Materials Science and Engineering 6193.01:
Practical Scanning Electron Microscopy

Instructor: Dr David W McComb
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Office Hours: Open, but appointments are preferable

Location: CEMAS Digital Theater - 1305 Kinnear rd., Suite 100, Room 144

Objectives: This is a practical course designed to introduce students to basic operation techniques of the Scanning Electron Microscope. At the end of the course, students will have an understanding of 1) the capabilities of an SEM, 2) the types of samples compatible with SEM analysis, 3) how to prepare samples for SEM investigation, 4) how to obtain quality images from various types of specimens, and 5) how to overcome some of the issues encountered while analyzing specimens. Students who pass this course will be allowed to book time on Quanta SEM at CEMAS after demonstrating practical understanding of sample loading and vacuum pumping systems. Completion of this course does not count as training on more advanced SEMs and techniques, but will allow future SEM training sessions to focus on proper analysis of the students’ samples, as opposed to basic microscope operation.

Format: This course will take place entirely in the digital lecture theater at CEMAS. There will be lectures, and lab periods. During the lectures, some basic information will be covered, then demonstrated, with student participation. During the lab periods, students will split into smaller groups to use the SEM, to insure that all students obtain hands-on experience.

Pre-requisites: Student advisor approval required to confirm that SEM techniques are an important component of their planned research project.

Grading: The course is S/U, but the instructor must determine the students’ understanding of the material. Therefore, short homework assignments will be assigned, and a lab practical final examination will be administered. Above all else, coming to and participating in class is paramount.

Homework (3 assignments): 25%
In-Class Participation: 50%
Lab Practical Exam: 25%
Schedule:

Week 1: Lecture 1 - Basics of SEM Operation
Week 2: Lecture 2 - Starting and Using the SEM
Week 3: Lab 1 – Startup and Basic SEM Operation (Group 1)
Week 4: Lab 1 – Startup and Basic SEM Operation (Group 2)
Week 5: Lecture 3 – Electron Beam Parameters
Week 6: Lab 2 – Electron Beam Parameters (Group 1)
Week 7: Lab 2 – Electron Beam Parameters (Group 2)
Week 8: Lecture 3 – Acquiring Images
Week 9: Lab 3 – Acquiring Images (Group 1)
Week 10: Lab 3 – Acquiring Images (Group 2)
Week 11: Lecture 4 – Advanced Analytical Techniques in the SEM
Week 12: Lecture 5 – Sample Preparation
Week 13: Practice and Lab Practical
Week 14: Practice and Lab Practical
Week 15: Practice and Lab Practical

Disability Accommodation

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 614-292-3307, TDD 614-292-0901; http://www.ods.ohio-state.edu/.

Any student who feels s/he may need an accommodation based on the effect of a disability should contact the Office for Disability Services to coordinate reasonable accommodations for documented disabilities.