

Syllabus

OCN 668 Advanced Geophysical Fluid Dynamics II

Instructor: Peter Muller

Prerequisites:

- Marine Hydrodynamics (OCN 662)
 - Ocean Waves I (OCN 660)
 - Introduction to Geophysical Fluid Dynamics
 - Numerical Modeling
 - Advanced geophysical Fluid Dynamics I (OCN 667)
- Otherwise, the consent of the instructor is required.

The class applies the theoretical concepts developed in OCN 667 to analyze the widely used Regional Ocean Modeling System (ROMS). The class covers the equations of motion, coordinate systems, boundary conditions, approximations, parametrizations, numerical algorithms, and computational implementation of the model. The class consists of lectures by the instructor, classroom discussions, and presentations by students. Discussions and presentations will be based on the ROMS manual available at

https://www.myroms.org/wiki/index.php/Documentation_Portal

the “Draft Technical Manual for a Coupled Sea-Ice/Ocean Circulation Model (Version 2)” by Katherine Hedström, and on the literature cited therein.

Grading will be based on presentations, homework assignments, and participation in classroom discussions.

Student learning outcomes:

By the end of the class students should be able to:

- Critically evaluate the basic elements of the ROMS model: the equations of motion, coordinate systems, boundary conditions, approximations, parametrizations, numerical algorithms, and computational implementation.
- Understand the functioning of the ROMS model.
- Understand the limits and range of applicability of the ROMS model.
- Competently use the ROMS model in their research.