

EAS 3803: Natural Hazards

THE GEORGIA INSTITUTE OF TECHNOLOGY

January 13 - May 7, 2026

Lecture: Tues., Thurs. 12:30 - 1:45 pm in 202 Skiles

Instructors: Andrew Newman (Professor) Sonia Hajaaji (Teaching Assistant)
email: anewman@gatech.edu ssalgado30@gatech.edu
office: ES&T 2254 (+online) ES&T 2135 (+online)

Online material: Canvas at <https://gatech.instructure.com/courses/520256> and
<https://avnewman.github.io/teaching/NatHaz>

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General

This class is developed to give students insight into the physical underpinnings of the major natural geologic and climate-related hazards, as well as strategies to mitigate damage to life, the environment and infrastructure in order to maximize long-term sustainability. We will synthesize our understanding of many components of Earth sciences (including geology, oceanography, and climatology) to understand the varied contributions that collectively create risk to populations. We will examine regional susceptibilities to hazards, including event severity and frequency of occurrence, and the impact that economics, regulations, and monitoring may have on the community.

Student Learning Outcomes: Students will develop an integrated understanding of Earth hazards and their impact to populations:

- Geologic hazards including earthquakes, volcanism, landslides, tsunamis.
- Atmospheric hazards including hurricanes, flooding, climate change.
- Synthesis of Earth System interactions as they pertain to direct and cascading hazards.
- Data analysis and statistics based on real-world data
- Scientific communication through written and oral communication

Required Text: Marshak, S., R. Rauber, & N. Johnson, Natural Disasters, 1st Ed., W. W. Norton & Company, ISBN: 9780393921977 (paperback)/9780393532623 (epub), 2022.

Office Hours: I am eager to connect with you all to maximize the success of Georgia Tech. For brief communications, this can often be handled directly after class, in the room or in my office. In addition, you can use Canvas messages or email for quick, short-answer questions, particularly about logistics. However, if you have run into a conceptual block, or would like to discuss a topic in more detail, this is best done by appointment, and I will work with you to find a time to meet either in-person or online. I do not hold regular “office hours” as these rarely work for most students. Instead, I will try to remain flexible to respond to your needs during normal work hours (8a - 5p).

Required Electronics: Students must have a computer with reliable high-bandwidth internet, a functional webcam, speakers, and microphone (headphones are fine). A quiet and minimally disruptive environment for online activities and study are important.

Online Resources and Communication: Canvas is the primary organizational resource for information about the class. Lectures are planned to be live and in-person. If there is a significant health concern due to COVID or similar, we will transition to Zoom meetings. I will always inform of any such changes through your Canvas announcements. Presentation slides for class are planned to be made available following each class. *These are considered supplementary for study, but are not a replacement for class attendance. Being at class and on-time is essential for your best performance in this course.*

Students with Disabilities: If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <https://disabilityservices.gatech.edu>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Attendance: You are expected to attend the class in-person. If health-measures require, we will offer a remote, likely synchronous option. While I will not be taking direct attendance, you will be responsible for quizzes and participation in class-based discussions. Missing out on either of these will result in a zero for that grade. In any serious situation that precludes your participation in class (death in the family, serious illness, etc.) you should contact the Dean of Students as they are there to help you in these cases (<https://www.deanofstudents.gatech.edu/>).

Evaluation

Course Grade: Your grades will be based on your performance through **Participation (40%)**, **Quizzes (40%)**, and a **Final Project (20%)**.

- Letter Grade: $A \geq 90\% > B \geq 80\% > C \geq 70\% > D \geq 60\% > F$
- Satisfactory/Unsatisfactory: $S \geq 70\% > U$

Participation (40%): Students will be expected to come to class and participate in activities and lectures throughout the semester. Grading will come from both verbal and on-line discussions on individual topics throughout the semester (30%), and participation and questions during the final project presentations (10%).

Quizzes (40%): We will have 30-minute quizzes at the start of class every third Tuesday. These quizzes will solely cover the material since the prior quiz, with the exception of the final quiz during the final exam period which cover material throughout the semester. Including the final, there are 5 equally-weighted quizzes, with students being allowed to drop their lowest quiz grade (this includes the final).

