BI 539 COURSE SYLLABUS

Coral Reef Dynamics: A field research course on the MesoAmerican Barrier Reef of Belize

Professor: Randi Rotjan
Teaching Fellow: Rebecca Branconi
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Office: BRB 227 BRB 321

Class: CAS BI 539, BUMP Block 4, Fall 2016
10am – 5pm Monday through Friday, November 28th - December 7th
Intensive Field Immersion, December 8th – 20th
Final day clean-up and wrap-up, December 21st
On Campus Classroom: BRB 117; Abroad: Calabash Caye Field Station, Belize.

I. Quick Look Topics Calendar

**Boston**
- Mon 28th: Introduction/Coral Reef Biodiversity/Formation
- Tues 29rd: Reef Ecosystem Services
- Wed 30th: Coral Growth Forms and Zonation / Coral Symbioses
- Thur 1st: Coral Reef Fishes
- Fri 2nd: FitRec 9-11; Subtidal Field Methods
- Mon 5th: MPAs and the Future of Coral Reefs
- Tues 6th: Statistics and Planning
- Wed 7th: Research Proposal Presentations / Packing and logistics

**Travel**
- Thurs 8th: Meet @ Logan 3:00am - Flights - Boat - CCFS Welcome

**Belize**
- 8th-20th: Ecosystem Sampling Tours/Independent Field Projects

**Symposium**
- Mon 19th: Final Presentations/CCFS Farewell Dinner/Bonfire Party

**Travel**
- Tues 20th: 7am Boat to Belize City via RV Diadema - Flights - Home

**Boston**
- Wed 21st: BUMP Gear Return/Student Evals/Pizza Lunch

II. Introduction

Coral Reef Dynamics (BI 539) is an introduction to research on the biology and ecology of coral reefs. The course examines coral symbioses; reef types and their distribution; coral allies and associated species; and tropical nearshore community dynamics. Students will acquire the necessary foundation to conduct field research using standard subtidal sampling methods. The course culminates in an intensive field research experience in coral reef community ecology at field sites in Turneffe Atoll, Belize. Students will design and conduct an original field research project and present their findings during a symposium held at Calabash Caye Field Station.

The work is divided into two parts: time in Boston, time in Belize, plus two days in transit. This
is an extremely intensive course, and while in the field, we will work straight through the weekends. Time in Belize is also in two parts beside the travel days: an initial 2.5 days of exploring the landscape that supports coral reef growth at Calabash Caye, and the remaining 7.5 days during which everybody will conduct their field research, analyze their data, and present their results in a professional manner.

Coral Reef Dynamics is a unique collaboration between BUMP and the Environmental Research Institute, University of Belize. Students are engaged in work that contributes directly to Belize’s national marine research plan and to growing knowledge about marine ecological dynamics of the greater Mesoamerican Reef System. Work by Coral Reef Dynamics students will contribute directly to marine conservation and integrated coastal zone management in Belize.

TEXTBOOK (chapters available as pdfs on Blackboard):
   The Biology of Coral Reefs. Sheppard, Davy, and Piling
   Additional course readings (pdfs) are posted by date on Blackboard_Classes.

PRE-REQUISITES: BI 107, BI 260, and admission to the Marine Semester.

III. COURSE MATERIALS & PREPARATION FOR FIELDWORK IN BELIZE
1. INTERNATIONAL TRAVEL
   Required: Valid passport (visa not required)
2. SNORKEL AND SWIM PROFICIENCY
   Required: Participation in a BU FitRec snorkel skills analysis (snorkelympics or a "make-up" pool session with instructors); valid BU Swim Card
   Recommended: Practice both swim and snorkel skills in the FitRec pool prior to departure for the field.
   Provided by BUMP: Divers Alert Network (DAN) Insurance
3. SNORKELING GEAR
   Required: snorkel, mask, fins and booties (open-heeled fins recommended), waterproof watch, and either a wetsuit or a dive skin (full body or separate top and bottom). Your personal wetsuit choice is based on three important variables: A. warmth, B. coverage, and C. buoyancy. Many BUMP students wear full-length 3mm wetsuits, this is an excellent choice if you tend to get cold in the ocean and/or desire a little extra buoyancy during fieldwork. For those with higher body heat, coverage via a dive skin or rashguard is highly recommended. Note: the choice to wear a wetsuit does not mean that you will forfeit your ability to surface dive, weights are available at the field station for our use. Regardless of the material, coverage is key given the likelihood that we will be stung by nematocysts when sampling mangrove habitat (additional forms of coverage recommended below).
   Recommended: dive gloves (1-1.5mm or thin gardening gloves), dive hood (lycra or thin neoprene), underwater flashlight, personal underwater camera
   Provided by BUMP: underwater dive slate, UW pencil, snorkel vest, and several UW cameras for check-out
4. FIELD GEAR AND CLOTHING
   Required: light rain jacket, polarized sunglasses, sunscreen, insect repellant, light long-sleeved clothes, hat, bathing suit
Recommended: headlamp, sandals (chacos or tevas), water bottles(s), and a few cool weather clothing items

