

Biology 391 Electron Microscopy
Spring 2020, Dr. H. Hoops
Tues 2:30--4:20 + 4 hrs. arranged

By the end of this course students will:

- 1) Have a theoretical and practical basis for operation of the transmission electron microscope (TEM) and scanning electron microscope (SEM).
- 2) Be able to prepare biological samples for the TEM and SEM and to obtain quality images of these samples.
- 3) Be able to interpret TEM and SEM images of biological samples.

Schedule:

- Jan. 28 Introduction to course, description of course requirements.
Safety mini- lecture, solutions and dilutions mini-lecture.
Tour of the laboratory.
- Feb. 04 Review of practical aspects of fixations, dehydration, embedding, etc.
Solutions and dilutions quiz.
Start preparing for fixation and embedding
- Feb. 11 Start fixation and embedding for TEM.
- Feb. 18 Demonstration: TEM. Begin checking out on TEM.
- Feb. 25 Demonstration: Digital imaging. Work on projects.
- Mar. 03 Demonstration: Block trimming. Work on projects.
- Mar. 10 Demonstration: Ultramicrotomy. Work on projects. *Project #1 due.*
- March 17-20 break
- March 24-May 5 Work on projects, SEM (April 22 is Great Day – no class)
- April 24 (Fri.) TEM, SEM normal availability ends.
- May 01 (Fri.) TEM, SEM will no longer be supported.

Final time slot (3:30 Wed May 13). Meet to view and rate posters *Projects 2 and 3 due*. **If you want to take the optional final exam, it will be given during the last hour of this timeslot or by arrangement. (Note: check your final schedule. We can change this with unanimous consent or with any one exam conflict.)**

Note. It is very important to begin your TEM project very early in the course as the preparation and sectioning of your material will be *by far* the most time-consuming aspect of this course. In addition, if the machines go down for any reason, you will want to be ahead of the curve not behind it. You cannot catch up on machines that are broken.

Office hours: (subject to change after spring obligations are finalized)

Mon 9:00-10:30 a.m.
Tues 9:30-10:30 a.m.
Wed 4:00-5:00 p.m.
Thurs 9:30-10:30 a.m.
Fri 9:30-11:00 a.m.

In addition, I will reserve a couple hours per week specifically for this course. Tentatively it is 10:30-12:30 on Thursday but I will probably change it to match your schedules.

Lastly, I can often meet at 7:30 or 8:00 a.m. (before classes start) or other times by appointment.

Evaluation

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| Solutions and dilutions quiz | 05 pts |
| Report #1 | 25 pts |
| Report #2 | 50 pts |
| Report #3 | 25 pts |
| Discretionary | 14 pts |
| Practical (optional) | 20 pts |
| Peer evaluations of helpfulness | 08 pts |
| Peer evaluations of TEM & SEM images | 08 pts |

See section on "Reports" for expectations on content of projects #1 - #3.

The discretionary portion of the grading is designed to make the course more fair.

Components that will be considered include:

- a) effort expended
- b) distribution of the effort (i.e. starting early in the course)
- c) care with the instrumentation
- d) competence with the techniques and ideas of electron microscopy as demonstrated by daily use
- e) unforeseen contingencies
- f) an especially difficult project

A final practical exam is optional. You may take the exam to try to improve their grade or because you would like to demonstrate competence in electron microscopy in a classroom as well as in a laboratory setting. If you choose to take it, the final can **raise or lower** your final grade. Because this course is predicated mostly on hands-on results, this option is probably not necessary or advised for most students, but if you are convinced you know more than your results show, it might become an option.

Peer evaluations. Because this course will stress helping each other, you will get a chance to rate and be rated by your peers twice. In the first case, you will rate your peers for contributions to each other's success. In the second, you will rate each other's posters for quality of images and quality of analysis.

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will be made for medical conditions related to pregnancy or parenting. Requests for accommodations including letters or review of existing accommodations should be directed to the Office of Disability Services in Erwin 22 (disabilityservices@geneseo.edu or 585-245-5112). Students with accommodation letters should contact their faculty members as early as possible in the semester to discuss specific arrangements. Additional information on the Office of Disability Services is available at www.geneseo.edu/dean_office/disability_services. Additional information about resources available for student success can be found at the course homepage.