Course Syllabus: Electron Microscopy & Analysis

McCoy College of Science, Mathematics, and Engineering

BIOL 5553 ♦ GEOS 5553 | Spring 2023

Contact Information

Instructors: Dr. Jon Scales and Dr. Jonathan Price
Office: Bolin 218E (Scales) and 102 (Price)
Office hours: Scales: 11-12 MTW & 9-11T
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Course Objectives

The course provides background and practical introduction to the scanning electron microscope.

- Fundamental principles
- Basic and intermediate operation of an active instrument
- Sample preparation
- Imaging techniques
- X-ray spectrometry
- Practical application to research

Textbook & Instructional Materials

All readings and materials will be assigned on D2L

Room

Our lecture room will be Bolin 125. The instrument and prep lab are in Bolin 229. Meeting location is contingent on the topic for the session, so please stay on top of scheduled activities as imparted on D2L.

Hours

The class meetings have scheduled times on Thursdays from 09:30 am-10:20 am *(Group work may require an extension to 10:40 AM*), and on Fridays 01:00 pm-04:50 pm. For some of the sessions, the class will be broken into group or individual appointments. Please keep track of your schedule for each session. For group work, we tentatively have specified these times (subject to change):

- Slot 1: R 9:30-10:40
- Slot 2: F 1-2:10
- Slot 3: F: 2:20-3:30
- Slot 4: F 3:40-4:50

Some additional lecture material, required readings, and assignments will be posted online to D2L. You will be expected to complete these independently. Assignment completion will require your use of the lab outside of class hours. You will need to schedule instrument time through the instructors prior to use.

Scheduled time should be during regular university hours (e.g. M-F 8 am to 5 pm), in up to two-hour blocks for individuals or three-hour blocks for groups. First come, first served. The official instrument calendar is available here: msutexas.edu/academics/scienceandmath/sem/.
Please frequently check D2L for changes to the schedule.

Academic Misconduct Policy & Procedures

Academic Dishonesty, which includes cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given), undermines the integrity of the class, the programs, and the university. Any infraction may be met with the minimal penalty of a zero credit on the evaluation. Further additional penalties, such as a failing grade for the course, or dismissal from the academic program will be applied at the discretion of the instructors. Additional guidelines on procedures in these matters may be found in the Student Handbook .

Grading

Table 1: Assignment weights

Assignments	Percent
Specific tasks and quizzes	50%
Participation and interaction	10%
Term project report	30%
Term project presentation	20%

Table 2: Total percentage points for final grade.

Grade	Points
A	90+
B	80 to 89.9
C	70 to 79.9
D	60 to 69.9
F	Less than 60

Work submission

Unless specified otherwise, assignments will be remitted through D2L.
Note: You may not submit a paper for a grade in this class that already has been (or will be) submitted for a grade in another course, unless you obtain the explicit written permission of me and the other instructor involved in advance.

Projects Required

This class aims to provide practical assistance towards research questions. You are required to complete an involved term project that fully utilizes the instrument. Details for process and evaluation will be imparted at the time of its assignment.

Late Work

Late papers are the bane of our mutual existence: they are disadvantageous to you, because you fall behind the class. They are detrimental to the class, because they hold up grading. They are disconcerting to the instructors, because they require my reexamination of a previously graded assignment.
This is a graduate class. You should anticipate that assignments will be multifaceted and time intensive. Start early.

Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into D2L through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

Attendance

Students are expected to attend all meetings of the classes in which they are enrolled. Students are graded on intellectual effort and performance rather than attendance, but absences or tardiness from meetings may result in a lower grade.
As students in a graduate class, hopefully you realize that it's rude to miss appointments without sending an apology, preferably ahead of time. Please extend the same courtesy to your professor and your classmates for this course.

Change of Schedule

A student dropping a course (but not withdrawing from the university) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exists in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability

Support Services, located in the Clark Student Center, Room 168, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to Disability Support Services.

Notice

Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructors.

Schedule

BIOL 5553/GEOS 5553 Electron Microscopy and Analysis

Wk	Start Date	Topic	Student groupings	Instructor(s)
1	1/19/2023	Introduction	All	Scales & Price
	1/20/2023		No lab	
2	1/26/2023	Instrument physics	All	Price
	1/27/2023	Sample prep I	All	Price
3	2/2/2023	SEM applications	All	Scales
	2/3/2023	Sample prep II	All	Scales
4	2/9/2023	Basics startup/shutdown	Group slot A	Price
	2/10/2023	Basics startup/shutdown	Group slots B-C	Price
5	2/16/2023	Basic imaging	Group slot A	Scales/Price
	2/17/2023	Basic imaging	Group slots B-C	Scales/Price
6	2/23/2023	Flight test	Individual	Price
	2/24/2023	Flight test	Individual	Price
7	3/2/2023	Flight test	Individual	Scales
	3/3/2023	Flight test	Individual	Scales
8	3/9/2023	Imaging techniques I	Groups slot A	Scales/Price
	3/10/2023	Imaging techniques I	Group slots B-C	Scales/Price
B	3/16/2023		Spring Break	
	3/17/2023			
9	3/23/2023	Imaging techniques II	Group slot A	Scales/Price
	3/24/2023	Imaging techniques II	Group slots B-C	Scales/Price
10	3/30/2023	X-ray analysis	Group slot A	Price
	3/31/2023	X-ray analysis	Group slots B-C	Price
B	4/6/2023		Easter Break	
	4/7/2023			
11	4/13/2023	STEM-holder	Group slot A	Scales
	4/14/2023	STEM-holder	Group slots B-C	Scales
12	4/20/2023	Project interaction	Group slot A	Price
	4/21/2023	Project interaction	Group slots B-C	Price
13	4/26/2023	Project interaction	Group slot A	Scales
	4/28/2023	Project interaction	Group slots B-C	Scales
14	5/4/2023	Oral project reports	All	Scales & Price
	5/5/2023	Oral project reports	All	Scales & Price