

14:635:401 & 402
Senior Materials Science and Engineering Laboratory: I & II
Department of Materials Science and Engineering

Course Instructor:

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By Appointment

Description:

Senior Materials Science and Engineering Lab I & II are two Senior Materials Science and Engineering Laboratory classes to be provided on junior and senior years. In this course, students chose an independent research project that they will carry out under the direct supervision of a Faculty member of their choosing. The Faculty member is the leader of the project and team, and the person directly interacting with the student and who is responsible for the technical oversight of the student's research program, progress, lab notebook, etc. In addition, Research Associates, Post-Doctoral Researchers, Graduate Students and other undergraduates make up the team. I, as the instructor of the course am also a member of the team. I will meet with all of the students in this class almost each week. Students with any difficulties or problems with their projects should first contact their faculty supervisor and then me if needed. I will introduce the students to the challenges of doing independent research and working on teams. I will discuss with them engineering ethics (as related to research, i.e. use of other's work as their own, plagiarism, etc.).

Objective:

The objective of Senior Lab is to give students the important experience of conducting an independent research project as part of a research team. In addition, this class is intended to improve student's ability to communicate their research plans, progress and results in writing, in oral presentations with visual computer graphics. This class is also intended to be the culminating experience with respect to the scientific, engineering and "soft" skills of their undergraduate education.

Prerequisites:

Students must be in good academic standing and have satisfactorily completed at least three semester course work as required by MSE program.

Attendance:

Attendance is mandatory! Only if the students indicate that they have an acceptable reason for an absence, before the class, will they are excused. Students will be excused from class without penalty because of a religious observance, to attend a conference or for a job interview. Students missing any class are responsible for all material covered in class.

Conduct:

It is expected that all students will conduct themselves in a professional manner in this class. This includes ethical conduct, and professional manner, conduct and dress for the end of the semester presentations.

Spring 2016

Projects:

Each student will be required to carry out an independent laboratory based research project under the direct supervision of a faculty member (or members). In addition, the students will be required to make three presentations each semester. Students will also be required to keep a lab notebook and submit that to their faculty supervisor for approval two times per semester and then submission to the instructor for grading.

Grading:

The final grade for the course will be compiled as follows:

First and second Oral Presentation	30%
Final Oral Presentation at the end of the semester	30%
Final laboratory notebook	10%
Final Outcome and Progress of Research Project	20%
Class Participation	10%
Extra points for abstract submission and conference presentation	

Policy on Calculators:

As there are no exams in this class, there is no policy on calculators

Policy on Other Electronic Devices:

The use of cell phones, pagers, Walkman or any other electronic device that may disrupt the class is not permitted. Students are encouraged not to bring these devices to class. If it is necessary to bring a device to class, it must be turned off or muted. It is acceptable for students to bring a computer to class if they choose to take notes in this manner (provided it does not disturb anyone in the class) or to make LCD presentations.

Academic Integrity:

Students will be expected to adhere to the Policy on Academic Integrity listed within the New Brunswick Undergraduate Catalogue. Students are encouraged to review this policy.

Contribution of Course to Meeting the Professional Component of ABETS:

Senior Laboratory course are the capstone courses for students who primarily are interested in: an industrial career in materials science and engineering or continuing their education in graduate school. The course integrates the fundamental science, e.g. physics and chemistry, and mathematics with the engineering courses the students completed in earlier semesters. By carrying out an independent research program with the Faculty advisor, Research Associates, Graduate Students, other Undergraduates, and the course instructor, the student learns how to carry out research into new Materials Science and Engineering materials, processes, components, and systems. This puts their prior education into perspective with respect to the engineering profession. The students also experience working as a member of a team.

Senior Laboratory course gives the students the final experience of the conduct of independent laboratory based research. This course provides the student with an understanding of the challenges

and pleasures of independent laboratory based research. Many students use this course as a yardstick upon which (in part) they will make their decisions about going to graduate school or not.

Relationship of Course to Program Objectives:

Senior Laboratory I & II develop an integrated opportunity for students to use all of their prior course work to carry out independent research on a Materials Science and Engineering problem. In all cases, the students use their understanding and practice their knowledge on properties, processing and the structure of materials used in Materials Science and Engineering applications. Students will see how new materials, microstructure or processes are designed which allow one to optimize some aspect of materials. In this manner, they are conducting research that is directly relevant to current Materials Science and Engineering. This research opportunity prepares them very well to enter the Materials Science and Engineering or other discipline or to continue on to Graduate School in Materials Science and Engineering, other materials related field.

This course improves their ability to apply knowledge of mathematics, science and engineering. This course improves their ability to design and conduct experiments, as well as to analyze and interpret data. This course improves their ability to design a system, component, microstructure or process to meet desired needs. This course improves their ability to function on a team. This course improves their ability to identify, formulate and solve engineering problems. This course improves their ability to understand professional and ethical responsibility. This course improves their ability to communicate effectively. This course improves their ability to understand the impact of engineering solutions in a global and societal context. This course improves their knowledge of contemporary issues related to Materials Science and Engineering. This course improves their ability to use experimental, statistical, and computational methods to analyze the behavior of Materials Science and Engineering systems. This course improves their understanding of the fundamental principles underlying and connecting structure, properties, processing and performance related to the material systems utilized in Materials Science and Engineering.