

MINERALOGY

GEOL302-001 - Fall 2025

Syllabus

Course INFO

Lecture type: on Campus Horizon Hall 5001 – Optical Mineralogy classes will take place in Exploratory Hall (dates TBA).

Lecture time: Tuesday and Thursday 10:30 to 11:45 AM

Lecturer: Dr. G. Mattiotti, PhD; **E-mail:** gkysar@gmu.edu

Laboratory Instructor: Prof. Angela V. Bee **E-mail:** abee@gmu.edu

Office Hours: Tuesday, 3:30 to 5:30 PM, please make an appointment during that time. Additional times can be available upon request.

Instructional Material

- This is a course with a significant amount of material presented in class; a textbook is useful, but no textbook can substitute for effective studying habits.
- The textbook is: **Introduction to Mineralogy, 4e** by William Nesse, Graham Baird. This textbook is highly recommended. You can buy a used copy, you can share a copy, rent it, check it out from the library.
- Pdfs of the lecture-course notes are available to the students through Canvas°. Notes for each lecture are available the day before class.

**Lecture PowerPoint slides, notes, tests, outlines, overall, any course materials posted on Canvas are protected by U.S. copyright law and/or are intellectual property of the course instructor. You may make copies of course materials for your own use but you cannot repost on the web or distribute them in any format outside the class.*

Course Description/Overview

This is an introductory level course in Mineralogy. This course is designed to provide students with a foundational understanding of minerals, including their chemical composition, crystal structure, physical properties, and how they form and are identified. The course enables students to identify common minerals, understand the processes that form rocks, and apply these principles to understand Earth and other planetary systems. This knowledge serves as a fundamental building block for all other geoscience discipline.

The course is composed of a 3-credit lecture and a 1 credit laboratory. This syllabus covers the Lecture. See the Laboratory Syllabus for info regarding the lab.

Prerequisites

Students enrolled in Mineralogy must have successfully taken GEOL 101 (introductory physical geology) with laboratory (GEOL 103) or equivalent college level class, and an introductory chemistry class at AP or college level.

Course Learning Outcomes

Students who apply themselves to the study of the course material will gain the foundation requirement of core knowledge of Natural sciences for a better understanding of how science approaches the knowledge of our world.

- * Skills in identifying and classifying minerals in hand-samples
- * Ability to use the petrographic microscope and other tools for mineral identification in thin section.
- * Ability to observe, document concisely and correctly, and interpret mineralogical data
- * Comprehension of the significance of mineral assemblages and rock associations
- * Understanding reactions and processes operating in minerals and mineral associations

Course Assessment (a.k.a. grading schema and weights)

GEOL 302 grade is based on the combination of three Lecture exams and the laboratory final score.

There is no final exam, however, exam three is taken on the day of the final exams as scheduled by the registrar and will be limited to 75 minutes.

Missing any of the exams results in a score of zero for the missed exam. Make-ups of exams without proof of extenuating circumstances carry a 20% penalty and must be arranged within a week of the exam-scheduled date.

Homework consists of a set of assignments designed to further the understanding of the lecture topics; homework assignments can be repeated twice to achieve a better score. Homework has deadlines: late submissions on assignments carry a penalty of 20%.

The final grade for GEOL 102 is calculated as follows, with no exceptions:
 $24\% \text{ (1st exam)} + 22\% \text{ (2nd exam)} + 24\% \text{ (3rd exam)} + 30\% \text{ (Laboratory)} = 100\%$.

For information about the laboratory see the Laboratory Syllabus

Grading scale: Final grade is based on the following scale, with no exceptions:

A+ $\geq 99\%$ and above; A 94% to $<99\%$ A- $\geq 90\%$ to $<94\%$

B+ $\geq 87\%$ to $<90\%$; B 83% to $<87\%$ B- $\geq 80\%$ to $<83\%$

C+ $\geq 75\%$ to $<80\%$ C $\geq 70\%$ to $<75\%$; C- $\geq 65\%$ to $<70\%$

D $\geq 50\%$ to $<65\%$.

F $<50\%$

- Final score rounds up to next integer at 0.5 or higher (e.g., 79.74% rounds up to 80%)
- Cheating/cheating attempts in any form during an exam result in a score of 0 (zero) for that exam.
- No individualized Extra-credit available under any circumstance. This is non-negotiable.
- No score curved unless the end-of-semester total course score MEDIAN (based on all lecture exams and homework scores) falls below 80%.

