

Syllabus

EMA 4121 Section 003F (Interfacial Engineering), Spring 2019

1. Catalog 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.
 2. Prerequisites: CHM 2045 (sequence), EMA 3010, EMA 3123 or permission of instructor
 3. Course Objective: Develop an understanding of the role that interfaces play in determining the properties of materials.
 4. Contribution of course to meeting the professional component: Students will learn about the importance of interfaces in materials systems.
 5. Relationship of course to program (MSE) outcomes (ABET skills acquired during the course):
 1. Ability to apply knowledge of mathematics, science, and engineering to materials systems (high coverage): This course brings together knowledge acquired in previous courses on materials and applies them to systems containing interfaces. Students are assigned homework and exam problems in this area, on which they are graded.
 2. Ability to identify, formulate, and solve engineering problems. The subject area of interfacial engineering inherently touches on many classes of materials, requiring students to interrelate information from different disciplines and to develop the ability to formulate and solve multidisciplinary engineering problems.
 3. Ability to engage in lifelong learning: Identifying the role of interfaces and their relative importance, assessment of research topics within various materials sub-disciplines, each student will be graded on their ability to assimilate and communicate these important contemporary scientific issues.
 6. Instructors: Co-Instructors - Dr. Brij Moudgil
Dr. Brij M. Moudgil
 - a. Office location: 205E PS&T Bldg.
 - b. Telephone: 352-846-1194
 - c. E-Mail: bmoudgil@perc.ufl.edu
 - d. Web site: TBA
 - e. Office Hours: TBA, or by appointment
- (Please contact Dr. Moudgil's Office Assistant Ms. Hollie Starr at hstarr@ufl.edu or 352-846-3550 for scheduling an appointment with him.)
7. Teaching Assistant: Wei, Yi
 - a. Office location: TBA
 - b. Telephone: TBA
 - c. E-Mail: weiyi1312@ufl.edu
 - d. Office Hours: TBA, or by appointment

8. Meeting Times: 7th Period (1:55 pm – 2:40 pm) Monday, Wednesday and Friday.

9. Class/Laboratory: Class meets three times a week for 1 period of 50 minutes each lecture

10. Meeting Location: LIT 0121

11. Materials and Supply Fees: N/A

12. Textbook and Software Required: 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.

13. Recommended Reading:

Required Textbook:

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

Reference texts:

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

14. Course Outline:

Defining Interfacial Engineering; Interaction Forces in Interfacial Systems; Systems Containing Fluid Interfaces.

Colloids – Electrical Double Layer, Surfactants and Polymers; Liquid-Liquid and Liquid – Gas Interfaces – Emulsions, Microemulsions, Foams, Froth Flotation, Flocculation.

Solid-Solid and Solid-Gas Interfaces, Crystalline Surfaces, Thin Films, Composite Materials

15. Attendance and Expectations:

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 Feb. 11; Exam 2 – week of March 18; Exam 3 – week of April 22.

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.

16. Grading:

The course grade is based on numerical scores that include homework and exams:

Homework	5 %
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Additionally, a homework based on the critical review of a research topic would be assigned 5%.

Best of three exams	40%
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Next two best exams	25% each
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Total	100
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17. Grading Scale:

This class will be graded on the following scale:

92-100 A (GPA points = 4.0)

88-91 A- (3.67)

84-87 B+ (3.33)

80-83 B (3.0)

76-79 B- (2.67)

72-75 C+ (2.33)

68-71 C (2.0)

65-67 C- (1.67)

62-64 D+ (1.33)

59-61 D (1.0)

56-58 D- (0.67)

< 56 E (0)

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:

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

18. Make-up Exam Policy: If you miss an exam through documented illness or for an excused absence, you may take a make-up exam. If you miss an exam for any other reason, you will receive a zero on that exam.
19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
21. UF Counseling Services –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.

 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
22. Software Use – All faculty, staff and student 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.