

Syllabus

Marine Science, OCE 4006, 4 Credits

Prerequisites: CHM 2045, 2045L, 2046, 2046L with a minimum grade of C-

Corequisites: None

Course Logistics: Lectures originate at Harbor Branch Oceanographic Institute at FAU (MC 209), Mondays and Thursdays, 3:00 to 4:50p.m.

Instructor Contact Information:

Dr. Mingshun Jiang, office: Rm 205, Lab 2 Building, HBOI_FAU, 5600 Old Dixie Hwy, Fort Pierce, FL 34946, jiangm@fau.edu, (772) 242-2254, office hours Friday 11 a.m., and by appointment.

Dr. Laurent Cherubin, office: Rm 207, Lab II, 5600 Old Dixie Hwy, Fort Pierce, FL 34946, lcherubin@fau.edu, (772) 242-2314, office hours by appointment.

Course Description:

An introduction to geological, physical and chemical oceanography.

Course Objectives and Learning Outcomes:

This course is intended to provide a survey of marine geology, physical oceanography and marine chemistry. Through lectures and homework assignments, students will achieve a broad understanding of the fundamental concepts in these three branches of marine science.

Course Evaluation Methods:

Final grades will be based upon the following student activities:

- Marine Geology (25%)
 - Exam (20%), homework (5%)
- Physical Oceanography (50%)
 - Exam (40%), homework (10%)
- Marine Chemistry (25%)
 - Exam (20%), homework (5%)

Homework

Geology and Physical homework exercises will be handed out at the start of the Marine Geology and Physical Oceanography sections of the course, respectively. Each exercise has a due date, but it can be handed in early. Homework handed in late will not receive full credit. Points obtained from homework will be added to points obtained from exams to determine a student's final grade.

Policy on make-up tests, late work and incompletes

Assignments completed late will be accepted only with prior approval and under exceptional circumstances. Grades of Incomplete ("I") will be given only to students who are passing the course but have not completed required assignments due to exceptional circumstances.

Classroom etiquette policy

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions." Sending/receiving text messages, tweets, etc. should be done before or after class, or during the break.

Disability Policy Statement:

In compliance with the Americans with Disabilities Act (ADA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office of Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses- Boca Raton, Davie, and Jupiter, however, disability services are available for students on all campuses.

Religious Accommodations

Students who wish to be excused from course work, class activities or examinations must notify the instructor in advance of their intention to participate in religious observations and request an excused absence.

Code of Academic Integrity Policy Statement:

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf and contact the FAU Biological Sciences Department for their policy regarding plagiarism.

Required Text/readings:

"Oceanography. An Invitation to Marine Science," (8th Edition, 2013), by Tom Garrison, Brooks/Cole, Cengage Learning.

Course Lecture Schedule:

Lectures presented by Dr. Mingshun Jiang and Dr. Laurent Cherubin are indicated by MJ and LC, respectively. The schedule of topics to be discussed is subject to change during the semester, depending on the needs of the class. Exams will be given during the usual class periods (same time, except for the chemistry exam; same room).

Week 1: Monday, January 5th LC: Introduction to the course, introduction to marine geology, Earth's structure, plate tectonics. Assigned reading: Chapter 3

Week 1: Thursday, January 8th LC: Plate tectonics (continued). Assigned reading: Chapter 3.
Homework exercise due: "G1" (Highlights of Chapters 1 and 2)

Week 2: Monday, January 12th LC: Continental margins and ocean basins (continued). Assigned reading: Chapter 4

Week 2: Thursday, January 15th LC: Sediments I. Assigned reading: Chapter 5.
Homework exercise due: "G2" (Recent Earthquakes)

Week 3: Monday, January 19th No Class (M.L.K. Jr. Holiday)

Week 3: Thursday, January 22nd LC: Sediments II. Assigned reading: Chapter 5.
Homework exercise due: "G3" (Nautical charts)

Week 4: Monday, January 26th LC: Coasts I. Assigned reading: Chapter 12.

Week 4: Thursday, January 29th LC: Coasts II. Assigned reading: Chapter 12.
Homework exercise due "G4" (Contouring)

Week 5: Monday, February 2nd Geology Exam

Week 5: Thursday, February 5th LC: Introduction to physical oceanography, temperature structure, water masses, density and sigma-t. Assigned reading: Chapter 6

Week 6: Monday, February 9th LC: Sound and light in the ocean. Assigned reading: Chapter 6

Week 6: Thursday, February 12th LC: Ocean energy: heat energy and the heat budget equation, potential and mechanical energy. Assigned reading: Chapter 6
Homework exercise due: "P1" (Hydrographic properties)

Week 7: Monday, February 16th LC: Air-sea interaction: trade winds, hurricanes, sea breezes, wind-driven circulation. Assigned reading: Chapter 8.

Week 7: Thursday, February 19th LC: Ocean waves: kinematics, wave-induced transport, internal waves, energy from ocean waves. Assigned reading: Chapter 10. Homework exercise due: "P2" (Wave observations and predictions)

Week 8: Monday, February 23th Physical Oceanography Exam 1

Week 8: Thursday, February 26th MJ: Ocean tides I: basic principles, tidal constituents, tide predictions, energy from ocean tides. Assigned reading: Chapter 11. Homework exercise due: "P3" (Tidal predictions)

Week 9: Monday, March 2nd No class (Spring Break)

Week 9: Thursday, March 5th No class (Spring Break)

Week 10: Monday, March 9th MJ: Ocean tides II: Tides in the World Ocean, around the United States and around Florida. Assigned reading: Chapter 11.

Week 10: Thursday, March 12th MJ: Nontidal variations in sea level: intra- and inter-annual time scales, sea level rise. Assigned reading: Chapter 12. Homework exercise due: "P4" (Sea level rise)

Week 11: Monday, March 16th MJ: Ocean circulation I: basic principles, equation of motion, measurement techniques. Assigned reading: Chapter 9.

Week 11: Thursday, March 19th MJ: Ocean circulation II: surface circulation in regional seas and major ocean basins, circulation in the deep ocean. Assigned reading: Chapter 9.

Week 12: Monday, March 23rd No class (Oceanographic Experience Cruise)

Week 12: Thursday, March 26th No class (Oceanographic Experience Cruise)

Week 13: Monday, March 30th Physical Oceanography Exam 2

Week 13: Thursday, April 2nd MJ: Introduction to marine chemistry. Assigned reading: Chapter 7

Week 14: Monday, April 6th MJ: Chemical composition of seawater, Assigned reading: Chapter 7.

Week 14: Thursday, April 9th MJ: Marine nutrient cycles, Assigned reading: Chapter 7.

Week 15: Monday, April 13th MJ: Trace metal chemistry, Assigned reading: Chapter 7.

Week 15: Thursday, April 16th MJ: Dissolved gases in seawater, Assigned reading: Chapter 7.

Week 16: Monday, April 20th MJ: Carbonate system in the sea, Assigned reading: Chapter 7.

Week 16: Thursday, April 23th Chemistry Exam (10:00a-12:30p)