Geochemistry

CoSM Class Syllabus / Policy
2023 / Fall Semester
Geochemistry w/ lab

GEOL 4320.500 and GEOL 4020.500
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Office Hours: M: 1:00 p.m. – 4:00 p.m.; T: 10:00 a.m. – 12:00 p.m.; or by appointment
This is an online course and office hours will also be offered electronically.

Class Meeting Time

Online via Brightspace by D2L. Please feel free to call, email, or stop by any time to ask questions, discuss any problems you may be having with the material or to help facilitate further understanding. If these hours conflict with your schedule, please call or email to make an appointment.

Course Description

Geochemistry (GEOL 4320) – Applications of chemical laws and methods to the solution of geological problems. Over the past several decades environmental issues and problems have become an important area of study, occupying scientists from many disciplines. Geochemistry is a course that helps to gain understanding of the geochemical reactions that take place at or near the earth’s surface and the resulting environmental conditions. This course utilizes fundamental chemical concepts applied to reactions in aqueous solution.

Student Learning Outcomes

The student is expected to understand and apply the following concepts of geochemistry:

1. Understand the basic principles of chemical bonding and types of chemical reactions.
2. Apply the basic laws of thermodynamics and kinetics to chemical reactions.
3. Acid – Base Reactions and the buffering capacities of natural waters.
4. Carbon geochemistry and the formation of fossil fuels.
5. Geochemistry of the atmosphere, continent and marine environments.

Text and Materials

Lecture Text: Principles of Environmental Geochemistry* G. Nelson Eby, 2004

*This text was reprinted by Waveland Press in 2016. You may be able to purchase or rent used copies through various online booksellers. More information on the text can be found here.
Course Requirements

Geochemistry meets for a minimum of 25 lecture contact hours during the semester, including the final exam. The lecture and laboratory must be completed concurrently. The grades for lecture and laboratory are combined into one single grade for the course. Students are required to complete assignments based on selected readings, along with periodic quizzes and exams over the course content. Successful completion of all elements for the course (both lecture and laboratory) requires at least six hours of additional out-of-class work each week.

The Federal Definition of the Credit Hour - a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours out of class student work each week for approximately fifteen weeks for one semester of credit.

Course Calendar: Background information from these topics will be posted on d2l as we progress through the semester. I will be pulling information from resources other than the text, so please be aware that the answer to every question is not always in your textbook. Please read the assigned material and text chapter to facilitate your understanding of the material.

<table>
<thead>
<tr>
<th>Date</th>
<th>Proposed Topics</th>
<th>Assigned Reading Chapter</th>
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<tbody>
<tr>
<td>Aug 26 – Sept 3</td>
<td>Module 1: Introduction - What is Geochemistry?</td>
<td>1</td>
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<tr>
<td>Sept 2 – Sept 10</td>
<td>Module 2: Review of Basic Chemistry Principles</td>
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<tr>
<td>Sept 9 – 17</td>
<td>Module 3: Equilibrium Thermodynamics and Kinetics</td>
<td>3</td>
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<tr>
<td>Sept 16 – 24</td>
<td>Module 4: Aqueous Complexes, Acid-Base Equilibria</td>
<td>4</td>
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<tr>
<td>Sept 23 – Oct 1</td>
<td>Module 5: Buffers, Mineral-Water Reactions</td>
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<tr>
<td>Sept 30 – Oct 8</td>
<td>Module 6: Oxidation-Reduction Reactions</td>
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<tr>
<td>Oct 7 – 15</td>
<td>Module 7: Introduction to Carbon Chemistry</td>
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<td>Oct 14 – 22</td>
<td>Module 8: The Weathering Environment and Soils</td>
<td>8</td>
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<tr>
<td>Oct 21 – 29</td>
<td>Module 9: Carbon Chemistry and Fossil Fuels</td>
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<tr>
<td>Oct 26 – 29</td>
<td>Midterm Exam (Modules 1-8)</td>
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<td>Oct 28</td>
<td>Video Presentation Module Opens</td>
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<td>Oct 28 – Nov 5</td>
<td>Module 10: Environmental Mineralogy</td>
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<td>Nov 4 – Nov 12</td>
<td>Module 11: Overview of the Atmospheric Environment</td>
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<tr>
<td>Nov 11 – 19</td>
<td>Module 12: Overview of the Continental Environment</td>
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<tr>
<td>Nov 19</td>
<td>Video Presentation Due</td>
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<td>Nov 20 – 24</td>
<td>Thanksgiving Holidays</td>
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<td>Nov 25 – Dec 3</td>
<td>Module 13: Seawater Composition</td>
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<tr>
<td>Nov 25 – Dec 10</td>
<td>Video Presentation Discussions</td>
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<td>Dec 2 – Dec 10</td>
<td>Module 14: Marine Sediments and Estuaries</td>
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<td>Dec 11-13</td>
<td>Final Exam</td>
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Grading Policy: Two major tests of 100 points each will be given during the semester. The midterm and final exams are essay exams; the midterm exam will open Thursday, October 26 and is due Sunday, October 29 at 11:30 p.m. The final exam will open Monday, December 11 and is due Wednesday, December 13 at 11:30 p.m. All tests are comprehensive and basic understanding of chemistry will be
emphasized. Regular attendance in online meetings and participation in lecture readings and laboratory assignments are necessary for full understanding of the course material.