GEOL 302 - Course Calendar*

Date	Topic	
Aug. 26	Part 1: Crystallography and Crystal Chemistry	Intro to minerals and crystallography
Aug. 28		Symmetry, crystal faces and forms
Sept. 2		Crystal forms and the six crystal systems
Sept. 4		Crystal chemistry 1
Sept. 9		Crystal chemistry 2
Sept. 11		Crystalline structures
Sept. 16		Mineral growth part 1
Sept. 18		Mineral growth part 2: binary eutectic and solid solutions
Sept. 23		Wrap up part 1
Sept. 25	EXAM 1	
Sept. 30	Part 2: Mineral growth, properties and analytical techniques	Mineral growth: nucleation, growth, defects and twinning
Oct. 2		Physical properties of minerals
Oct. 7		Optical mineralogy 1
Oct. 9		Optical mineralogy 2
Oct. 14		Analytical Techniques I: Crystallography
Oct. 16		Analytical Techniques II: Chemical Analysis
Oct. 21		Normative mineralogy
Oct. 23		Wrap up part 2
Oct. 28	EXAM 2	
Oct. 30	Part 3: Mineral Descriptions, occurrence and paragenesis	Fractional crystallization sequence – Orthosilicates
Nov. 4		NO CLASS
Nov. 6		Chain silicates
Nov. 11		Sheet silicates
Nov. 13		Framework silicates
Nov. 18		Carbonates, Sulfates and Phosphates
Nov. 20		Evaporites, Oxides and Hydroxides
Nov. 25- 30		Thanksgiving break
Dec. 2		Halides - Sulfides and Related Minerals; Native Elements
Dec. 4		Wrap up part 3
Dec. 16	EXAM 3	

* Instructor reserves the right to change lecture topic and order to fit class needs and learning objectives.

General Course Policies

By staying enrolled on this course, you agree with the following course policies:

- Attendance to class: It is not mandatory, but it is the best use of your time if you want to do well on the course.
- Communications: email is the official way of communicating with students. Any email from me will come from blackboard directly or from gkysar@gmu.edu. In accordance with protection of privacy best practices, I will not respond to emails sent from non-GMU official accounts. It is your responsibility to make sure that your GMU email is set up properly and to check your email regularly. Your email must have a subject because emails without a subject go directly to spam mail.
- Class etiquette: everybody in the class has the right to a welcoming and safe learning environment. Mute your cell phone; be respectful of everybody in your class community. Disruptive behavior will result in disciplinary action.
- Course Assessment: see Course requirement and grading section above apply with no exceptions.
- Use of AI: this course has no written submission of any sort or length that might benefit from the use of AI. Use of AI or any digitally supported resources during exams is prohibited.
- Extenuating circumstances might prevent you from taking an exam. If such circumstances can be justified, a make-up session will be arranged. Make-up can be arranged before the exam (for justifiable reasons, including religious holidays). An unjustified absence/failure to take an exam or submit homework on time carries a penalty of 20% on the score.

GMU POLICIES that Apply to this and any course at GMU:

In accordance with Catalog Policy AP.2.5, the following apply to this Course:

• Academic Standards

Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community that values integrity and produces graduates who carry this commitment forward into professional practice. As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:

- **Honesty**: Providing accurate information in all academic endeavors, including communications, assignments, and examinations.
- **Acknowledgement**: Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, coauthored pieces, and project reports.
- **Uniqueness of Work**: Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.

Violations of these standards—including but not limited to plagiarism, fabrication, and cheating—are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and resolving violations is outlined in the [university's procedures](#).

Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

Student responsibility: *Students are responsible for understanding how these general expectations regarding academic standards apply to each course, assignment, or exam they participate in; students should ask their instructor for clarification on any aspect that is not clear to them.* [Link to the GMU Honor Code document](#)

- **Accommodations for Students with Disabilities**

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit <https://ds.gmu.edu/> for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu; phone: (703) 993-2474.

Student responsibility: *Students are responsible for registering with Disability Services and communicating about their approved accommodations with their instructor in advance of any relevant class meeting, assignment, or exam.*

- **FERPA and Use of GMU Email Addresses for Course Communication**

The [Family Educational Rights and Privacy Act \(FERPA\)](#) governs the disclosure of [education records for eligible students](#) and is an essential aspect of any course. Students must use their GMU email account to receive important University information, including communications related to this class. Instructors will not respond to messages sent from or send messages regarding course content to a non-GMU email address.

Student responsibility: *Students are responsible for checking their GMU email regularly for course-related information, and/or ensuring that GMU email messages are forwarded to an account they do check.*

- **Title IX Resources and Required Reporting**

As part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environments for all members of the University community, the University does not discriminate based on sex or gender in any of its education or employment programs and activities. Accordingly, all non-confidential employees, including your faculty member, have a legal requirement to report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). For more information about non-confidential employees, resources, and Prohibited Conduct, please see [University Policy 1202: Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence](#). Questions regarding Title IX can be directed to the Title IX Coordinator via email to TitleIX@gmu.edu, by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

Student opportunity: *If you prefer to speak to someone confidentially, please contact one of Mason's confidential employees in [Student Support and Advocacy Center](#) (703-380-1434) or [Counseling and Psychological Services](#) (703-993-2380), [Student Health Services \(SHS\)](#), (703-993- 2831) and/or the [Office of the University Ombudsperson](#). (703) 993-6596.*

- **Statement on Diversity and Inclusion:** Faculty, staff and students in this course welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and disability.

Student opportunity: *If you need to speak to somebody regarding Diversity and inclusion, contact [office of access, compliance, and community](#) (703-993-8730). For religious holidays, see the calendar under this link: [religious holidays](#) and inform the instructor at the beginning of the semester to receive a waiver for penalties on make-up.*