

Syllabus

EMA 4121 Section 003F (Interfacial Engineering)

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.
 6. 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.
 11. 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 and Dr. P. Sharma

Dr. Brij M. Moudgil

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Dr. Parvesh Sharma

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(Please contact Dr. Moudgil's Office Assistant Ms. Hollie Starr at hstarr@ufl.edu or 352-846-3550 for scheduling an appointment with him, or with Dr. Sharma)

7. Teaching Assistant: TBA,

- a. Office location: TBA
- b. Telephone: TBA
- c. E-Mail: TBA
- d. Office Hours: TBA

8. Meeting Times: 7th Period Tuesday, 7th & 8th Periods Thursday

9. Class/Laboratory: Class meets twice a week for 3 periods of 50 minutes each lecture

10. Meeting Location: 7th Period Tuesday, Location FLO 0100; 7th & 8th Periods Thursday Location: FLO 0270

11. Materials and Supply Fees: N/A

12. Textbook and Software Required: N/A, This course will use Sakai (<https://lss.at.ufl.edu>). All class handouts, homework problem sets, homework solutions, exam solutions, and grades will be available throughout the semester.

13. Recommended Reading:

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; 2005 (e-book available on line in the UF library).
- Milton J. Rosen, "Surfactants and Interfacial Phenomena," 3rd Edition; Wiley-Interscience, 2004.
- Other material assigned and/or posted on the Sakai 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 Interfaces – Emulsions, Microemulsions.

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

15. Attendance and Expectations: Lecture attendance is recommended, but will not be recorded. While attendance is not mandatory, experience has shown that those who attend lectures earn higher grades in the course. Arrival on time is expected. Please turn off all cell phones upon entering class.

16. Grading: The class grading system will be based upon homework (5%), midterm exams I, II & III (25% lowest scoring exam; 30% second highest scoring exam; 40% highest scoring exam).

Examinations will consist of short answers, derivation, and numerical problem solving type questions. Exact dates for exams will be announced in the class and posted on the Sakai system, a tentative schedule is as follows: Exam 1 – week of Feb. 3; Exam 2 – week of March 10; Exam 3 – week of April 14. There will be no final exam.

17. Grading Scale Final grades will be assigned according to the following scale: (A \geq 92%) (A- \geq 88%)

(B+≥84%) (B≥80%) (B≥76%) (C+≥72%) (C≥68%) (C-≥ 65%) (D+≥62%) (D≥59%) (D-≥ 56) (E<56%).

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: Through arrangement with the instructor. Must have a written letter justifying the reason for not taking the exam during the regularly scheduled time.
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.