

SOUTHERN CONNECTICUT STATE UNIVERSITY

ESC 140 – Oceanography

Spring 2004

Lecture: T, Th 12:25 – 1:40 JE 114

Lab: T 3:15 – 5:10 Mo 209 or

Th 3:15 – 5:15 Mo 209

Instructor: James Tait, Ph.D.

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Office Hours:

M, W 10:30-12 am

T, Th. 11:00-12:00

Or by appointment

Course Number: **ESC 140** Credit Hours: **3** Prerequisite(s): **University-level English and math**

Course Title: **Oceanography**

DESCRIPTIONS:

Catalog Description:

Physical, chemical, geological, and biological aspects of the ocean basins and waters. The historical development and interdisciplinary nature of oceanography are stressed. For non-science majors only. Lecture, 2 hours, laboratory, 2 hours. 3 credits.

Course Description:

This is an introductory survey course of the principles, body of knowledge, and methods of contemporary marine science. It covers the geology, chemistry, physics, and biology of the oceans and focuses on the relationship between basic principles and current environmental concerns related to the oceans.

This course is designed for non-science majors who wish to learn about the oceans. It includes lab activities that require quantitative reasoning (solving math problems). The level of math preparation is basic algebra. Lab exercises use real scientific data to explore real scientific questions and include the use of computers and oceanographic data available on the internet. Labs will also be used for discussion-based activities. Students are also expected to research an oceanographic topic independently and to present that research in an appropriate format. The class will also undertake two Saturday morning field trips. These are optional but carry extra-credit if the accompanying field exercise is completed.

COURSE CONTRIBUTION:

This course satisfies Southern's Natural Sciences A general education requirement. All students, regardless of major or field of study should have, as part of their overall education, an appreciation for the planet they live on, it's history and processes, and socially relevant issues concerning the Earth. Such social relevance could include important environmental issues, issues of resources, or more abstract issues such as humanity's place in nature. This course is designed to accomplish this by focusing on the 70% of the planet's surface that is marine in nature.

It is also important that students understand the role *science* plays in understanding nature and addressing social concerns, how scientific knowledge is produced, and to be able to think critically about scientific observations. This includes the ability to understand science from a quantitative point of view. Students also need to see science as a human enterprise, that is, science should be understood as something people do as in pursuit of truth, not just as a collection of facts. This course focuses on the nature of science and its role in society as well as on the communicating knowledge of the oceans.

LEARNING OUTCOMES

- 1) Students will be able to describe and explain some of the fundamental insights to the world oceans that the basic sciences (geology, biology, chemistry, physics) have afforded. (NSTA 1,5; INTASC 1,3,4; CCCT 1.2, 1.5)
- 2) Students will learn, through hands-on experience, the ways in which oceanographic knowledge is generated, and will generate new knowledge using basic data sets and observations. (NSTA 2,3; INTASC 1,3,4; CCCT 1.4)
- 3) Students will be able to solve oceanographic problems quantitatively. (NSTA 2,3; INTASC 4; CCCT 1.3, 1.4, 2.6)
- 4) Students will be able to describe and explain a number of marine-related environmental issues and how ocean science has helped society understand these issues. (NSTA 1,4,7; INTASC 1, 4; CCCT 2.2)
- 5) Students will research oceanographic issues on their own so that they may become better independent and lifelong learners. (NSTA 3,4; INTASC 4; CCCT 1.4, 2.4)
- 6) Students will develop and be able to articulate an enhanced appreciation for the oceans. (NSTA 4,7; CCCT 2.4)

COURSE CONTENT OUTLINE

Week	Topic	Readings/Assignments
1 Jan 27,29	The ocean floor and the interior of the earth	Chapters 4 & 2
2 Feb 3,5	Continental drift; sea floor spreading and plate tectonics	Chapter 3
3 Feb 10,12	Marine geological processes and hazards: global seismicity, volcanism	Chapter 3
4 Feb 17,19	Origin, distribution, and applications of marine sediments Exam One – Feb 19	Chapter 3
5 Feb 24,26	Chemical and physical properties of seawater; <i>hypoxia in Long Island Sound and other estuaries</i>	Chapter 5
6 Mar 2,4	Ocean circulation: atmospheric circulation patterns, surface ocean currents, <i>upwelling and fisheries</i>	Chapter 6 and 7
7 Mar 9,11	Deep-water ocean currents, El Niño-La Niña, <i>the oceans and climate</i> ;	Chapter 7
8 Mar 16,18	Exam Two – Mar 16 Tides: equilibrium and dynamic tides	Chapter 8
9	Spring Recess – March 20-28	
10 Mar 30, Apr 1	Waves: parameters, generation, propagation, shoaling, refraction, and breaking; seismic sea waves (tsunamis)	Chapter 8
11 Apr 6,8	Coasts, beaches, estuaries, and wetlands;	Chapter 9
12 Apr 13,15	The Connecticut coast; coastal hazards and environmental issues	Chapter 9
13 Apr 20,22	Exam Three – Apr20 Marine biological productivity and ecological basics	Chapter 10
14 Apr 27,29 May 4	Life in the Water Column	Chapter 11
15 May 6,11,13	Life on the Sea Floor; Ocean Biodiversity	Chapter 12
	Final Exam: Thursday, May 20, 10:15-12:15 am	

REQUIRED BOOKS

Duxbury, Duxbury, and Sverdrup. Fundamentals of Oceanography, Fourth Edition. McGraw-Hill, New York, N.Y., 2002. (ISBN: 0-07-2442790-6)

COURSE REQUIREMENTS

- Daily attendance and detailed note taking
- Weekly reading assignments
- Four exams (multiple choice)
- Weekly lab (attendance is required: always bring book, pencil, calculator, and mm scale)
- Research project
- Attendance of office hours (as per professor's advisement)

FIELD TRIPS (Saturdays)

- West Haven Beach (beach and wetlands); Norwalk Aquarium (marine organisms of Long Island Sound)

CLASS DECORUM

- Please do not arrive late or leave early
- Please do not talk during lecture unless you have something to contribute
- Please feel encouraged to ASK QUESTIONS during lecture (don't worry about feeling dumb!). Raising one's hand is the best way to do this.

