



## **Course Syllabus: Geochemistry [GX]**

McCoy College of Science, Mathematics, and Engineering

GEOS 5243 -201 | Spring 2024

### **Contact Information**

Instructor: Dr. Jonathan D. Price

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### **Course Objectives**

- Familiarize students with the fundamentals of magmatic and aqueous mass transport
- Evaluate and explore thermodynamics and kinetic theory as applied to geosystems large and small
- Provide tools for examining geochemical reactions
- Examine the basics of stable and radioactive isotopes
- Introduce useful attributes to be applied to research
- Provide numerous opportunities to engage with data and critically evaluate merits and weaknesses
- Discuss and evaluate scientific literature

### **Textbook & Instructional Materials**

White, Geochemistry 2E ISBN: 1119438055

### **Room**

Bolin 115 is both the meeting room and workroom for the course. Access by valid student ID card.

### **Student Handbook**

Refer to: [Student Handbook](#)

### **Academic Misconduct Policy & Procedures**

Academic Dishonesty: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct.

## Grading

Table 1: Assignment weights

Assignments	Percent
Project (lab/written/oral)	20%
Participation and interaction within discussion and problem solving	11%
Exam 1	15%
Exam 2	17%
Lab assignments	30%
Field Trip	7%

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

I will issue specific assignments in class and lab, and try to replicate these on D2L. Completed work may be remitted to me in person, through my office mailbox (outside P207), or by electronic submission.

## Exams

Exam 1 will cover the first half of the semester, and may include an in-class and take-home portions. Exam 2 will cover the entire semester in a similar fashion

## Projects Required

The class will engage in hands-on geochemical research on individually assigned problems. The class will progress project work throughout the semester, culminating in a written report covering the acquired data.

All submissions need to follow the format for an M.S. Thesis in the Kimbell School of Geosciences (consider this good practice).

## Colloquium

The Kimbell School of Geosciences hosts up to three speakers each semester as part of our Geoscience and Environmental Science Colloquium. This is an opportunity to learn about the broader science from experienced practitioners. As students in this class, your attendance is mandatory. The schedule is at <https://msutexas.edu/academics/scienceandmath/geosciences/colloquium>

## Late Work

Late submitted assignments 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 my grading. They are disconcerting to me, because they require my reexamination of a previously graded assignment.

Needless to say, this will not be an issue if you complete your assignments well ahead of the due date.

### **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**

This is a graduate –level class. At this point, you undoubtedly realize the importance of interactions with your professor and colleagues in the classroom and lab settings. You need to be both present and fully engaged in each meeting. In the rare case you are missing class, you should contact the professor and the other members of the class to inform us of your absence prior to the meeting.

***Note: you are still responsible for missed assignments.***

### **Learning environment**

Dr. Price is committed to providing an equitable and inclusive forum for learning and endeavors to keep this class an open, supporting, and safe space for all students. He is available and willing to address your issues and concerns. He also wants you to be aware of the following supporting structures that assist in this environment.

To help achieve the vision of "STEM leadership--Diverse scholarship," the McCoy College of Science, Mathematics, and Engineering (MCOSME) students benefit from the numerous offices and student services available on the MSU campus. Links to resources and information are here:

[https://msutexas.edu/academics/scienceandmath/student\\_resources.php](https://msutexas.edu/academics/scienceandmath/student_resources.php).

### **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](#).

## University-Wide Policies: Campus Carry

Refer to: [Campus Carry Rules and Policies](#)

## Notice

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

## Course Schedule

GEOS 5234    Geochemistry			
Wk	Day	Date	Topic
1	T	1/16	01 Intro-orientation
1	W	1/17	No lab
1	R	1/18	02 Earth Overview
2	T	1/23	03-Elements and ions
2	W	1/24	Reservoirs Lab
2	R	1/25	04-Minerals and rocks
3	T	1/30	05-Rocks and minerals
3	W	1/31	Mineral structure
3	R	2/1	06-Thermodynamic fundamentals
4	T	2/6	07-Thermodynamic fundamentals
4	W	2/7	Compositional analysis I
4	R	2/8	Discussion
5	T	2/13	08-Solutions and multicomponent
5	W	2/14	Compositional analysis II
5	R	2/15	09-Solutions and multicomponent
6	T	2/20	Discussion
6	W	2/21	Compositional analysis III
6	R	2/22	10-Graphical TDX
7	T	2/27	11-Graphical TDX
7	W	2/28	Phase diagrams I
7	R	2/29	Midterm issued
8	T	3/5	Midterm discussion

Wk	Day	Date	Topic
8	W	3/6	Phase diagrams II
8	R	3/7	Midterm due
Break			
9	T	3/19	12-Reaction Kinetics
9	W	3/20	Field trip prep
9	R	3/21	13-Diffusion
FT	S	3/23	Field Trip
10	T	3/26	Discussion
10	W	3/27	Kinetics lab
Short Break			
11	T	4/2	14-Experimental Geochemistry
11	W	4/3	Computational geochem I
11	R	4/4	15-Experimental Geochemistry
12	T	4/9	16-Aqueous (Acid-base)
12	W	4/10	Computational geochem II
12	R	4/11	17- Aqueous (diss and precip)
13	T	4/16	Discussion
13	W	4/17	Project I
13	R	4/18	18- Radioisotopes
14	T	4/23	GSA-sectional
14	W	4/24	Project II
14	R	4/25	19-Stable isotopes
15	T	4/30	Discussion
15	W	5/1	Presentations
15	R	5/2	Presentations - Final Released
FT	R	5/9	Final due