



## Course Syllabus: Electron Microscopy & Analysis

McCoy College of Science, Mathematics, and Engineering

BIOL 5553 ♦ GEOS 5553 | Spring 2021

### Contact Information

Instructors: Dr. Jon Scales and Dr. Jonathan Price

Office: Bolin 218E (Scales) and 102 (Price)

Office hours: Scales: 8:30-10:30 MW & 2-4 R

Price: 9:00-11:00 M & 10:00-11:00 WF or by appointment

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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. Please respect pandemic protocols when assembled (face coverings, distancing, hygiene, and health monitoring).

### 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:

- 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 8am to 5pm), 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/](https://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 2020-21](#) .

### **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.

### **Writing Center**

Begin drafting papers as early as possible and take advantage of the MSU Writing Center, located off the 2nd floor atrium of Prothro-Yeager. Tutoring is available Monday through Thursday from 9am to 4pm; you can also find a tutor at the satellite location in Moffett Library Honors Lounge, Sunday and Thursday from 6pm to 9pm. Writing tutors will not edit your papers for you, but they will provide support and feedback at every stage of the writing process, from brainstorming to drafting, revising to proofreading.

### **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 graduate students, 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 instructor.

### **Continuing in the spring...**

This course has been planned as a fully face-to-face course for Spring 2021. The class will meet in its regularly scheduled room but will utilize social distancing. You should regularly check D2L and the email hosted via D2L for important course information.

In the event of increased incidence and risk of COVID-19 that results in the university moving back to a shelter-in-place mode, the course instruction will transition to fully online. More instructions will be given at that time.

**Schedule****BIOL 5553/GEOS 5553 Electron Microscopy and Analysis**

Wk	Start Date	Topic	Student groupings	Instructor(s)
1	1/14/2021	Introduction	All	Scales & Price
	1/15/2021		No lab	
2	1/21/2021	Instrument physics	All	Price
	1/22/2021	Sample prep I	All	Price
3	1/28/2021	SEM applications	All	Scales
	1/29/2021	Sample prep II	All	Scales
4	2/4/2021	Basics Startup/shutdown	Group slot 1	Scales
	2/5/2021	Basics Startup/shutdown	Groups slot 2-4	Scales
5	2/11/2021	Basic imaging	Group slot 1	Price
	2/12/2021	Basic imaging	Groups slot 2-4	Price
6	2/18/2021	Flight test	Individual	Price
	2/19/2021	Flight test	Individual	Price
7	2/25/2021	Flight test	Individual	Scales
	2/26/2021	Flight test	Individual	Scales
8	3/4/2021	Imaging techniques I	Group slot 1	Scales
	3/5/2021	Imaging techniques I	Groups slot 2-4	Scales
9	3/11/2021	Imaging techniques II	Group slot 1	Price
	3/12/2021	Imaging techniques II	Groups slot 2-4	Price
10	3/18/2021	Imaging techniques III	Group slot 1	Scales
	3/19/2021	Imaging techniques III	Groups slot 2-4	Scales
11	3/25/2021	X-ray analysis	Group slot 1	Price
	3/26/2021	X-ray analysis	Groups slot 2-4	Price
12	4/1/2021		Easter Break	
	4/2/2021			
13	4/8/2021	Project interaction	Group slot 1	Scales
	4/9/2021	Project interaction	Groups slot 2-4	Scales
14	4/15/2021	Project interaction	Group slot 1	Price
	4/16/2021	Project interaction	Groups slot 2-4	Price
15	4/22/2021	Oral project reports	All	Scales & Price
	4/23/2021	Oral project reports	All	Scales & Price
F	4/29/2021		Finals week	
	4/30/2021			