

EAS G633 Advanced Geophysics Seminar Syllabus: Geology & Geophysics of the Global Mid-ocean Ridge System

Multi-institution virtual 10-week course Fall 2024

Instructors: Jessica Warren, Dorsey Wanless, Jianhua Gong, Daniel Lizarralde, Mark Behn

Credit: 1 credit

Level: Advanced undergraduate + graduate

Prerequisite: Intro-level geology course

Weekly schedule:

- Wednesday 2:00-3:30 pm EST, 10 weeks from September 4 to November 6, 2024
- 1 hour lecture + 30-minute discussion via Zoom

Course Description:

Imagine that you are a marine geoscientist with a burning scientific question that you could answer if you only had the perfect data and/or samples. Lucky for you, this course on marine geology and geophysics will teach you about the techniques that you can use to collect data at sea to answer your question! In the process, we will explore the tectonics of mid-ocean ridges and transform faults through lectures and discussions.

Course Learning Objectives:

At the end of this course, you should be able to:

- Describe the processes occurring at ridges and transform faults.
- Explain the types of data collected by marine geologists (at sea and in the lab) and identify the vehicles or tools required to do this.
- Read/discuss scientific journal articles and apply this knowledge to key marine geology questions.

Methods of Assessment:

- Lecture attendance
- Submission of questions about reading assignments
- Active participation in discussions

Textbook:

- Searle (2013), Mid-Ocean Ridges, Cambridge University Press.

TOPICS:

Week 1 [Sep 4]

- Lecture: Introduction to mid-ocean ridges [Jessica Warren]

Week 2 [Sep 11]

- Lecture: Lithosphere structure, ridge morphology, multibeam bathymetry [Mark Behn]

Week 3 [Sep 18]

- Lecture: Igneous petrogenesis. Sampling the seafloor [Jessica Warren]

Week 4 [Sep 25]

- Lecture: Eruption dynamics [Dorsey Wanless]

Week 5 [Oct 2]

- Lecture: Oceanic transform faults [Jianhua Gong]

Week 6 [Oct 9]

- Lecture: Seismicity of the seafloor [Jianhua Gong]

Week 7 [Oct 16]

- Lecture: Marine seismology basics [Dan Lizarralde]

Week 8 [Oct 23]

- Lecture: Sequence stratigraphy on stacked MCS data [Dan Lizarralde]

Week 9 [Oct 30]

- Lecture: Ocean exploration, hydrothermal vents, deep submergence [Guest lecture by Adam Soule]

Week 10 [Nov 6]

- Lecture: What do scientists do at sea? [Jessica Warren & Dorsey Wanless]