Course Syllabus: BIOL 4450/6450: Fall 2013

Theory and Practice of Scanning Electron Microscopy

CRN 81304 and 81325; MW 1:00 – 1:50 p.m. (BC 1202), MW 2:00 – 3:50 p.m. (BC 1075)

Instructor: Dr. Russ Goddard, BC 2090, 249-2642
email: rgoddard@valdosta.edu Office Hours: Mon. and Wed. 10:15 a.m. – noon.

Course Catalog Description: BIOL 4450/6450, Theory and practice of scanning electron microscopy, 2-2-4. Prerequisite: BIOL 3200 and 3250 or consent of the instructor (for 6450: admission into the graduate program). General principles of scanning electron microscopy operation and theory with comparison to light optics in a laboratory intensive environment. Topics include fixation and preparation of samples for standard, low voltage, low vacuum, and high resolution SEM.

Recommended Texts

Goldstein et. al. 2003. Scanning electron microscopy and x-ray microanalysis, 3e. Kluwer Academic/ Plenum Publishers. New York.

Scanning Electon Microscopy Primer: http://www.charfac.umn.edu/instruments/sem_primer.pdf

Grading: There are two parts to this course, the lecture and the laboratory, but students must understand that this course is a laboratory intensive course and that they will need to spend significant independent time in the laboratory.

Lecture Exams (300 pts) There will be 3 one-hour exams in this course. Each exam will cover approximately 1/3 of the lecture and reading material. Each of the three exams will be worth 100 pts.

Lab Image Portfolio (200 pts): Throughout the course, students will be assigned comparative parameters that they will use to photograph specimens. Students will be required to make a high resolution print portfolio of the comparative images before the end of class.

Research projects:

BIOL 4450 and 6450 (50 pts) Since the SEM represents a tool for acquiring high quality research data, students must propose a research topic that could be studied using the equipment and procedures learned in the course. Students will research the literature and take preliminary photographs of any specimens that fit into a scientifically valid study. Students will give either a 10 min PowerPoint presentation, or present a poster, on their proposal at the end of the course. Graduate students in BIOL 6450 will present their proposals before midterm.

BIOL 6450 (100 pts) Graduate students are expected to propose a research topic early in the course to study (see previous assignment) and will develop this proposal into a research paper using original image data obtained using the instrumentation in this course. A research paper with significant literature review (citations) and original data will be submitted (75 pts) and a 30 min research presentation (25 pts.) using PowerPoint will be given to the class at the end of the course.

Oral Proficiency Exams (100 pts): Each student will orally articulate and demonstrate all procedures with specimen preparation and microscope use, following a standard checkout procedure in use in the microscopy lab. Oral checkouts will be performed several times during the semester to check basic operation and knowledge of more specific procedures as they are added in class. Before students can operate the SEM independently, they must pass the standard checkout procedure.

Attendance: Students who miss class (lecture or laboratory) will lose points toward their final grade. Don't miss class.

Guaranteed grade distribution is as follows (Max. pts = 650 for BIOL 4450; 750 for BIOL 6450):

A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69%
F = < 59%

Points available BIOL 4450:

Lecture Exams:	300 pts
Research Proposal:	50
Oral Proficiency Exam:	100
Lab Image Portfolio:	200
Total:	650 pts

Points available BIOL 6450:

Lecture Exams:	300 pts
Research Proposal:	50
Research Paper / Oral Presentation:	100
Oral Proficiency Exam:	100
Lab Image Portfolio:	200
Total:	750 pts

Tentative EXAM SCHEDULE:

Exam 1: Monday, 16 September 2013
Exam 2: Monday, 21 October 2013
Exam 3: Monday, 2 December 2013

Final Exam Period: Wednesday, Dec. 4, 2013; 12:30 pm - 21(3)4.7(0 pm)r7N

Tentative Lecture and Laboratory Schedule: