

Syllabus and description of SIO239 (Geophysical Research skills)

Short description

In this course we will read, synthesize and present geophysical literature. The course has two core parts: Paper discussions and a writing sample. For the paper discussions, you will read about one paper every other week and present and discuss the papers in a group setting. We will also give constructive feedback about the paper presentations. For the writing sample, you will produce an extended abstract (including a figure) and discuss your writing with your peers.

Covid protocol and class format

Provided in person teaching is allowed and safe, we will meet in person without a remote/hybrid option. If Covid guidance changes, we will switch to remote teaching.

If you do feel sick or show Covid-like symptoms, please stay home and take care of yourself. You can catch up when you recovered and when symptoms disappeared. If you need to isolate for an extended period of time (more than one week), please reach out to me and I will help getting you on board remotely.

This course is S/U only, no grade option. The course meets 1.5 hours per week, plus 1 office hour per week.

Writing sample

Writing scientific texts (papers, proposals, thesis, reviews) is an integral part of being a scientist. To help you get ready for success with writing, you will practice writing in this course in form of a *writing sample*. Download and read the “Writing Sample” document to learn more about the writing sample, when it is due and what it entails.

Synthesis of geophysical literature

We will read geophysical papers and discuss them in a group setting. These discussions and presentations will make up the main part of this course. Download and read the “Literature Discussion” document to learn more about the discussion format. The discussion sessions require a nontrivial amount of “homework.”

Office hours

As part of this course, you are required to come to at least one office hour and chat with me. Please use the google doc to sign up for an office hour.

Course plan

Here is a breakdown of what we will do in each class.

- *Meeting 1, March 29.*

Introduction, course planning, office hour time, explaining of the paper discussions and writing sample. Discussion of what papers we will read.

- *Meeting 2, April 5.*
Paper 1 - green team presents, red team asks questions.
- *Meeting 3, April 12.*
Paper 1 - red team presents questions, green team answers, followed by group discussion.
- *Meeting 4, April 19.*
Paper 2 - green team presents, red team asks questions.
- *Meeting 5, April 26.*
Paper 2 - red team presents questions, green team answers, followed by group discussion.
- *Meeting 6, May 3.*
Departmental Exam Q&A.
- *Meeting 7, May 10.*
Paper 3 - green team presents, red team asks questions.
- *Meeting 8, May 17.*
Paper 3 - red team presents questions, green team answers, followed by group discussion.
- *Meeting 9, May 24.*
Discussion of writing samples I/II.
- *Meeting 10, May 31.*
Discussion of writing samples II/II.

List of papers

- **Paper 1.** K. Gwirtz, M. Morzfeld, A. Fournier, G. Hulot, *Can one use Earth's magnetic axial dipole field intensity to predict reversals?*, *Geophysical Journal International* 225(1), 277-297 (2021).
- **Paper 2.** W. Sun, H. Tkalčić, *Repetitive marsquakes in Martian upper mantle*, *Nature Communications* 13, 1695 (2022). <https://doi.org/10.1038/s41467-022-29329-x>
- **Paper 3.** S.C Constable, R.L. Parker, C.G. Constable, *Occam's inversion: A practical algorithm for generating smooth models from electromagnetic sounding data*, *Geophysics* 52(3) 289-300 (1987).