

ADVANCED OCEANOGRAPHY
GLY 350
FALL 2009

INSTRUCTORS: Dr. Lynn A. Leonard DL 102
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Office Hours M&T 10-11 or by appointment

TEXT BOOKS: Seawater: Its Composition, Properties and Behaviour, Marine Biogeochemistry, and Ocean Circulation—all by the Open University Press; and other readings as assigned.

COURSE OBJECTIVE: Prerequisite: GLY150. This course is a 3 credit hour upper level course that explores the role of oceans in the hydrological cycle, the distribution of temperature and salinity and their influence on water movement, atmospheric and oceanic circulation, waves, and tides. This course expands on material introduced in GLY150 and covers each topic in greater detail using more quantitative and hands-on approaches. The course format will consist of lectures, discussions, and homework activities.

GRADES: Grades will be determined as follows:

Homework/Assignments	20%
Case Study Presentation	20%
Exams	60%

Grade Policy: The plus/minus system will be applied as follows:

A	>94	B-	79.5-82.5	D+	67-69.5
A-	89.5-93.5	C+	77-79.5	D	63-66.5
B+	87-89.5	C	73-76.5	D-	59.5-62.5
B	83-86.5	C-	69.5-72.5	F	< 59.5

Two exams will be given. In addition, students will be expected to contribute and participate in a presentation of a series of case studies selected from a variety of topics chosen by the instructors. Presentations will be grouped by similar topic with each student in the groups giving an individual presentation 10 minutes in length using Powerpoint. A 2 page, single-spaced, 11 pt, typed extended abstract (short paper) summarizing the topic and citing relevant references must be included. Key figures should be appended and referenced in the text. Your presentation material must be coordinated with any other presenters covering the same general topic as to avoid replication.

Honor Code: "The University of North Carolina at Wilmington is committed to the proposition that the pursuit of truth requires the presence of honesty among all involved. It is therefore this institution's stated policy that no form of dishonesty among its faculty or students will be tolerated. Although all members of the university community are encouraged to report occurrences of dishonesty, honesty is principally the responsibility of each individual." *UNCW Undergraduate Catalogue*.

TENTATIVE SCHEDULE

AUGUST

20 Introduction

SECTION 1 OCEAN BASIN PROPERTIES

25 Sea Floor Features and Ocean Morphology

27 Ocean Morphology and Evolution of Ocean Basins

SEPTEMBER

1 Observing the Ocean floor- Techniques

3 Marine Sediments & *Analysis of marine sediments*

8 Marine Sediments continued

SECTION 2 COASTAL OCEANOGRAPHY

10 Coastal Morphology

15 Coastal Morphology continued

17 Coastal Ocean Observing Systems

22 CASE STUDY 1 PRESENTATION (Applications of satellite oceanography)

24 Surface Wave Theory

29 Wave applications

OCTOBER

1 Dynamic Theory of Tides

6 Fall Break

8 CASE STUDY 2 PRESENTATION (Tsunamis and extreme waves)

13 *Analysis of wave and tide data*

15 **EXAM 1**

SECTION 3 OPEN OCEAN PROCESSES

20 Oceanic Water Masses

22 Global Wind System and Wind Driven Currents

27 Oceanographic Instrumentation

29 CASE STUDY 3 PRESENTATION (Thermohaline circulation and the ocean conveyor)

NOVEMBER

3 Galapagos and El Nino

5 Properties of Ocean Water, Hydrologic Cycle, Seawater Composition

10 Sources and Sinks of Salts and Ocean Elemental Cycles

12 CASE STUDY 4 PRESENTATION (The Carbonate System: alkalinity and CO₂)

17 Ocean chemical cycles

19 CASE STUDY 5 PRESENTATION (Climate Change and Sea Level Rise)

24 Ocean technology and instrumentation

26 HOLIDAY

DECEMBER

1 CASE STUDY 6 PRESENTATION (Ocean Energy Resources)

FINAL EXAM Thursday, December 10th 3 to 6 PM