF safety training with EH&S.
- GatorTRACS hazard assessment: peer tutors must update their information in GatorTRACS and subsequently review & sign the hazard assessment of the Unit Operations Lab via LATCH (more details will be provided in the first meeting)

- Homework Assignments:
    - HW-1 - General Safety: this assignment deals with general lab safety in the Unit Operations Laboratory as well as safety guidelines in assigned experiment(s). It must be completed before experiments start.
    - HW-2 - Confidence, Authority, and Ethics: This assignment includes a list of questions and study cases to assess the relevance of confidence and authority by peer-tutors, along with ethical dilemmas.
    - HW-3 and HW-4 – New Experiment Theory and SOP: These assignments aim to review lab manuals for new experiments, thus identifying strengths and potential improvements. Peer tutors will use a Word version of the lab manual to add comments, changes, or suggestions to improve the quality of lab manuals in sections such as theory and standard operating procedures (SOP).
    - HW-5 - Identification of prospective peer-tutors: This assignment deals with the identification of prospective peer tutors for subsequent semesters, including strengths and potential challenges, based on student evaluations and interactions in the lab.
    - HW-6 - Training of new peer tutors: Once new peer tutors have been selected, training of new peer tutors will be coordinated with course instructors.

Please note the following guidelines regarding assignments:

1. Guidelines and rubrics are available on Canvas where applicable.
2. Written assignments should be prepared using complete sentences, with correct spelling and grammar. All symbols should be defined on their first use. Clarity and brevity will be rewarded; sloppy thinking and writing will be penalized.
3. All assignments, forms, and evaluations should be submitted via Canvas either in Word or PDF format. No need to submit hard copies unless otherwise stated. Grading of assignments will primarily be done on a complete/incomplete basis.
4. Any assignment with more than five days overdue will result in a "warning notification" for the student. If after three days of this notification the assignment is still overdue, the student will receive a letter grade reduction.

Student evaluations and qualitative rubrics

In addition to assignments described above, peer tutors will periodically evaluate the performance of supervised students in experiments via student evaluation forms submitted to course instructors via Canvas. Qualitative rubrics may also be used to evaluate the progress of data analysis, calculations, and preliminary results of supervised students. Peer tutors will submit these rubrics to course instructors.

- Student Evaluations: Peer tutors will qualitatively rate the participation and involvement of supervised students in the lab. Rubrics (available in Canvas and prepared by course instructors of ECH4224L and ECH4404L) will be submitted via Canvas at the end of week 2 for each rotation (**no later than Friday)**
- Progress Analysis (PA) -UO1 peer tutors only: Peer tutors will qualitatively rate the preliminary calculations, and data analysis of tutored teams. Rubrics (available in Canvas and prepared by the course instructor of ECH4224L) will be submitted via Canvas at the end of week 1 for each rotation (**no later than Friday**)

Attendance Policy, Class Expectations, and Make-Up Policy

- Attendance is described as follows:
    - Weekly meeting: students are required to attend (see excused absences)
    - Experimental sessions: in their role as peer-tutors, students are required to attend all tutored experimental sessions depending on credit enrollment: 1 lab session per week for students registered with 1 credit, 2 lab sessions per week (two different days) for students registered with 3 credits.

- Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation. **Students must let course instructors know as soon as possible** so we can plan for someone else to cover your session.
    - Arrangements between peer-tutors of different sections are possible, but they must be discussed with the course instructor.
- Tardiness will result in a grade reduction (unless there is a valid excuse, and they are notified to the course instructor in a reasonable time window). First tardiness will result in a "warning" for the student. After a 2nd tardiness, one grade of final score will be reduced, a 3rd tardiness an additional grade of final score will be reduced. A 4th tardiness will result in failure in the class.

Evaluation of Grades

The grade in the class will be determined according to the following weighting criteria:

Criteria	% Final Grade
Experimental Training	5%
EH&S, FERPA, and LATCH Assessment	5%
Performance in tutored lab sessions (10 - 12)	45%
Student Evaluations (4 - 6) and PA Rubrics* (4)	15%
Homework† (6)	20%
Weekly Meeting Attendance	10%

* *UO1 peer-tutors only*

† *See Homework table (HW-1 – HW-6)*

Note: Grades for assignments and class activities as described in the tables above will be posted on Canvas. However, the final grade will be computed outside Canvas to avoid incorrect weighing frequently observed in Canvas gradebooks.

Grading Policy

Percent	Grade	Grade points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu