

## OCEANOGRAPHY 460:331

Instructor: Dr. Adam Kustka; [kustka@andromeda.rutgers.edu](mailto:kustka@andromeda.rutgers.edu)

Office Hours: After class or by arrangement, Smith 140A.

Required materials:

- Trujillo and Thurman. Essentials of Oceanography. 9<sup>th</sup> Edition. ISBN-10: 0-13-240122-3.
- I-clicker.

**Course Description:** Oceanography can be described as the interdisciplinary study of geological, physical, chemical and biological processes that – in concert – are responsible for the characteristics of the World Ocean. During the semester we will dive into the scientific underpinnings (if you can pardon the bad pun) of the answers for a multitude of questions, including (and in no particular order): Why is the water in the Caribbean Sea clear and blue, while New Jersey water is mostly brown-green (No... pollution is not the answer)? Did life originate at hydrothermal vents and how does life thrive there without sunlight? What are harmful algal blooms and how do they compare to ‘regular’ blooms? What causes blooms? What do the oceans have to do with global climate? Why are deep sea creatures often red? What is it about the Atlantic Ocean that makes western Europe winters mild compared to the East Coast of the United States? For example, why does it snow in Washington, D.C. but rarely (every 50 years or so!) in Lisbon, despite that they are at the same latitude? What has the genome revolution told us about the oceans? How do hurricanes form? Why don’t they ever cross the equator? Why does the beach look scalloped? Why do waves form and why do they break? Have the oceans always been salty? Are they expanding or shrinking? How does sea level drop in one place if it is rising everywhere else? Why is the middle of the ocean sometimes shallower than waters just a few tens of miles offshore? What the heck are plates anyway? Why is the tidal range at the Bay of Fundy a whopping 53 feet, while other locations show no tidal range at all?

This course can be viewed as a scientifically intensive and more in depth version of “Introduction to Oceanography”.

Prerequisites are:

(21:120:101 GEN BIO DISCUSSION and 21:120:102 GENERAL BIOLOGY II and 21:120:101 GEN BIO DISCUSSION and 21:120:101 GEN BIO DISCUSSION)

*OR*

(21:160:115 GENERAL CHEMISTRY I and 21:160:116 GENERAL CHEMISTRY II and 21:160:115 GENERAL CHEMISTRY I and 21:160:115 GENERAL CHEMISTRY I)

*OR*

(21:750:205 INTRO PHYSICS LAB and 21:750:206 INTRO PHYSICS LAB and 21:750:205 INTRO PHYSICS LAB and 21:750:205 INTRO PHYSICS LAB)

*OR*

(21:460:103 PLANET EARTH and 21:460:104 PLANET EARTH LAB and 21:460:206 ENVIRONMENTAL GEOL and 21:460:207 ENVIRON GEOL LAB)

*OR*

(28:120:200 CONCEPTS IN BIOLOGY and 28:120:200 CONCEPTS IN BIOLOGY and 28:120:200 CONCEPTS IN BIOLOGY and 28:120:200 CONCEPTS IN BIOLOGY)

## Learning Objectives:

Through this course, students should be able to:

- Achieve an intermediate level of ocean literacy, encompassing information and concepts from geological, physical, chemical and biological oceanography.
- Analyze and synthesize oceanographic data sets.
- Utilize the scientific method to test hypotheses with oceanographic data sets.
- Employ data management programs (MS Excel and freeware plotting software) and data analysis skills (including statistical) to present and interpret oceanographic data sets.

## Course Notes:

1) Grades will be assigned as follows: There will be three hourly exams and one cumulative final exam. The lowest grade of the regular (hourly) exams will be dropped. If you miss an exam for **any reason (excused or not)**, that will be your dropped exam. You should plan to make your best effort on the first two hourly exams. The final exam is cumulative and worth 25% of your grade. Attendance and participation is worth 20% of your grade (note that absence yields zeros for both attendance & participation during a given class. Also, your two lowest clicker day scores will be dropped to handle unavoidable absences, excused or not). Homework assignments are worth 25% of your grade and **cannot be handed in late.**

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|----------------------------------|-----|
| i. Highest hourly exam           | 15% |
| ii. Second highest hourly exam   | 15% |
| iii. Final cumulative exam       | 25% |
| iv. Attendance and participation | 20% |
| v. Homework assignments          | 25% |

Letter grades are assigned as follows:

86-100	A
82-85.99	B+
75-81.99	B
66-74.99	C+
60-65.99	C
50-59.99	D

- 2) Hourly exams will consist of essay questions, short answers and multiple choice questions. The final exam will be entirely multiple choice. The questions will not emphasize memorization (which is distinctly different from learning).
- 3) Class participation will be gauged by correct answers to in-lecture questions via I-Clicker. This also gives me instant feedback on how well I am communicating concepts. Not all the course material is in powerpoint format - some is covered on the chalkboard, so attendance is valuable to overall class performance.
- 4) We will start using I- clickers on 02 February. **BRING YOUR I-CLICKER TO CLASS 26 JANUARY.** Reading assigned materials before class – and answering I-Click questions correctly -- will help you obtain a high score. If you decide to not buy a clicker then you've decided to get a zero for this portion of the grade (it has happened before). Since attendance and participation count for a non-trivial portion of the grade, using your absentee friend's clicker is a violation of academic integrity policy.
- 5) Handouts will be used during class and should always be brought with you.
- 6) Rules for exams:
  - i. There may be assigned seating. Arrive early.
  - ii. Please use restroom prior to exam.
  - iii. No one will be permitted to enter after 15 minutes have elapsed; no one will be permitted to leave until 30 minutes have elapsed.
  - iv. Exams are closed book, closed notes.