5. BUNKROOM AND BATHROOM
   Required: tropical sleeping bag or sleeping sheet, towel (full-sized towel or REI pack towel), and all personal toiletries (see below)
   Recommended: extra string or cord for laundry line and/or use in setting up your mosquito tent, favorite personal snacks and treats (clifbars, probars, chocolate, fancy coffee, favorite tea). We will be making a stop at a local supermarket before heading to the Ferry Dock on arrival in Belize but note that typical Belize City grocery store goods are quite different than those we stock up here in the US.
   Provided by CCFS: bunk beds, bug tent, fan, pillow/case, and bed sheets

6. TOILETRIES AND MEDICATIONS
   Required: any/all personal toiletries and personal medications (in original bottles)
   Recommended: swimmer's ear drops, motion sickness medicine (dramamine or bonine), anti-diarrheal (immodium), cold medicine antihistamine, nasal decongestant), pain medicine (tylenol, ibuprofen, acetaminophine), and personal first aid (disposable bandages, benadryl). Consult your physician and the CDC regarding immunizations.

7. TECH AND ACADEMIC
   Required: USB flashdrive/thumbdrive, chargers/batteries/cases for personal devices
   Recommended: personal field guides, artist's paper (personal field drawings, plant/algae pressings), binoculars (7x50 to 10x50, suitable for birding)
   Provided by BUMP: two online laptop stations (pc and mac) with photo-analysis, stats, and presentation software; four ipad mini's with stats and presentation software; underwater sampling gear, dry and wet lab instrumentation, waterproof field journals (Rite in Rain), and a field library of guides and references.
   Optional: personal laptops, tablets, and phones are allowed at CCFS for data entry, ppt building, final presentation, and field camera use. Should you choose to bring your laptop or device please note the following: wifi is not available for personal use (our bandwidth is extremely limited on the Atoll and is reserved for our two BUMP laptops, the CCFS Manager, and emergency medical communication); CCFS buildings can leak in heavy rainstorms (we will provide air tight pelican cases as daily and nightly classroom storage but waterproof cases and/or anti-desiccation packets are recommended); and all associated personal power cords must be brought by you (clearly labeling them is a good idea).

IV. Travel details

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V. SYLLABUS CALENDAR (An itinerary for each class and field day is presented)

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VI. DISCUSSION LEADERS:
MON NOV 28: _______________________
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FRI DEC 2: _______________________
MON DEC 5: _______________________
TUES DEC 6: _______________________
WED DEC 7: _______________________
VII. STUDENT EVALUATION

PARTICIPATION 100 pts. . . . . Attendance and engagement in Class, Lab, and Field Sessions while abroad.

RESPONSE TO READINGS 100 pts. . . . . On five occasions while in Boston, students will write (1) an original, testable research question based on topics presented in the HW readings and (2) a brief statement on why the question is important. Students will email this assignment to the designated student discussion leader by 10pm on that same HW evening and cc me when you do so (rotjan@bu.edu). On the following day, in the final 10min of the 10:00-10:50am lecture block, the student discussion leader will anonymously present her selection of the 2 most cohesive submissions for discussion.

DISCUSSION LEADERSHIP 100 pts. . . . . Each student will have the opportunity to participate as a “student discussion leader” during the class. The role is responsible for (1) the evaluation of student “responses” to nightly readings and (2) the anonymous presentation of two exemplary study designs during the final 10min of the 10:00-10:50am lecture block. The discussion leader is also responsible for leading the discussion of a select paper during the 11:00-12:00am lecture block.

DISCUSSION OF PAPERS 100 pts. . . . . While on campus at BU the 11:00-12:00am lecture will take the form of a graduate seminar-style discussion of a contemporary paper in tropical marine invertebrate biology. Preparedness and participation during discussion will be assessed.

