

# Management of Fluid Dynamics, Mass Separations and Heat Transfer Laboratories

ECH 4905

*Academic Term:* Spring 2019

**Class Schedule:** The students will supervise one or two lab sessions (4 hours each) per week. In addition, a period-long class meeting will be held each week. The students are also expected to meet with the instructor individually or in small groups for practice teaching sessions and discussion of their progress on term projects.

**Class Meetings:** Tuesdays, period 6 (12:50 – 1:40 pm).

**Location:** TBA

**Instructor:** Prof. Dmitry I. Kopelevich

*Office:* CHE 315

*Phone:* 392-4422

*E-mail:* [dkopelevich@che.ufl.edu](mailto:dkopelevich@che.ufl.edu)

*Office hours:* by appointment.

## **Peer Tutors:**

Name	Email Address
Lauren Paschall (safety supervisor)	<a href="mailto:lauren4463@ufl.edu">lauren4463@ufl.edu</a>
Laura Sanz Perdiguero	<a href="mailto:laurasanzperdig@ufl.edu">laurasanzperdig@ufl.edu</a>
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## **Course Description**

3 credit hours. Supervised teaching and management of the Unit Operations lab. Students taking this course will guide experiments of small groups of students, troubleshoot equipment problems, and perform a detailed analysis of the lab experiments.

**Course Pre-Requisite:** At least one of the Unit Operations classes (ECH 4224L and/or ECH 4404L).

## **Course Objectives**

The overall goal is to teach students to think and communicate as engineers, learn how to guide others to conduct experiments in the laboratory, work with the department's laboratory technician to improve experiments and troubleshoot technical problems that occur during lab operations.

Students taking this course will

- Supervise one lab session per week and perform a research project (teaching + research option) or teach two lab sessions per week (teaching only option).
- Give presentations on lab safety, theory, and operating procedures to groups of students taking the Unit Operation courses.
- Manage a group of students and guide them to solve problems encountered during the lab.
- Develop quiz questions and proctor quizzes at the beginning of each lab.

- Review (but not grade) pre-lab homework and quizzes with the students in the lab.
- Participate in weekly meetings with the lab director, instructors, and other students teaching the lab.
- Participate in the lab management by
  - Documenting performance of the experimental equipment.
  - Periodically discussing assigned experiments with other students and the lab director.
  - Performing periodic safety assessments and revisions of SOPs for assigned experiments.

***Contribution of this Course to Meeting the Professional Component:***

The students taking this course will

- Gain in-depth understanding of Chemical Engineering equipment.
- Reinforce knowledge of safe operating procedures.
- Learn to apply theory to real-world systems.
- Enhance communication skills.
- Gain experience leading a team.
- Gain teaching experience.

***This course contributes to the following program outcomes:***

- Ability to apply knowledge of mathematics, science, and engineering.
- Ability to design and conduct experiments, as well as to analyze and interpret data.
- Ability to identify, formulate, and solve engineering problems.
- Understanding of professional and ethical responsibility.
- Ability to communicate effectively.
- Recognition of the need for, and an ability to engage in life-long learning.
- Knowledge of contemporary issues.
- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Recognition of industrial health and safety issues, and ability to engage in fostering and exercising health and safety rules and regulations.

***Unit Operations Lab Website:*** <http://ww2.che.ufl.edu/unit-ops-lab/index.html>

Contains descriptions of experiments and safety guidelines.

***Canvas Website*** (<http://elearning.ufl.edu/>) will be used for announcements.

***Recommended Literature***

1. Geankoplis, C. J., *Transport Processes and Unit Operations*.
2. Incropera, F. P. and D. P. DeWit, *Fundamentals of Heat and Mass Transfer*.
3. McCabe, W. L., J. C. Smith, and P. Harriet, *Unit Operations of Chemical Engineering*.
4. Perry, R. H., D. W. Green, and J. O. Maloney, *Perry's Chemical Engineers' Handbook* [E-book is available through UF Library website]

There is no required textbook for this class.

## *Course Schedule*

### **Week 1:**

Orientation, review of lab safety guidelines, selection and practicing of experiment(s) to be taught. At the end of the first week, the students will demonstrate their proficiency in the experiment(s) to the instructor. Specifically, they will

- Submit their solution of pre-lab homework.
- Develop several quiz questions and submit them together with the answers.
- Present theory, operating instructions, and safety rules for the experiment(s).

The students will be allowed to teach an experiment only after they have demonstrated their mastery of the subject and communication skills. In case of unsatisfactory performance, the students will be required to repeat the presentation until their teaching performance is satisfactory. In case a student needs multiple attempts to pass the presentation, their grade for the presentation will be taken as an average of the grades for each of the attempts.

