**GEO 416S: EARTH AND PLANETARY PROCESSES THROUGH TIME**

**Fall 2023 Syllabus**

**Instructors:** Matt Malkowski and Kyle Spikes  
**E-mail:** malkowski@jsg.utexas.edu; kyle.spikes@jsg.utexas.edu  
**Offices:** Malkowski EPS 3.128; Spikes JGB 4.220AA  
**Phones:** Malkowski 512–471–5172; Spikes 512–471–7674  
**Office Hours:** TBD  
**Lectures:** TTH 2:00–3:20 pm, JGB 2.218 (In person only)  
**Laboratory:** MW 8:00 am–10:00 am, EPS 2.136 (In person only)  
  - TTH 12:00 pm–2:00 pm, EPS 2.136 (In person only)  
  - MW 6:00 pm–8:00 pm, EPS 2.136 (In person only)  
  - TTH 5:00 pm–7:00 pm, EPS 2.136 (In person only)  
**TAs:** Madison Preece (Head TA), and others (TBD)  
**Class Structure:**  
4 Modules  
7 hours of contact time per week:  
  - 3 hours of lecture per week  
  - 4 hours of breakout section to work on module concepts  
  - 2 field trips  
Lectures will be only in person. No videos will be provided for general use. Exceptions for illnesses will be considered. Laboratory sessions must be attended in person.

**Description:** In this course, students will learn about modern physical, chemical, and biological processes through the prism of Texas’s changing rivers and coastlines. We will look at the dramatic changes that have occurred across the Texas continental shelf since the last Ice Age. We will then step into deep geological time through an exploration of the Permian of West Texas to explore how continental margins are constructed and how we use life to study changing environments over long timescales. Ultimately, we will illustrate how an understanding of geological processes on Earth may be used to interpret planetary systems. Along the way we emphasize underlying tenets of the history of life, geologic time, and surface processes. We will introduce quantitative methods to study both the Earth’s surface and its subsurface. We will expose students to myriad directions they can learn more deeply about the evolving surface of the Earth and other planets.

**Objectives of this course:** The objectives of this course are to Introduce JSG undergrads to the basic concepts (tenets) of the geosciences in the subsurface, surface, and life of the past and present. The course seeks to accomplish this through a module-based pedagogy that includes the classroom, laboratory, and field observations. The course will provide a roadmap for students to further pursue topics/questions of interest.

**Learning outcomes:** Students who complete this course will acquire a basic understanding of the physical, chemical, and biological processes that shape the surface of the Earth today and through geologic time. Students will see the role that human impacts, changing climates, and sea level have on Texas’s landscapes, coastal processes, and natural hazards more globally. Through problem-based exercises, students will develop their observational skills, explore underlying processes, and extrapolate these insights to an understanding of how our world is shaped. Finally, students will leave this course with a broad perspective on the array of tools, techniques, and approaches that geoscientists use to investigate feedbacks between subsurface, surface, and life systems on Earth and other planets.
### Tentative Schedule for Fall 2023:

#### Module 1 - The Present & Human Interaction

<table>
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<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Lab</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Aug 21–25</td>
<td>Intro/Background/Framework</td>
<td>Lab 1: Waller Creek</td>
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<tr>
<td>Week 2</td>
<td>Aug 28–Sept 1</td>
<td>Sediment - erosion and transport</td>
<td>Lab 2: The Earth’s mobile surface – grains</td>
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<tr>
<td>Week 3</td>
<td>Sept 4–8</td>
<td>Sediment - transport and deposition</td>
<td>Lab 3: How solids flow I – Wind Tunnel</td>
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<tr>
<td>Week 4</td>
<td>Sept 11–15</td>
<td>Fluvial and Coastal processes</td>
<td>Lab 4: How solids flow II – Water Tank</td>
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<td>Week 5</td>
<td>Sep 18–22</td>
<td>Fluvial and Coastal processes: Environments of Deposition</td>
<td>Lab 5: Field Trip (Sept. 23–24) – Trinity River System and Shoreline erosion in Galveston</td>
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#### Module 2 – Reconstructing the Pleistocene to Present

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<tr>
<th>Week</th>
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<tbody>
<tr>
<td>Week 6</td>
<td>Sept 25–29</td>
<td>Seeing below the surface (subsurface data)</td>
<td>Lab 6: How do we take a picture of what we can’t see (seismic reflection tank)</td>
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<tr>
<td>Week 7</td>
<td>Oct 2–6</td>
<td>Shelf margin/seismic data</td>
<td>Lab 7: Reconstructing the buried shorelines of the Pleistocene</td>
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<tr>
<td>Week 8</td>
<td>Oct 9–13</td>
<td>Climate, sea level, and carbon dating</td>
<td>Lab 8: Texas’s Pleistocene ecosystem (‘Manatees, tigers, and mammoths oh my!’)</td>
</tr>
<tr>
<td>Week 9</td>
<td>Oct 16–20</td>
<td>Module 2 capstone/synthesis: Reconstructing the Pleistocene to Present</td>
<td>Lab 9: Reconstructing/mapping the Pleistocene of Texas – synthesis and write-up</td>
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#### Module 3 – Reconstructing Environments in ‘Deep Time’