CLASS POLICIES

- No make-up exams unless arrangements are made ahead of time
- No late work, please
- No talking or looking around during exams: this will result in a grade of zero on the exam
- Repeated incidents of inappropriate classroom behavior will be dealt with by an administrative drop

EVALUATION CRITERIA

- Exams: 60%
- Labs and Lab Exams: 30%
- Abstract or Project: 10%

MODES OF LEARNING

Multi-media lectures, classroom discussions, hands-on laboratory activities, course readings, and group projects.

STATEMENT ON ACCOMODATIONS FOR ESC 140

Students with disabilities and diverse learning needs are welcome in this class. Students with diverse backgrounds and experiences add greatly to the quality of a course. Students with disabilities who require accommodations are strongly encouraged to speak to me within the first three class sessions. These students will need to contact the Disabilities Resource Office located in EN15 (392-6828) and provide formal documentation of a disability. If you would like to speak with me about other information, such as emergency medical information, or arrangements in case the building must be evacuated, please make an appointment with me as soon as possible.

If you need any help understanding the course material or meeting the course requirements, you are encouraged to make an appointment to meet with me. All students are expected to acquire the basic knowledge and competencies outlined in the learning outcomes in this syllabus. If you are concerned about your success in this course, or you experience difficulty (C or lower) on the first exam or assignment, I would urge you to speak to me privately for support and suggestions in improving your performance. All information and inquiries will be kept confidential.

ACADEMIC DISHONESTY

Any form of academic misconduct will result in a failing grade for the course and a referral to the Dean for further disciplinary actions. Academic misconduct is outlined in detail in the *SCSU Student Handbook* (pp 97-114). Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation including papers, projects and examinations; and presenting, as one's own ideas or words of another person or persons for academic evaluation without proper acknowledgement.

STANDARDS GUIDELINES		
INTASC (Interstate New Teachers' Assessment & Support Consortium) Criteria	Professional Standards National Science Teacher's Association	CCCT (Connecticut Common Core of Teaching) Criteria
<p>SCHOLARSHIP</p> <ol style="list-style-type: none"> 1. Knowledge of subject matter 2. Knowledge of human development & learning 3. Instruction adapted to meet diverse learners 4. Use of multiple instructional strategies & resources <p>ATTITUDES & DISPOSITIONS</p> <ol style="list-style-type: none"> 5. Effective learning environment created 6. Effective communication 7. Lesson planning <p>INTEGRITY</p> <ol style="list-style-type: none"> 9. Reflection and professional development <p>LEADERSHIP</p> <ol style="list-style-type: none"> 8. Assessment of student learning to improve teaching <p>SERVICE</p> <ol style="list-style-type: none"> 10. Partnership with school and community 	<ol style="list-style-type: none"> 1. Content – Structure and interpret the concepts, ideas and relationships in science. 2. Nature of Science – Define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community. 3. Inquiry – Formulating solvable problems, constructing knowledge from data, exchanging information for seeking solutions, developing relationships from empirical data. 4. Context of Science – Relate science to daily life: technological, personal, social and cultural values. 5. Skills of Teaching – Science teaching actions, strategies and methodologies, interaction with students, effective organization and use of technology. 6. Curriculum – Extended framework of goals, plans, materials and resources for instruction. 7. Social Context – Social and community support network, relationship of science to needs and values of the community, involvement of people in the teaching of science. 8. Assessment – Alignment of goals, instruction and outcomes, evaluation of student learning. 9. Environment for Learning – Physical spaces for learning, psychological and social environment, safety in science instruction. 10. Professional Practice – Knowledge and participation in the professional community, ethical behavior, high quality of science instruction, working with new colleagues as they enter the profession. 	<p>DEMONSTRATION OF KNOWLEDGE</p> <ol style="list-style-type: none"> 1.1 Understanding of student learning & development 1.2 Understanding of need for different learning approaches 1.3 Proficiency in reading, writing and mathematics 1.4 Understanding of central concepts & skills, tools of inquiry and structures of discipline(s) 1.5 Knowledge of how to design and deliver instruction 1.6 Recognition of need to vary instructional methods <p>APPLICATION OF KNOWLEDGE</p> <ol style="list-style-type: none"> 2.1 Instructional planning based upon knowledge of subject, students, curriculum & community 2.2 Selection and/or creation of learning tasks that make subject meaningful for students 2.3 Establishment and maintenance of appropriate behavior standards and creation of positive learning environment 2.4 Creation of instructional opportunities supporting students' academic, social and personal development 2.5 Use of verbal, nonverbal and media communication fostering individual and collaborative inquiry 2.6 Employment of various instructional strategies in support of critical thinking, problem solving and skills demonstration 2.7 Use of various assessment techniques to evaluate student learning & modify instruction <p>DEMONSTRATION OF PROFESSIONAL RESPONSIBILITY</p> <ol style="list-style-type: none"> 3.1 Professional conduct in accordance with the Code of Professional Responsibilities for Teachers 3.2 Shared responsibility for student achievement and well-being 3.3 Continuous self-evaluation regarding choices & actions on students and school community 3.4 Commitment to professional growth 3.5 Leadership in the school community 3.6 Demonstrations of a commitment to students and a passion for improving the profession