

Course Change Request

New Course Proposal

Date Submitted: 01/25/22 10:34 pm

Viewing: **GEOL 603 : Geochemistry**

Last edit: 02/17/22 11:17 am

Changes proposed by: ggilleau

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2022

Subject Code: GEOL - Geology

Course Number: 603

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Geochemistry

Banner Title: Geochemistry

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May be only taken once for credit, limited to 3 attempts (N3)

Max Allowable Credits:

In Workflow

- 1. AOES Chair
- 2. SC Curriculum Committee
- 3. SC Associate Dean
- 4. Assoc Provost- Graduate
- 5. Registrar-Courses
- 6. Banner

Approval Path

- 1. 01/31/22 2:27 pm
Mark Uhen
(muhen): Approved for AOES Chair

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Default Grade Mode: Graduate Regular

Recommended Prerequisite(s):

An undergraduate degree in physical or natural sciences, including at least one semester of chemistry, introductory physical geology, and preferably, mineralogy, or permission of instructor.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(Course/Test Code	Min Grade/Score	Academic Level)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

Includes stable isotope, crystal, water, and organic geochemistry; geochronology; and geochemistry of rocks.

Justification:

What: Creating a new course

Why: Adding a graduate version of our existing undergraduate course GEOL 403 (Geochemistry) to

accommodate our new faculty hire in geochemistry and our new proposed PhD program in Geology and Earth Science.

Does this course cover material which crosses into another department? Yes

Impacted Departments:

Department
CHEM - Chemistry & Biochemistry
ESP - Environmental Science & Policy

Learning Outcomes:

To understand the basic principles of geochemistry and how chemistry can be used to analyze natural processes on Earth.

Attach Syllabus

[Geochem_syllabus.pdf](#)

Additional Attachments

Staffing:

New geochemistry hire in AOES

Relationship to Existing Programs:

Great course for ESS MS students and BAM students entering the ESS MS program as undergraduates. Also important for new PhD program in Geology and Earth Science. Also of interest to students in CHEM and ESP.

Relationship to Existing Courses:

Cross-list of undergraduate GEOL 403.

Additional Comments:

Reviewer Comments

GEOL 603: GEOCHEMISTRY

Fall 2021 Syllabus

Professor: TBD based on AOES's new hire in geochemistry

Lecture Meeting Time: Wednesdays 9:00 to 11:40am

Lecture Meeting Place: Exploratory Hall Room 1005

Course Textbook: "Geochemistry" by William M. White; "Using Geochemical Data: Evaluation, Presentation, Interpretation" by High R. Rollinson

*Additional material from journal articles in peer-reviewed publications and lecture notes will be distributed in class. Lecture readings will be posted on Blackboard.

Course Description:

The course will begin with a discussion of the basic principles of thermodynamics and phase equilibrium. We will explore elements of aqueous geochemistry linked to redox, carbonates, mineral-fluid, and fluid-gas interactions. The role of geochemistry in understanding solid Earth processes would be studied through trace element and radiogenic isotope geochemistry. We will conclude with exploring elements of stable isotope geochemistry and how this is tied to climate research.

Learning Outcomes:

To understand the basic principles of geochemistry and how chemistry can be used to analyze natural processes on Earth.

Grading Scheme:

Your final course grade will consist of:

10% each: Mid-term exams (take home)

10% each: Homeworks (6), only the 4 best homework grades will be counted

20%: Final exam (take home)

20%: Final presentation (graduate students only)

Grade scale:

A+ = 97 - 100%, A = 94 - 97%, A- = 90 - 94%, B+ = 87 - 90%, B = 84 - 87%, B- = 80

- 84%, C = 70 - 80%, F = 0 - 70%

Structure of the Lecture:

09:00 to 10:15am: Lecture

10:15 to 10:30am: Break

10:30 to 11:40am: Lecture and lab demonstrations

Lecture Attendance: It is important to attend all lectures. Students are responsible for all material covered in lecture. At times, material may appear in class that is not covered in the assigned text. You must be on time for lectures; the announcements made at the beginning of class often are vital.

Course Policies:

A. Re-grading Policy

Requests for re-grading must be in writing and handed in no later than one week after graded exams or assignments are returned.

B. Make-up Policy

Make-ups will not be given, unless for exceptional circumstances with a legitimate excuse (e.g., signed doctor's excuse). Make-up exams will be all essay. Otherwise, any missed exams will be scored a zero.

Make-up exams must be taken within one week of the missed exam.

C. Late Policy

Assignments are due on the posted deadline.

Semester Schedule:

Week	Topic Overview
1	Introduction, Thermodynamic Principles
2	Free Energy and Chemical Equilibrium
3	Phase Equilibria of Simple Systems*
4	Equilibrium Constants, Activity of Dissolved Species, Redox*
5	Aqueous Geochemistry: Acid/Base, Carbonates*
6	Aqueous Geochemistry: Mineral-Fluid Equilibria, Gases**
7	Trace Element Geochemistry: Theory
8	Trace Element Geochemistry: Applications*
9	Radiogenic Isotope Geochemistry: Theory
10	Radiogenic Isotope Geochemistry: Applications**
11	Solid Earth, Oceans*
12	Stable Isotope Geochemistry: Theory
13	Stable Isotope Geochemistry: Applications*
14	Geochemistry and Climate***

*Homework assignment

**Take-home exams

***Final presentations

Academic Integrity

The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. If you have any doubts about what constitutes plagiarism, please see me.

Disability Accommodations

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit

http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474

Privacy

Students must use their Mason email account to receive important University information, including communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address.