Note: If a student does not pass the presentation before their scheduled teaching time, this student will be required to perform a lab-related project to make up for the missed teaching time.

In addition, within the first week of the semester, the students are required to take the following online training modules:

- Lab Safety Actions & Reactions
- Hazardous Waste Management
- FERPA Basics

These courses can be accessed through my.ufl.edu:

Main menu → My Self Service → Training & Development → My Training

The students are required to submit certificates confirming that they have taken this training **no later than January 14, 2018**. Late submissions will result in a grade reduction for the course.

### **Weeks 2-13:**

Teaching the experiment in the lab and working on the term project.

### *Term Project*

The project should be focused on development of a new experiment or improvement and/or detailed analysis of an existing experiment in the lab. Projects may be performed individually or in groups of two.

### **Project Deadlines:**

- February 1: Selection of the project topic.
- February 8: Plan of the proposed work.
- April 1: First draft of project report is due.
- May 3: Final project report is due.

### ***Alternative to the Project:***

Instead of completing a project, the students may choose to double their teaching assignment (i.e., teach twice a week). Students choosing this option will be assigned two different experiments to teach per week. Note that availability of this option depends on the number of students enrolled in the Unit Ops Lab courses and the Unit Ops Management course.

### ***Class Attendance***

Students are required to attend all weekly meetings and lab sessions assigned to them. Excused absences must be consistent with university policies in the [undergraduate catalog](#) and require appropriate documentation. Students missing their assigned teaching time may be required to perform a lab-related project to make up the missed time. Unexcused absences and tardiness will result in a *grade reduction*.

Moreover, the students taking this course are responsible for enforcing the class attendance policy in the Unit Operations Lab courses. Failure to enforce this policy (e.g., allowing Unit Operations students arriving late to the lab to take a quiz) will result in a *grade reduction*.

### ***Evaluation of Grades***

- 20%: Knowledge of the experiments in the lab. This knowledge will be evaluated through
  - Oral presentations of both theory and operating procedures of the experiment.
  - Pre-lab homework and quizzes.

### **Teaching-Only Option (teaching two labs per week):**

- 80%: Performance during the lab, as evaluated by the students taking the Unit Operations courses and the lab director. The performance will be evaluated at least twice per semester in order to give the students an opportunity to improve any weak areas.

### **Teaching + Research Option (teaching one lab per week and completing a term project):**

- 40%: Performance during the lab.
- 40%: Term project. The project report will be graded both on technical content and communication effectiveness. Note that missing the project deadlines (including the intermediate ones) will result in a grade reduction.

Extra credit will be given for lab participation beyond direct assignments. Examples include reporting potential safety issues and suggesting improvements to experiments.

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

## ***Safety***

Students are expected to know, follow, and enforce safe operating procedures of the equipment as well as proper handling of hazardous materials. The students are required to attend a safety orientation session at the beginning of the semester. **Failure to follow or enforce safe operating procedures will result in a significant grade reduction.** Examples of safety violations are listed below (this list is not exhaustive):

<b>Safety violation</b>	<b>Penalty</b>
Leaving the lab without shutting down an experimental system	Failing grade
Leaving the lab without checking out with the safety supervisor or the lab technician	Letter grade reduction
Not wearing PPE required by an experiment	Letter grade reduction
Not disposing of hazardous waste properly	Letter grade reduction
Not handling a chemical spill properly	Letter grade reduction
Causing a spill due to negligence (e.g., by opening wrong valves)	Letter grade reduction
Bringing food or drink into the lab	Letter grade reduction

## ***Laboratory Management***

Laboratory management is an important aspect of this course. The students taking this course are required to review results of preliminary analysis (e.g., mass and energy balances) of their groups before the end of each lab and post brief summary of the collected data on the Canvas page of the Unit Ops Management course. This summary should also contain observations that may be useful to other students teaching the same experiment, as well as information on any problems encountered during the lab. The students should review the summaries from recent lab sessions before starting a new lab session. Furthermore, the lab director and/or the lab technician should be promptly informed about any equipment or supplies problems. Failure to do so *will result in a grade reduction.*

The students are also expected to periodically review and, if necessary, update the SOP and hazard analysis for their experiments, as well help maintain an up to date Chemical Hygiene Plan.

### ***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

## ***Campus Resources:***

### ***Health and Wellness***

#### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Sexual Assault Recovery Services (SARS)**  
Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

### ***Academic Resources***

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling.  
<https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.