Final Project (20%): This will include both a **Paper (15%)** and a brief **Presentation (5%)**.

- **Paper:** All students will review and present on a topic of your choice that focuses on a specific case study surrounding natural hazards. The project will include, a statement of the hazard(s), an assessment of the risk, as well as mechanisms being considered that will help to mitigate disaster. The report will use relevant research and review articles from scientific and policy literature, including peer-reviewed articles, and government reports (not *National Geographic* or *Scientific American*, but journals like *Science*, *Nature*, *Earthquake Spectra*, *Disasters*, *Natural Hazards*, *Nature Climate Change*, *Population and Environment*, *Progress in Disaster Science*, USGS Open File Reports, etc...). In order to receive full credit for the project you must:

- Submit a six-to-eight page single-spaced 12-point font (Helvetica, Times, or PT Sans), manuscript.
- Must include a synthesize no less than four papers on the chosen hazard.
- Must include a clear discussion of at least one mechanism for mitigating a future disaster, including potential drawbacks from such a mitigation strategy.
- Must include a clear discussion of your own thoughts on approaches to mitigate hazards.
- A complete bibliographic reference list (not included in the above page limit). All in-text and bibliographic citations should follow the APA style guidelines.
- Figures are optional, but will require clear captions and referencing (not included in above page limit).
- Manuscript must be of your own work and not the manifestations of Artificial Intelligence.

Before Spring Break, you will submit a draft outline (2 pages), that identifies the papers that you plan to use, why you chose them, and gives a brief structure of your planned report (following the above guidelines). This will account for 25% of your paper's grade.

- **Presentation:** All students will present a brief “lightning talk” covering their topic for their paper. More details on the presentation will come in the second half of the semester.

Academic Honesty

General: It is expected that all students are aware of their individual responsibilities under the Georgia Tech Academic Honor Code, which will be strictly adhered to in this class. The complete text of the Honor Code may be found at: <https://honor.gatech.edu>.

Student-Faculty Expectations

At Georgia Tech we believe it is important to strive for an environment of mutual respect, acknowledgment, and responsibility between faculty and students. Please, see the *Student Handbook Code of Conduct* for some basic expectation that we should have of each other. Ultimately, we should respect each others time, hard work, and quest for knowledge. We should strive to build an environment for cordial and effective interaction.

Pathway to success:

Students should do best in this course if they keep up with reading, actively participate in lectures, turn in assignments on time, and rapidly seek help if they begin to fall behind or are having difficulty with a topic. Note that the chapters are listed with each lecture topic and that I will not explicitly tell you to read them beforehand. When prepping for quizzes, it is wisest to focus on content that was discussed in lecture rather than material only covered in the book. Finally, I try to focus the course on understanding processes and mitigation strategies rather than memorizing jargon or particular catastrophic events. However, a certain amount of jargon and some case examples will be inevitable.

Campus Resources for Students

In your time at Georgia Tech, you may need support. Below you will find some resources to support you both as a student and as a person. Links to all of these resources should be findable on the left-hand side of the Canvas webpage under the title “GT Student Resources”.

Lecture Outline

Week	Chapter	Topic
1-2	Ch 1,2	Hazards & Tectonics overview
3-4*	Ch 3	Earthquakes
5	Ch 4	Volcanism
6	Ch 6	Tsunamis
7*	Ch 5	Mass Wasting
8	Ch 7	Subsidence
9	Ch 8	Atmospheric Behavior
10*	Ch 9,10	Severe Weather & Ice
3/23-3/27		<i>Spring Break</i>
11	Ch 11	Hurricanes
12	Ch 12,13	Flooding & Coastal Change
13*	Ch 14,15	Heat & Climate Change
14-15		<i>Final Presentations</i>
5/7/2026	Ch 1-14	Final Quiz

Topics and timing are subject to change during the semester.
*30 minute quizzes about every 3 weeks on Tuesday.