ENMA 489C & ENMA 698C   Fall 2019

ENMA 489C Continuum Modeling of Materials
ENMA 698C Continuum Modeling of Materials

Instructor: Dr. Yifei Mo, 1137 Engineering Lab bldg 089, yfmo@umd.edu
Lecture Time/Room: Tuesday & Thursday 8:00-9:15am
Lab Time/Room: EGL0312
Office Hours: Tuesday 9:30-10:30 pm; Wednesday 2:00-3:00pm (or schedule separately)

Pre-requisite:
- MATH 206: Introduction to MATLAB, or equivalent
- ENMA 362 or equivalent
- Physics 270/271 or equivalent
- MATH 246 or equivalent

Course Description: This is an introductory course aiming for junior/senior undergraduate students and graduate students to study continuum modeling techniques used in materials research. This course covers the methods and applications of continuum modeling techniques using COMSOL in simulating a range of materials phenomena and properties. Specific topics of continuum modeling include:
- The construction and analyses of continuum models using COMSOL.
- Structural mechanics.
- Heat transfer.
- Electrical current.
- Chemical species transport.
- Fluid flow.
- Multi-physics models coupling above phenomena.

Requirements and Grading:
- <u>Attendance is required for all lectures and laboratories.</u> Failure to comply will result in a lowering grade.
- A lot of education activities will happen on the Canvas https://myelms.umd.edu/ . Quizzes, homework, and labs will be assigned on the Canvas, and you are required to turn in all lab reports, code, reports, presentations on the Canvas website.
- **Computer Labs**: Hands-on experiences of using COMSOL software packages to calculate materials properties and to solve materials problems. Lab reports summarizing calculation results will be turned in and graded.
- **Homework**: Using COMSOL software packages to calculate materials properties and to solve materials problems. This is in most cases a direct continuation of the Labs.
- **Final Project**: A significant research project to be completed by the end of class. You are required for a presentation and a final report. The project topic should be directly related to continuum modeling of materials using COMSOL. You are encouraged to conduct project related to your research, other courses, or design project.
- **Grading**

- Labs & HW: 60%
- Final Project: 40%

Books: No class textbook. The following reference books are available electronically.
- **Computing**
  - *COMSOL documentation*
  - *MATLAB documentation*

Software:
- Scientific Software Packages:
  - COMSOL
  - MATLAB

Honor Code: The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu.

To further exhibit your commitment to academic integrity, remember to sign the Honor Pledge on all examinations and assignments: "I pledge on my honor that I have not given or received any unauthorized assistance on this examination (assignment)."

Attendance Policy: Attendance to class is required. In the event that a class must be missed due to an illness, the policy in this class is as follows:

- For every medically necessary absence from class, a reasonable effort should be made to notify the instructor in advance of the class. When returning to class, students must bring a note identifying the date of and reason for the absence, and acknowledging that the information in the note is accurate.
- If a student is absent on days when quizzes, labs, or presentations are scheduled, he or she is required to notify the instructor in advance, and upon returning to class, bring documentation of the illness, signed by a health care professional.