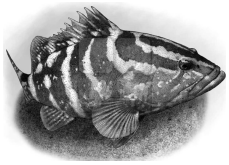



Biodiversity of Coral Reefs (BIOL 314)
Geology of Coral Reefs (GSci 388)



Spring 2020 **SUNY Geneseo**

Instructor: Isidro Bosch, Professor of Biology
Office ISC 260; e-mail: bosch@geneseo.edu; phone: 245-5303
Office Hours: M 2:30-3:30, R 10: 00-11:30, F 11:30-12:30

Instructor: D. Jeffrey Over, Professor of Geological Sciences
Office ISC 249; e-mail: over@geneseo.edu; phone: 245-5294
Office Hours: TBD

Course Schedule: MW Lecture: 1:00-2:15 ISC 137; (3 cr: 2-3 Lab TBD in Bahamas

Course Description

Coral reefs are marine biodiversity hot spots that are in serious jeopardy. Students enrolled in Biology 314 and GSCI 388 will have the opportunity to study these amazing ecosystems and learn about the forces that compromise reef health. The topics we cover emphasize geological and biological processes that contribute to the biodiversity and structure of reefs. In the study abroad/field portion of this course you will spend 9 days working at Gerace Research Institute on San Salvador Island in The Bahamas, where you will witness first-hand the remarkable diversity, beauty, and the fragile nature of coral reefs.

During the first half of the semester while on campus students will work to identify a research topic, propose a formal written plan of investigation, and carry out the proposed study while in the Bahamas during spring break (March 12-21), where you will conduct field surveys and carry out projects designed to explore questions related to biodiversity. The project work will culminate in two deliverables that will be completed on campus during the second half of the semester: a research group poster presentation on GREAT Day (April 22) and an individually written scientific report due May 1.

To enroll in BIOL 314/GSCI 388 students must have completed a college course in Ecology or Environmental Science, or a comparable course. Enrollment is by permission of instructor.

Activities Abroad

The trip to San Salvador Island and our stay at the Gerace Research Institute are coordinated by SUNY Geneseo's Study Abroad Program. You will need a valid passport to enter the Bahamas and return to the U.S.A. If you are not a U.S. citizen in addition to your passport you will/may need a valid re-entry permit and a visa. Please check with the Study Abroad Office if you have any questions about international travel.

While on San Sal, the group will be active in the field during the day and meet for about an hour or more of course related activities each evening. Our field activities typically involve multiple hours in the water each day, swimming at depths of 1-4m over reefs and other habitats. Safety during these outings is a priority. Proper snorkeling gear is required, including an emergency snorkeling floatation device. We will adhere strictly to the buddy system. To demonstrate proficiency in snorkeling, students must attend at least 2 of 3 pool training sessions organized by your instructors while in Geneseo.

Readings

There is no required textbook. While in Geneseo, the instructors will assign readings from the scientific literature. Copies of these articles will be provided as pdf files. Each student will be responsible for organizing and leading a short discussion centered on one of the assigned readings. Before departure for the Bahamas you will be provided an informative field course booklet containing travel information, readings, species lists, assignment rubrics and more.

Participation

Preparation and cooperation in all class activities are important in any course, but they are critical to the success of an advanced course and especially with a small class size. We devote a considerable amount of time to discussion topics and to preparation for field studies, and then we have a very brief and hectic time doing our field work on the island. Students should prepare well for class meetings, show enthusiasm and interest during class activities, and behave responsibly in all cases, especially while we are away from campus (There is no "I" in "Study Abroad"). During our stay on San Salvador and passage through Nassau we will be representing SUNY in a foreign nation. It is imperative that we respect the cultural norms and laws of our host country. Even when abroad, students and faculty are legally bound by the laws of the United States and the SUNY Geneseo code of conduct. Once we leave campus your instructors have ultimate authority for all course activities and participant actions. Your participation score is 15% of the final grade.

Learning Outcomes - To achieve minimum competency in this course students should be able to:

- Describe the key features of the ecology and geology of the Bahamian marine environment, focusing on coral reef ecosystems and their component habitats, fauna, and flora.
- Identify common organisms in five major reef associated habitats and describe basic aspects of their biology and ecology (e.g. taxonomy, feeding mode, habitat, etc.).
- Explain how the processes of carbonate geology have shaped the Bahamian island group and their coastal zone and created the five major habitats in the Bahamian reef environment.
- Discuss ways in which human activities disrupt the balance of coral reef systems and potential strategies for management/mitigation of such problems.
- Write a persuasive proposal for a significant field research project to be carried out in the Bahamas
- Write a scientific journal-style report effectively describing a scientific problem, methods used, and the results of fieldwork in the Bahamas, including both descriptive and inferential analysis of the results, evaluation of the trends and significance of the findings.
- Create an effective and scientifically rigorous poster presentation describing the research project questions and methods, and the results and conclusions of the work.

The first four learning outcomes will be assessed primarily through participation in class discussions and a single take home mid-term exam. Success in meeting the remaining learning outcomes will be determined by the student's performance in three different but related projects: (i) A written proposal to conduct a field study in the Bahamas as part of the co-requisite field course; (ii) A journal style research paper reporting the results of the field project; (iii) A poster presentation describing the complete project.

Assignments, Due Dates, and Grading

Midterm Exam: Midterm Exam on geology and ecology of Caribbean reefs, based on lectures.

