**Oceanographic Methods and Data Analysis: Biology/Chemistry**

**11:628:363**

**Fall Semester: 3 credits**

**Instructors and Contact Information**

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TA: Graduate student TA assignment and contact information TBD

**Course Description**

We will focus on basic techniques to collect, analyze, and report oceanographic and marine science data with emphasis on biological and chemical variables. This will include interactive lectures, team-based hands-on field sampling, laboratory sample analysis, writing and presenting results, and writing a scientific paper. Our goal is to have fun doing science.

*Teamwork is required for this course.*

*When someone isn’t working for a team, the team should self-correct.*

*This course will require some travel and work outdoors, aboard research vessels, and in the laboratory.*

*This course requires the use of chemicals in a laboratory.*

**Pre- or Co-requisite**

For undergraduates: 11:628:320 (Dynamics of Marine Ecosystems)

**When and Where**

This class meets one day per week. Regular labs (non-field trip days are structured as follows):

Lecture:  10:20-11:40am (or on field trip)

Lab\*:  12:10 – 4:00 p.m. (or on field trip)

*\*Note: unless there is a scheduling problem, we typically take a 30-45-minute lunch break between lecture and lab.*

There are three field trips during this course. On those days, class time is 7:30am-4:00pm.

**Course Platform**

We utilize the Canvas platform (<https://canvas.rutgers.edu/>) for course information and content.

**Course materials**

Standard Operating Procedures (SOPs) and other required reading will be uploaded onto Canvas before the start of each class. Other relevant literature will be provided as supplement to the lectures or to augment the labs and homework assignments. Reading should be referred to in answers to homework questions, where appropriate.

**Learning Goals**

The learning goals for the Marine Sciences program are posted on our website at <http://marine.rutgers.edu/main/academics/undergraduate>. This course addresses these learning goals by having students:

1. Master the basic biological, chemical, physical, and geological principles of marine science
2. Interpret contemporary oceanographic datasets
3. Show evidence of scientific literacy and communicate information effectively both orally and in writing

**Assessment and course grading**

Student achievement of learning goals will be assessed from homework assignments after each lab, an oral presentation (individual or team effort), and a paper (full class collaborative effort).

**Percentage of grade**

Homework:  50%

*Note: all lab reports must be turned in to receive a grade; late submissions will have points deducted*

Oral presentation: 25%

Final paper:  25%

**Course schedule and topical focus areas**

**(Subject to change dependent upon weather and equipment availability)**

Class 1 Introduction:  Review syllabus and expectations, Sample collection instruction (CTD/Niskin/Rosette/refractometer/secchi disk/ProDSS), Team development for cruises, Data analysis discussion.

Class 2 **Field Trip** to Haskin Shellfish Laboratory. Fauna sampling: benthos (trawl, dredge, grab, nets, traps); water sampling: water quality (ProDSS, YSI/castaway), Demo FlowCam

Class 3 Chlorophyll-a/Phaeophytin on frozen samples and Primary Productivity

Class 4 **Field Trip** Cruise #1 in the Raritan Bay: Collect and preserve or freeze samples and analyze later during other labs

Class 5 Dissolved oxygen; Respirometry experiment on live aquatic organisms

Class 6 **Field Trip** Cruise #2 in the Raritan Bay: Collect and preserve or freeze samples and analyze later during other labs

Class 7 Nutrients in seawater; Analysis of ammonia and phosphate (SRP) on frozen samples

Class 8 Carbonate chemistry: pH analysis (on standards); Total alkalinity on preserved samples; CO2SYS Lesson (using pH and total alkalinity data)

Class 9 Zooplankton abundance and composition on preserved samples

Class 10 Complete analysis of all remaining samples

Class 11 Data Analysis/Interpretation discussion #1

Class 12 Data Analysis/Interpretation discussion #2

Class 13 Oral presentations (LAST DAY OF IN-PERSON CLASS)

Class 14 Turn in class paper (electronic submission; no in-person class)