

**EMA 4121 Section 003F**  
*Interfacial Engineering*  
**Spring 2015 Syllabus**

Meeting Time: Period 6, MWF

Location: MWF- FAC 120

Instructor: Dr. Scott Perry, Office: Rhines 206, Phn: 846-3333 email: [ssp@ufl.edu](mailto:ssp@ufl.edu)

Office Hours: Period 4, Tuesday and Thursday, or by appointment

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Office Hours: TBA

**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 Objective:** Develop an understanding of the role that interfaces play in determining the properties of materials.

**Relationship of course to program (MSE) outcomes:**

- a. 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.
- e. 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.
- i. Ability to engage in lifelong learning (high coverage): Assessment of research topics within various materials sub-disciplines will form the basis for student poster presentations, identifying the role of interfaces and their relative importance. Each student will be graded on their ability to assimilate and communicate these important contemporary scientific issues.

**Important Course Policies- Read Carefully!**

- **Credit:** 3 hours.
- **Prerequisites:** CHM 2045 (sequence), EMA 3010, EMA 3123 or permission of instructor
- **Text:** Robert J. Stokes, D Fennell Evans, "Fundamentals of Interfacial Engineering", Wiley-VCH © 1997.
- **Required:** Scientific/engineering calculator.
- **Help:** Review sessions will be given the week of each exam.
- Midterm tests will be given in class on the dates listed on the next page.
- The following are prohibited in exam rooms: pagers, beepers, cell phones and any other communication devices or electronic/alphanumeric storage devices.
- January 12 (Monday)- Withdrawal deadline with no Fee Liability.
- January 30 (Friday)- Withdrawal deadline (25% refund)
- April 22 (Wednesday)- Last day of classes. *Also Earth Day!*
- Lecture attendance is recommended, but will not be required. 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.
- The class grading system will be based upon homework (5%), poster presentation (20%), and three midterm exams (25% each),
- Examinations will consist of short answer, derivation, and numerical problem solving type questions.
- Final grades will be assigned according to the following scale: (A $\geq$ 92%) (A $\geq$ 88%) (B $\geq$ 84%) (B $\geq$ 80%) (B $\geq$ 76%) (C $\geq$ 72%) (C $\geq$ 68%) (C $\geq$  65%) (D $\geq$ 62%) (D $\geq$ 59%) (D $\geq$  56) (E $<$ 56%).
- **Make-up exams** will be provided only with the **prior approval of the instructor or excused absence**. In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, religious holidays and participation in official university activities such as music performances, athletic competition or debate.

- **Accommodation for Students with Disabilities:** According to University policies, students requesting classroom accommodation must first register with the Dean of Students Office, who will provide documentation to the student, who must in turn provide this documentation to the Instructor.
- **The Honor Code:** *We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.* On all work submitted for credit by students at the university, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

### Assignments

- **Homework** will be assigned and is due on the assigned dates (TBA); no late homework will be accepted. Group problem solving and teamwork is encouraged but all turned in problem solutions should be your own work. These homework questions are essential to your study and some exam questions will be adapted from them.
- **Exams:** will closely follow the material covered in class, in your assigned reading and in homework problems. These will be closed book and will be given in class. Requests for re-grading must be made within one week after an assignment has been returned.
- **Presentation:** Each student will prepare a poster presentation regarding the influence of interfaces within their senior research project. Topics and scope will be identified by the midway point in the semester, with posters being presented at the end of the semester.

### Course Schedule (subject to change, other than exam dates)

#### NOTES:

- Please reserve Period 7 on Jan 12 and Jan. 26 in addition to our normal meeting time. Room TBA.
- No class on Friday, Jan. 16.
- No class on Monday, Jan. 19 (MLK day).
- No class Friday, Jan. 23.
- Spring Break: Feb. 28- March 8.

- 1- Defining Interfacial Engineering
- 2- Interaction Forces in Interfacial Systems
- 3- General Properties of Systems Containing Fluid Interfaces

#### EXAM 1, Friday, February 6

- 4- Colloids
- 5- Liquid-Liquid Interfaces
- 9- General Properties of Crystalline Surfaces

#### EXAM 2, Friday, March 20

- 10- Thin Films- Solid-Solid Interfaces Processed from the Vapor Phase
- 6- Polymers (sect. 6.5 only, plus supplemental material to be provided)
- Composite Interfaces (supplemental material to be provided)
- Surface and Interface Characterization (supplemental material to be provided)

#### POSTER PRESENTATION, Monday, April 22 (please reserve Periods 6 and 7)

#### EXAM 3, Wednesday, April 24