Quizzes: 5 quizzes on identification/ecology of reef species, including one at the end of our stay on the island (schedule TBD).

Proposal for a Research Project: Formal written proposal that must include an analysis of a scientific problem with an accompanying review of relevant scientific literature and the complete design of a field study.

Oral Presentation: This will be a short in-class summary of your data, completed analysis and plans for further work.

Poster Presentation: A poster describing the results of this project is to be presented for G.R.E.A.T. Day 2017 (April 22). Students must submit an abstract of the project before departure.

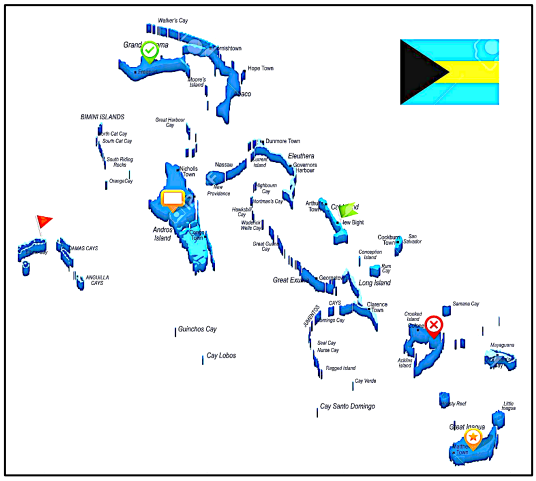
Research Report: Formal written report based on analyses carried out in the laboratory portion of the course. The report will follow standard scientific journal format.

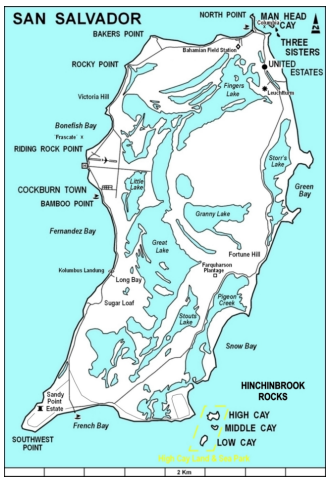
Field Notebook: This should be a well-organized, legible account of all the official activities and observations. A waterproof notebook will be provided as part of your course materials, and on the first evening there will be a lecture on best practices for maintaining a field notebook.

Participation: includes preparation for class, diligence in meeting deadlines, contributions to the dynamics of class discussions, and cooperation and effort on campus and especially during the field studies.

Total Scor	Grade Schem
93-100 %	A
90 - 93	A-
87 - 90	B+
83 - 87	B
79 - 83	B-
75 - 79	C+
71 - 75	C
66 - 71	C-
61 - 66	D

Assignments and Due Dates	% of final grade
Quizzes	10
Proposal (Due Th 2/25)	10
Mid term exam (3/11)	25
Field Notebook (3/31)	10
GREAT day poster (4/22)	10
Research Report (5/1)	20
Participation	15
TOTAL	100





Tentative Schedule of Class Meetings

Week/Date/Day_____Topics

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1 1/22 W Coral Ecosystems and other Bahamian Habitats (**Lect A**)

2 1/27 M Historical Geology of Coral Reefs (**Lec B)**

1/29 W Cnidarians and Corals of San Salvador (**Lect C**)

3 2/3 M Geological Origin of the Bahamas (**Lect D**)

2/5 W Invertebrate Biology (**Lec E**) **(Read 1:TBD)**

4 2/10 M Island Geology, Glacial Cycles and Stratigraphy (**LEC F**) **(Read 2:** Toomey 2013 **)**

2/12 W Vertebrate Primer/Fishes of San Salvador (**Lec G**)

5 2/17 M Zooxanthellae; Seaweeds of San Salvador (**Lec H**) (**Read 3**: Allemand and Furla 2018)

2/19 W Coral Reef Ecology (**Lec I**)

6 2/24 M Coral Reef Ecology (Read TBA (**Lec J**) (**Read 4**)

2/26 W Select Research groups, proposal topics

7 3/2 M Threats to Coral Reefs (**Lec K**)

3/4 W Threats to Coral Reefs (**Lec L) (Read 5: TBD)**

8 3/9 M Midterm (Monday)

3/11 W Logistics for Research/Travel (receive books, directions, etc.)

3/12 R Fly ROC –NAS-San Sal

9 3/12-20 FIELD STUDIES IN SAN SALVADOR

3/21 Fly: San Sal- Miami-ROC

10 3/23 M Discuss Research results, strategies for data analysis

3/25 W Report Format/Ecological Statistics: Diversity and Similarity Indices

11 3/30 M Statistical Analysis I (Regressions/Correlations) (**Read 6:** Fisheries)

4/1 W Statistical Analysis II: Two- Multi-Treatment Tests;**)**

12 4/6 M Writing a scientific paper/composing a poster (**Read 7**: Mumby, Caribbean Reefs)

4/8 W Work on Poster for GREAT Day

13 4/13 M Oral progress Report (**Read 8:** Van Oppen, Assisted Evolution of Corals)

4/15 W Work on Poster for GREAT Day

14 4/20 M In Class Poster Presentation

4/22 W GREAT Day

15 4/27 M Report Writing Consultations

4/29 W Report Writing Consultations

16 5/4 M Final reports due

5/6 W Consultation on Revisions/ Integration

17 5/14 R Thursday **Final Exam Period** Noon – 2:30 PM