THE FIELD JOURNAL 100 pts. . . . . Each student will keep a traditional naturalist’s field journal during the course of the class. Journals will be graded on the quality of information recorded on focal taxa (i.e., illustrations, technical descriptions, field sketches, and observations). Expectations for journals and exemplary journal entries will be presented in class.

STUDENT RESEARCH PROJECT:
1. PROJECT PROPOSAL 100 pts. . . . . Students will present their individual project proposals to the class during our final in-class session at BU, pre-Belize. Expectations for this ppt and its content will be discussed in class.

2. FIELD RESEARCH 100 pts. . . . . Individual students and student field teams will be evaluated for their conduct while carrying out field research in Belize. In addition to scientific merit,
the rubric includes assessment of group cooperation, collaboration, and division of labor.

3. **Presentation Notes** 100 pts. . . . . . . Each student will be required to submit a .docx of their ppt slides and talk notes prior to the final presentation of their research. This document will be graded for content and clarity.

4. **Final Presentation** 100 pts. . . . . . Students will present a ppt of their field research project during our final CRD Symposium to be held at Calabash Caye Field Station. Each student talk will be 8 min. followed by 2 min. for questions.

**Final Grade** 900 pts. . . . . . .
- **A 95-100%**  
- **A- 90-94%**  
- **B+ 87-89%**  
- **B 83-86%**  
- **B- 80-82%**  
- **C+ 77-79%**  
- **C 73-76%**  
- **C- 70-72%**  
- **D 60-69%**  
- **F <60%**

VIII. **Course Policies**
It is expected that:
- you will come prepared to class and field sessions and take an active role in your own learning. Preparedness is exhibited through your careful readings of relevant textbook, primary literature, and field materials as well as your active participation (oral or written) in class meetings.
- you will attend every class unless your absence is justified and pre-approved by the Instructor and TFs. Absences exceeding two class sessions will significantly affect your participation grade. If you foresee the need to miss class please let me know immediately and in advance. Upon missing, it is your responsibility to get class notes, assignments, updates, etc. from another student, not from the professor.
- you will be on time to class meetings at BUMP and in the field.
- for every hour you spend in class you should spend an equal hour outside of class reading, studying, and preparing for your field research project and presentation.
- behavior and discourse during class will reflect professional interactions in scientific meetings, symposium, and graduate lectures. Your classmate are your colleagues, treat them respectfully and considerately during group work, discussion, in-class debate, and collaborative field research.
IX. ACADEMIC INTEGRITY

My expectation is that you will adhere to the *Academic Conduct Code* while in BUMP ([http://www.bu.edu/academics/resources/academic-conduct-code/](http://www.bu.edu/academics/resources/academic-conduct-code/)) and *Boston University Policy* ([http://www.bu.edu/academics/resources/university-policy/](http://www.bu.edu/academics/resources/university-policy/)). For students, the Code establishes an environment of integrity and professionalism that helps to assure each individual of receiving appropriate recognition for his or her work. The ethical decisions that students face in an academic environment are similar to those they will encounter routinely in the professional world they will enter upon graduation or where they are currently employed. The Code allows faculty to conduct a fair and accurate evaluation of student performance and to maintain a supportive and just learning environment. Academic integrity is a critical component of such an environment, giving faculty the freedom to extend their role as educators to include serving as mentors and colleagues as well as instructors. For administrative staff, the Code gives them the ability to deal more effectively with students, and to work on a student’s behalf both within the University and outside it.

This respect for universally recognized ethical values affects the University’s reputation in both the academic and professional communities of which it is a part. This reputation is essential to the success of not only the current generation of students, but previous and future generations as well.

All Boston University students are expected to maintain high standards of academic honesty and integrity. It is the responsibility of every undergraduate student to be aware of the Academic Conduct Code’s contents and to abide by its provisions.

*Boston University prohibits discrimination against any individual on the basis of race, color, religion, sex, age, national origin, physical or mental disability, sexual orientation, or marital, parental, or veteran status. This policy extends to all rights, privileges, programs, and activities, including admissions, financial assistance, employment, housing, athletics, and educational programs. Boston University recognizes that nondiscrimination does not ensure that equal opportunity is a reality. The University therefore will continue to take affirmative action to promote equal opportunity for all students, applicants, and employees. Inquiries regarding the application of this policy should be addressed to the Associate Vice President for Human Resources, 25 Buick Street, Boston, MA 02215; 617-353-4477.*