You will be asked to work individually or in small groups (2 person) to create a presentation with the topic of "New Applications for Geochemical Data". These presentations will be prepared using video presentation software such as Zoom or other technology, and are due Sunday, November 19 at 11:30 p.m. The presentations will be posted in our course materials and available for viewing during the final week of the course, November 25 through December 10. You will be responsible for monitoring the discussion thread for your presentation for comments and questions, and will also need to view and comment on the presentations of your classmates. The presentation is worth 40 points, your participation on the discussion thread for your presentation is worth 20 points, and your participation on your classmate’s discussion thread is worth 20 points.

Weekly discussion posts will be assigned to further explore the topic we are studying. Each discussion post is worth 5 points, with a total of 70 points available for the semester.

Laboratory time will be your chance to gain practical experience interpreting and manipulating various geochemical data sets. Homework and laboratory will be an important component of your final grade; each module (Modules 1-14) has a laboratory assignment worth 25 points, for a total of 350 points. Laboratory work and homework assignments are embedded in each lecture module and will be available on Saturdays at 6:00 a.m. and are due at the same times as the lecture material, the following Sunday at 11:30 p.m. The Dropbox feature on the d2l platform will be utilized, so no late work will be accepted. See the lab and homework schedule for more detail.

There is a possible 700 points (350 points from lecture and 350 points from laboratory activities) available for this class. These points will come from:

**Lecture Points:**
- Midterm Exam 100 points
- Final Exam 100 points
- Video Presentation 40 points
- Video Participation 40 points
- Module Discussions 70 points

Lecture Total 350 points

**Laboratory Points:**
- Laboratory Activities
- 14 Modules @ 25 points each 350 points

Total Points Available 700 points

Grades from the lecture and lab will be combined; your grade will be based on the ratio of the number of points you earn divided by 700.

Grade Scale: 90 – 100 = A, 80 – 89 = B, 70 – 79 = C, 60 – 69 = D, < 60 = F
Geochemistry

All written work such as homework, lab reports, essay answers to test questions, and any other work submitted will be processed through TurnItIn, a verification tool administered through the d2l platform, to check for plagiarism and similarity of content. Your answers must be in your own words and if you are using research material as the basis for your answer, you must cite your sources.

