

EOSC 579 : Dynamic Oceanography, 24W2, Feb-Apr 2025

January 22, 2025

1 Prerequisites

EOSC 512 or equivalent.

2 Instructor

Susan Allen, Professor
ESB 3017
email: sallen@eoas.ubc.ca

3 Meeting Times

Monday (ESB 4009): Feb 3, Mar 3, 24, all 1-2 pm

Wednesday (ESB 4009): Feb 26, Mar 19, Apr 2, all 3-4 pm

and Friday (ESB 3064): Feb 7, 28, Mar 7, 14, 21, 28, Apr 4, all 2:30-3:30 pm

First class Feb 3. There will also be a final test. We will schedule once the exam schedule is out.

4 Course Purpose

The students completing this course will be able to explain physically and do problems concerning ocean stratification, waves, instability and general ocean circulation.

5 Assignments

The assignments are an important part of the learning process in this course because the course is oriented to problem solving.

The assignments are expected on time and neatly hand written or typed. Assignments can be handed in on paper or as a pdf emailed to the instructor. Please include explanations as to what you are doing at each step. The assumptions you make to solve the problem are crucial and must be explicitly stated. Late assignments will be marked and then the mark will be multiplied by $(0.9)^{(\text{number of days or part days late})}$.

It is permissible to work in groups or assist each other with the problems. But each student must hand in a document completely prepared by her/him/themselves and not directly copied from another. It is to your advantage that you ensure that you understand each and every step made in solving the problems.

6 Contents

Topics and approximate numbers of lectures.

- Stratification and Normal Modes (2 lectures)
- Internal Waves (2-3 lectures)
- Barotropic/Baroclinic Instability (4-5 lectures)
- Ocean General Circulation (5-3 lectures)

7 Grades

- Assignment 1 20%
- Assignment 2 30%
- Test 25%
- Assignment 3 25%

8 Text:

No specific text.

9 References:

- B. Cushman-Roisin, *Introduction to Geophysical Fluid Dynamics: Physical and Numerical Aspects*, Academic Press, 2011. Bookstore copy not in yet. Previous version available QC809.F5 C8 1994, Woodward Library stacks.
- P.H. LeBlond and L.A. Mysak, *Waves in the Ocean*, Elsevier, 1978, available Woodward Library, Main Library and Mathematics Library : call number GC211.2 L43 1978. Out of print. Quite mathematical treatment of the waves part of the course.
- A.E. Gill, *Atmosphere-Ocean Dynamics*, Academic Press, 1982. Available from Main Library : call number GC 190 G54 1982. This book is less terse than Cushman-Roisin.
- S. Pond and G.L. Pickard, *Introductory Dynamic Oceanography*, Second Edition, Pergamon, 1983. Available from Koerner Library and Main Library : call number GC 201.2 P66 1983. This book is less mathematical, more field based and oceanographic.
- J.R. Holton, *Introduction to dynamic meteorology*, Third Edition, available from Main : call number QC 880 H65 1992. More atmosphere based. (There is a fourth edition but the library does not have it).
- J. Pedlosky, *Geophysical Fluid Dynamics*, Second Edition, Springer-Verlag, 1987, available from Main Stacks : call number QC 809 F5 P43 1987. Next level up. Even more mathematics.

10 Important Dates

Date	Event
Feb 3	First lecture
Feb 28	Assignment 1 due
Mar 27	Assignment 2 due
Apr 4	Last Lecture
Apr 11	Assignment 3 due
Apr 7-18	Final Test