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<th>Week</th>
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<tbody>
<tr>
<td>Week 11</td>
<td>Oct 20–Nov 3</td>
<td>How biology and chemistry form rocks</td>
<td>Lab 11: The Earth’s growing surface – chemical rocks</td>
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<tr>
<td>Week 12</td>
<td>Nov 6–10</td>
<td>Permian of West Texas</td>
<td>Lab 12: Field Trip to Guads – Permian Reef: Thurs morning (Nov. 9) to Sun evening (Nov. 12)</td>
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<tr>
<td>Week 13</td>
<td>Nov 13–17</td>
<td>Module 3 synthesis/recap: Reconstruction of the Permian</td>
<td>Lab 3: How to keep your reef alive</td>
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***Wk 14: Nov 20–24 (Fall Break, no class, no lab)***
Module 4 – Reconstructing environments on Mars

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<tr>
<th>Week</th>
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<tr>
<td>Week 10</td>
<td>Nov 27–Dec 1</td>
<td>Remote Sensing and surface processes on other planets</td>
<td>Lab 15: Interpreting physical surface processes on Mars</td>
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Dec 4: Last Class Day: No class

Grading

**Pre Module Assessment (Cr/NC):**

**Module/lab Exercises/Deliverables (incl. Lab Notebooks): 60%**

**Attendance/Participation: 10%**
Includes lab attendance and pre-module assessments

**Field Notebooks: 10%**
(e.g., notes, observations, sketches, questions, reflections)

**Post Module Assessments (Graded): 20%**

93 to 100 = A
90 to 93 = A-
83-90 = B
80-83 = B-
73-80 = C
70-73 = C-
63-70 = D
60-63 = D-
<60 = F

**Standards of Conduct**

The University of Texas at Austin holds our students to a high standard grounded in our Code of Conduct and Student Honor Code. Students are expected to abide by all state and federal laws, statutes, and all regulations of the University of Texas System.

**Code of Conduct**

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.
**Student Honor Code**

“As a student of The University of Texas at Austin, I shall abide by the core values of the university and uphold academic integrity.”

https://deanofstudents.utexas.edu/conduct/standardsofconduct.php

**University Policies**

**Academic Integrity**

Each student in the course is expected to abide by the University of Texas Honor Code: “As a student of The University of Texas at Austin, I shall abide by the core values of the University and uphold academic integrity.” **Plagiarism is taken very seriously at UT.** Therefore, if you use words or ideas that are not your own (or that you have used in previous class), you must cite your sources. Otherwise, you will be guilty of plagiarism and subject to academic disciplinary action, including failure of the course. You are responsible for understanding UT’s Academic Honesty and the University Honor Code which can be found at the following web address:

http://deanofstudents.utexas.edu/sjs/acint_student.php

Plagiarism will not be tolerated. See the University of Texas guidelines for plagiarism:

http://deanofstudents.utexas.edu/sjs/scholdis_plagiarism.php

An online module about plagiarism and the consequences of plagiarizing.

http://www.lib.utexas.edu/services/instruction/learningmodules/plagiarism/

**Use of E-Mail for Official Correspondence to Students**

E-mail is recognized as an official mode of university correspondence; therefore, you are responsible for reading your e-mail for university and course-related information and announcements. You are responsible to keep the university informed about changes to your e-mail address. You should check your e-mail regularly and frequently—I recommend daily, but at minimum twice a week—to stay current with university-related communications, some of which may be time-critical. You can find UT Austin’s policies and instructions for updating your e-mail address at http://www.utexas.edu/its/policies/emailnotify.php

**Documented Disability Statement**

The University of Texas at Austin provides upon students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, http://diversity.utexas.edu/disability/

**Religious Holy Days**

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence.

**Student Rights & Responsibilities**

- You have a right to a learning environment that supports mental and physical wellness.
- You have a right to respect.
- You have a right to be assessed and graded fairly.
- You have a right to freedom of opinion and expression.
- You have a right to privacy and confidentiality.
• You have a right to meaningful and equal participation, to self-organize groups to improve your learning environment.
• You have a right to learn in an environment that is welcoming to all people. No student shall be isolated, excluded or diminished in any way.

With these rights come responsibilities:
• You are responsible for taking care of yourself, managing your time, and communicating with the teaching team and with others if things start to feel out of control or overwhelming.
• You are responsible for acting in a way that is worthy of respect and always respectful of others.
• Your experience with this course is directly related to the quality of the energy that you bring to it, and your energy shapes the quality of your peers’ experiences.
• You are responsible for creating an inclusive environment and for speaking up when someone is excluded.
• You are responsible for holding yourself accountable to these standards, holding each other to these standards, and holding the teaching team accountable as well.

Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. UT maintains the UT Outpost (https://deanofstudents.utexas.edu/emergency/utoutpost.php) which is a free on-campus food pantry and career closet. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to provide any resources or other assistance.

From the Gender and Sexuality Center

Personal Pronouns

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender identity & expression, and nationalities. Class rosters are provided to the instructor with the student’s legal name, unless they have added a “chosen name” with the registrar’s office, which you can do so here: https://utdirect.utexas.edu/apps/ais/chosen_name/. I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the pronouns you use (she/he/they/ze, etc). Please advise us of any changes early in the semester so that we can make appropriate updates to our records. For instructions on how to add your pronouns to Canvas, visit https://utexas.instructure.com/courses/633028/pages/profile-pronouns. More resources available on the Gender and Sexuality Center’s website, www.utgsc.org.

Q Drop Policy

If you want to drop a class after the 12th class day, you’ll need to execute a Q drop before the Q-drop deadline, which typically occurs near the middle of the semester. Under Texas law, you are only allowed six Q drops while you are in college at any public Texas institution. For more information, see: http://www.utexas.edu/ugs/csacc/academic/adddrop/qdrop

Title IX Reporting

Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, sexual misconduct, dating/domestic violence and stalking at federally funded educational
institutions. UT Austin is committed to fostering a learning and working environment free from discrimination in all its forms. When sexual misconduct occurs in our community, the university can:

1. Intervene to prevent harmful behavior from continuing or escalating.

2. Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation.

3. Investigate and discipline violations of the university’s relevant policies (https://titleix.utexas.edu/relevant-policies/).

Beginning January 1, 2020, Texas Senate Bill 212 requires all employees of Texas universities, including faculty, report any information to the Title IX Office regarding sexual harassment, sexual assault, dating violence and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, writing assignments, class discussions, or one-on-one conversations) must be reported. I am a Responsible Employee and must report any Title IX related incidents that are disclosed in writing, discussion, or one-on-one. Before talking with me, or with any faculty or staff member about a Title IX related incident, be sure to ask whether they are a responsible employee. If you would like to speak with someone who can provide support or remedies without making an official report to the university, please email advocate@austin.utexas.edu. For more information about reporting options and resources, visit http://www.titleix.utexas.edu/, contact the Title IX Office via email at titleix@austin.utexas.edu, or call 512-471-0419.

Although graduate teaching and research assistants are not subject to Texas Senate Bill 212, they are still mandatory reporters under Federal Title IX laws and are required to report a wide range of behaviors we refer to as sexual misconduct, including the types of sexual misconduct covered under Texas Senate Bill 212.

The Title IX office has developed supportive ways to respond to a survivor and compiled campus resources to support survivors.

**Diversity and Inclusion statement**

We are inclusive in this class. We celebrate multiple approaches and points of view. We believe diversity drives innovation. Thus, we are building a culture where difference is valued. We take a holistic approach. We are always growing our network of people, programs and tools all designed to help students grow and manage their university careers and beyond. We foster both a top-down and grassroots approach. This gives us the freedom to address the broadest set of initiatives.

**University Resources for Students**

Your success in this class is important to me. We will all need accommodations because we all learn differently. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we’ll develop strategies to meet both your needs and the requirements of the course. There are also a range of resources on campus:
Services for Students with Disabilities

This class respects and welcomes students of all backgrounds, identities, and abilities. If there are circumstances that make our learning environment and activities difficult, if you have medical information that you need to share with me, or if you need specific arrangements in case the building needs to be evacuated, please let me know. I am committed to creating an effective learning environment for all students, but I can only do so if you discuss your needs with me as early as possible. I promise to maintain the confidentiality of these discussions. If appropriate, also contact Services for Students with Disabilities, 512-471-6259 (voice) or 1-866-329- 3986 (video phone).

http://ddce.utexas.edu/disability/about/

Counseling and Mental Health Center

Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. http://www.cmhc.utexas.edu/individualcounseling.html

The Sanger Learning Center

Did you know that more than one-third of UT undergraduate students use the Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center’s classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas. For more information, please visit http://www.utexas.edu/ugs/sle or call 512-471-3614 (JES A332).

Undergraduate Writing Center: http://uwc.utexas.edu/

Libraries: http://www.lib.utexas.edu/

ITS: http://www.utexas.edu/its/

Student Emergency Services: http://deanofstudents.utexas.edu/emergency/

Important Safety Information

If you have concerns about the safety or behavior of fellow students, TAs or Professors, call BCAL (the Behavior Concerns Advice Line): 512-232-5050. Your call can be anonymous. If something doesn’t feel right – it probably isn’t. Trust your instincts and share your concerns.

The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, http://www.utexas.edu/safety/

Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
• Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
• Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
• In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
• Link to information regarding emergency evacuation routes and emergency procedures can be found at: www.utexas.edu/emergency.