**Laboratory Schedule**

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<thead>
<tr>
<th>Date</th>
<th>Assignment</th>
<th>Points</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Aug 26</td>
<td>Lab 1 – Journal Article Summary and Discussion</td>
<td>25</td>
<td>Sept 3</td>
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<tr>
<td>Sept 2</td>
<td>Lab 2 – Review of Basic Chemical Principles</td>
<td>25</td>
<td>Sept 10</td>
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<td>Sept 9</td>
<td>Lab 3 – Equilibrium/Kinetics</td>
<td>25</td>
<td>Sept 17</td>
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<td>Sept 16</td>
<td>Lab 4 – Aqueous Complexes</td>
<td>25</td>
<td>Sept 24</td>
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<tr>
<td>Sept 23</td>
<td>Lab 5 – Buffers, Mineral-Water Reactions</td>
<td>25</td>
<td>Oct 1</td>
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<tr>
<td>Sept 30</td>
<td>Lab 6 – Oxidation/Reduction Reactions</td>
<td>25</td>
<td>Oct 8</td>
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<td>Oct 7</td>
<td>Lab 7 – Carbon Cycle</td>
<td>25</td>
<td>Oct 15</td>
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<tr>
<td>Oct 14</td>
<td>Lab 8 – Fossil Fuels</td>
<td>25</td>
<td>Oct 22</td>
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<td>Oct 21</td>
<td>Lab 9 – Anthropogenic Carbon</td>
<td>25</td>
<td>Oct 29</td>
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<tr>
<td>Oct 28</td>
<td>Lab 10 – Environmental Mineralogy</td>
<td>25</td>
<td>Nov 5</td>
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<tr>
<td>Nov 4</td>
<td>Lab 11 – Air Chemistry</td>
<td>25</td>
<td>Nov 12</td>
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<tr>
<td>Nov 11</td>
<td>Lab 12 – Spring Chemistry</td>
<td>25</td>
<td>Nov 19</td>
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<tr>
<td><strong>Nov 20 – 24</strong></td>
<td>Thanksgiving – Enjoy!</td>
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<td></td>
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<tr>
<td>Nov 25</td>
<td>Lab 13 – Ocean Chemistry</td>
<td>25</td>
<td>Dec 3</td>
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<tr>
<td>Dec 2</td>
<td>Lab 14 – Journal Article Summary and Discussion</td>
<td>25</td>
<td>Dec 10</td>
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**Attendance Policy**

Attendance in the form of online participation is mandatory for understanding the material.

**Research Opportunities**

During the fall and spring semester, our department encourages individual and group directed research projects for undergraduate and graduate students. These projects can be presented in departmental meetings, the Undergraduate Research Conference at SFA, regional, state and national academic meetings such as Texas Academy of Science, AAPG and GSA. If you are interested, please let me know.

**Acceptable Student Behavior**

Classroom behavior (in-person or online) should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable, disruptive, or distracting behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic, or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend or participate in class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.
**Academic Integrity (SFA Policy 4.1):**

The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

**Penalties for Academic Dishonesty**

Penalties may include, but are not limited to, reprimand, no credit for the assignment or exam, resubmission of the work, make-up exam, failure of the course, or expulsion from the university.

**Withheld Grades (SFA Policy 5.5):**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic unit head, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work by the deadline set by the instructor of record, not to exceed one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F, except as allowed through policy [i.e., Military Service Activation (6.14)]. If students register for the same course in future semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.
If a student has been found guilty of academic dishonesty, a grade of “WP” or “WH” may be changed to “WF” at the discretion of the faculty member. In the case of a grade change to “WF”, the course will not count towards the six-course drop limit since the student is incurring an academic penalty.

Please read the complete policy [here](#).

**Students with Disabilities**

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to [this website](#).

**Student Wellness and Well-Being**

SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns and seeking help, SFA provides a variety of resources to support student’s mental health and wellness. Many of these resources are free, and all of them are confidential.

**On-campus Resources:**

**The Dean of Students Office** (Rusk Building, 3rd floor lobby)
[www.sfasu.edu/deanofstudents](http://www.sfasu.edu/deanofstudents)
936.468.7249
dos@sfasu.edu

SFASU Human Services Counseling Clinic
[www.sfasu.edu/humanservices/139.asp](http://www.sfasu.edu/humanservices/139.asp)
Human Services Room 202
936-468-1041

**The Health and Wellness Hub** “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
Geochemistry

- Alcohol and Other Drug Education
  www.sfasu.edu/thehub
  936-468-4008
  thehub@sfasu.edu

**Crisis Resources:**
Burke 24-hour crisis line 1(800) 392-8343
National Suicide Crisis Prevention: 9-8-8
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741