Interfacial Engineering

EMA 4121 Section 8797
Class Periods: T 5 & 6 (11:45a – 1:40p), R 6 (11:45a-12:35p)
Location: TBD
Academic Term: Fall 2019

Instructor:
Name: Brij M. Moudgil
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Office Phone Number: 352-846-1194
Office Hours: TBD, Particle Science & Technology Building room 205E (for appointment, contact Ms. Hollie Starr, Administrative Support Assistant at hstarr@ufl.edu; Ph: 352-846-1194).

Teaching Assistants:
Please contact through the Canvas website

- TBD, office location, office hours TBD

Course Description
Quantitative and conceptual treatment of interfacial forces and phenomena. Comparison and contrast of liquid and solid interfaces. Consideration of polymers, colloids, thin films, coatings, and characterization techniques.

Course Pre-Requisites / Co-Requisites
Prerequisites: CHM 2045, EMA 3010, EMA 3123 or permission of instructor
Corequisites: None

Course Objectives
Develop an understanding of the role that interfaces play in determining the properties of materials.

Materials and Supply Fees
None

Professional Component (ABET):
2 credits associated with mathematics or basic science, 1 credit associated with engineering. Course does not contain a significant design component.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.	High
2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	
4. An ability to communicate effectively with a range of audiences	
5. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must	

consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	Medium

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

Required Textbook:

1. Georgios Kontogeorgis and Soren Kiil, "Applied Colloid and Surface Chemistry," John Wiley & Sons, 2016

N/A, This course will use Canvas system. All class handouts, reading assignments, homework problem sets, homework solutions, exam solutions, and grades will be available throughout the semester.

(if any course notes derived from published sources are used, information will be provide for each source)

Recommended Materials

Reference texts:

2. Robert J. Stokes, D Fennell Evans, "Fundamentals of Interfacial Engineering", Wiley-VCH © 1997.
3. Terrence Cosgrove, "Colloid Science Principles, Methods and Applications," Blackwell Publishing Co; 2010 (e-book available on line or in the UF library)
4. Other material assigned and/or posted on the Canvas system.

Course Schedule

Week 1- 3: Defining Interfacial Engineering; Interaction Forces in Interfacial Systems; Systems Containing Fluid Interfaces.
Week 4 – 7: Colloids – Electrical Double Layer, Surfactants and Polymers; Liquid-Liquid and Liquid – Gas Interfaces – Emulsions, Microemulsions, Foams, Froth Flotation, Flocculation.
Week 8 – 16: Solid-Solid and Solid-Gas Interfaces, Crystalline Surfaces, Thin Films, Composite Materials.
(Select case studies will be presented to illustrate the practical relevance of the topics being covered in the class)

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance in class is important. Lecture attendance is recommended but will not be recorded. Material covered in class will follow the book closely in some areas and will deviate from it in others; in a few cases class notes will be used exclusively. In addition, there may be assignments to be completed in class. Those students not in class for any reason are responsible for the material covered in class, and the homework assigned.

Correct behavior in class is always important. Making noise, talking, reading the paper, leaving your cell phone on, leaving early or arriving late can be very distracting. Occasionally, your schedule will demand that you arrive late or leave early - in these cases please minimize class disruption.

Homework will be assigned and is due on the dates indicated on the course schedule; no late homework will be accepted. Talking with others is encouraged, but all turned in problem solutions

must be your own work. All homework problems and solutions may be downloaded from the Canvas site.

Exams: will closely follow the material covered in class, in your assigned reading and in homework problems. These will be closed book and without notes and will be given during a regular class period or at prescheduled times. All required equations for the exams would be provided, or a one-page (8.5 X 11" both sides) equation/formulae/constants etc. will be allowed. Requests for re-grading of exams must be made within one week after an assignment has been returned. Only exams completed in pen will be considered for re-grading.

Exact dates for exams will be announced in the class and posted on the Canvas system, a tentative schedule is as follows: Exam 1 – week of Sept. 23; Exam 2 – week of Oct. 28; Exam 3 – week of Dec. 2.

Final Exam: There will be no final exam.

On the Web: This course will use Canvas system. All class handouts, homework problem sets, homework solutions, exam solutions, and grades will be available throughout the semester.

This statement is required: 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.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (7)	100 each	5%
Midterm (best of three exams)	100	35%
Midterm (next two exams)	100	20% each
Team Project: Critical review of a select topic	100	20%

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
92 - 100	A	4.00
88 - 91	A-	3.67
84 - 87	B+	3.33
80 – 83	B	3.00
76 – 79	B-	2.67
72 – 75	C+	2.33
68 – 71	C	2.00
67 – 65	C-	1.67
62 – 64	D+	1.33
59 – 61	D	1.00
56 – 58	D-	0.67
< 56E	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

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.

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: https://registrar.ufl.edu/ferpa.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 Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

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 suppor*t*, 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.