

BIOLOGY 556: SCANNING ELECTRON MICROSCOPY FALL 2007
Sole use of the Facility equipment is predicated on successful completion of proficiency examinations for each instrument.

Your goal in this course is to learn to prepare a variety of specimens for scanning electron microscopy, and to image those samples at high resolution in the SEM. Using various detectors, you will be able to image a sample based on morphology, atomic number, and chemical composition at the surface. You will be able to diagram the various related pieces of sample preparation instrumentation and design preparation protocols for a variety of samples. You will learn basics of imaging. For the final portfolio, you will apply your knowledge of sample preparation and instrument operation to image 15 samples of your own choosing.

Initially students will work together in groups, but after the SEM practical each student **will work independently** on individual samples.

This course will take a minimum average of 5 hours per week in the laboratory. Students are not permitted to work in the laboratory outside of 8:30 am-5 pm M-F without express permission of Dr. Barlow. Students must log all their time in the laboratory and submit their weekly records along with their lab reports..

This class can fill a large portion of your life, so be sure you have the time for this class.

REFERENCES AVAILABLE IN THE LABORATORY

ELECTRON MICROSCOPY, J. Bozzola and L. Russell (1992)

BIOLOGICAL ELECTRON MICROSCOPY M. Dykstra (1992)

SCANNING AND TRANSMISSION EM Flegler et al. (1993)

WORKING WITH A SEM S. Chapman (1986)

Principles and Practice of X-Ray Microanalysis Oxford Instruments 1999

GRADING: Late assignments incur a grade increment/day late penalty

1	Instrumentation practicals	required for unsupervised use of equipment	cr/ncr
2	Scope Test	SEM solo exam	cr/ncr
3	Lab report I	Working Distance	11
4	Lab report II	Tilt Comp	11
	Lab report IIb	Dynamic Focus	11
5	Lab report III	Resolution & spot size	11
6	Lab report IIIB	Resolution & Working Distance	11
	Lab report IV	Accelerating voltage	11
	Lab report V	BSE & X-ray spectrum	11
	Lab report VI	BSE & X-ray maps	11
	Lab report	SEM Image portfolio	12
	Lab report	SEM Image portfolio/Class presentation	cr/ncr
7	Instrumentation Final Exam (Must pass to pass course)		cr/ncr

Lab reports will consist of labeled images and discussion highlighting each of the techniques discussed. Additional guidelines/deadlines will be given in lab.

The lecture is Wednesday afternoon from 13:00-13:50 in LS 269. Wednesday afternoon lab (2:10-4:40 pm) will be a laboratory demonstration and student practice session in the EM Facility (Physical Science 1). Upon successful completion of the SEM solo exam, students will sign up for independent time on the scope as needed to carry out the laboratory exercises. Students will also maintain a log of equipment and preparation time in the lab, to be used as part of the final grade.