

Interfacial Phenomena I
ECH 4905/6937
Class Periods: Tue, Period 7-8, LAR 330
Tue/Thu, Period 8, BLK 315
Academic Term: Fall 2019

Instructor:

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352-392-3412
Office Hours: Thu 2 p.m.

Course Description

Air-liquid and liquid-liquid interfaces; surface-active molecules, adsorption at interfaces, foams, micro- and macro-emulsions, retardation of evaporation and damping of waves by films, surface chemistry of biological systems.

Course Pre-Requisites / Co-Requisites

N/A

Course Objectives

The objective of this course is to introduce students to the forces and unique phenomena that occur at interfaces.

Materials and Supply Fees

N/A

Highly Recommended Textbooks and Software

- An Introduction to Interfaces & Colloids: The Bridge to Nanoscience
- John C. Berg
- 2010
- ISBN: 978-981-4299-82-4

Recommended Materials

- Intermolecular and Surface Forces
- Jacob N. Israelachvili
- 2011 (Third Edition)
- ISBN: 978-0-12-391927-4

Tentative Course Schedule

- Week 1: Introduction to Interfacial Phenomena (*Berg pp. 1-29*)
- Week 2: Intermolecular Forces (*Berg pp. 31-41*)
- Week 3: Measuring Surface Tension (*Berg pp. 64-76*)
- Week 4: Thermodynamics of Interfaces (*Berg pp. 107-135*)
- Week 5: Double Layers (*Berg pp. 455-523*)
- Week 6: Adsorption at Surfaces (*Berg pp. 176-202*)
- Week 7: Wetting/Capillarity (*Berg pp. 46-62; 76-103; 244-295*)
- Week 8: Measuring Adsorption on Surfaces (*Berg pp. 229-235; 315-333*)
- Week 9: Surfactants and Aggregate Structures (*Berg pp. 137-147*)
- Week 10: Phase Diagrams (*Berg pp. 148-175*)
- Week 11: Polymers in Solution (*Berg pp. 175-195*)

- Week 12: Adsorption of Surfactants at Interfaces
- Week 13: **No class: AIChE National Meeting**
- Week 14: Adsorption of Polymers at Interfaces
- Week 15: Mixed Surfactant/Polymer Systems
- Week 16: **Take-home exam**

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance of lectures is highly recommended. It is the student’s responsibility to obtain any notes, assignments, etc. that they may have missed during their absence. Repeated absences may lead to a lower grade in the class. Excused absences must be in compliance with university policies in the Graduate Catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation.

No make-up exam will be given. Students who do not attend an exam at the scheduled time will receive a score of zero for that exam. Exceptions will be made only in extraordinary circumstances, such as religious holidays or emergencies. It is required that, whenever possible, the student notifies the instructor about the situation prior to the exam, preferably at least two weeks in advance.

As a courtesy to the other students and to the instructor, the students should turn off the ringers for all cell phones during class and they should not answer incoming calls. If a student is expecting an emergency call, please notify the instructor prior to class.

Evaluation of Grades

Assignment	Percentage of Final Grade
Quizzes (~4)	25%
Demonstration	25%
Take-home Exam	25%
Review Paper	25%
	100%

Demonstrations

Each student will need to conduct one demonstration during the semester that covers interfacial phenomena. The textbook has some potential demonstrations at the end of each chapter in “Some fun things to do.” Students can select from these ideas or pick another short, interesting demonstration.

The instructor may be able to purchase some minor items for the demonstrations that cannot be purchased locally (e.g., chemicals, etc.). However, these requests should be made at least 2 weeks before the demonstration.

The demonstrations does not need to last long but the student should provide a short “lesson” to explain the relevant phenomena.

Grading Policy

Final grades will be curved accordingly.

More information on UF grading policy may be found at:
<http://gradcatalog.ufl.edu/content.php>

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 professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at

<https://gatorevals.aa.ufl.edu/students/>.

Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-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.

A non-passing letter grade will be assigned to students who violate academic honesty standards, regardless of the violator's performance on exams, quizzes, and homework assignments. Official sanctions issued by the Office of Student Judicial Affairs will become permanently noted in the student's official transcript.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

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 Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

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 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. <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.

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