OCB 4104C: Marine Field Ecology

Course Description and Syllabus

Course Justification: This course will provide students with the much needed practical application of coursework allowing them to actively participate and lead in the execution of group-based field experiments and formal analysis and reporting. Students will be able to critically evaluate hypotheses and methods applied throughout the course and identify sources of bias that may influence conclusions drawn from each experimental approach. Students will develop presentation skills by presenting project ideas and hypothesis and articulating results and conclusions to class peers.

Instructor: Dr. Kevin M. Boswell, Biscayne Bay Campus, MSB355. Email: kevin.boswell@fiu.edu (preferable); Please include OCB4104C in subject line. Phone: (305) 919-4009.
Office hours: Monday and Wednesday 9:00-12:00 or by appointment.

Day	Lecture Topics	Potential Field Activities
8/26	Introduction, Scientific Method, Principles of Ecological Analyses	Establish groups, YSI, HOBOs, Field Data Sheet Completion
9/2	No lecture this week- initial field exploration	Nekton community composition- nearshore seining (artificial beach, beach, tidal creek); Trawling, Plankton, YSI, HOBOs,
9/9	Ecological Succession, Methods of Nekton Collection, Identification and Meristics	Visual abundance surveys and habitat classification (Beach and Sea Grass), YSI, HOBOs,
9/16	Physicochemical Properties of Water and Water Quality Monitoring	Acoustic monitoring of beach and tidal creek habitats, YSI, HOBOs,
9/23	Visual Abundance Surveys	Data analysis and organization, YSI, HOBOs,
9/30	Photogrammetric Techniques	Autonomous Boat Deployment- Habitat Mapping (Beach and Sea Grass)
10/7	Analytical Techniques of Water Column Properties	Nekton community composition- nearshore seining (artificial beach, beach, tidal creek); Trawling, Plankton, YSI, HOBOs,
10/14	Principles of Acoustics and Analysis; Exam 1	Acoustic Monitoring, Visual abundance surveys and habitat classification (Beach and Sea Grass), YSI, HOBOs,
10/21	Subtidal Habitat Classification	Nekton community composition- nearshore seining (artificial beach, beach, tidal creek); Trawling, Plankton, YSI, HOBOs,
10/28	Data Analysis and Statistical Methods	Visual abundance surveys and habitat classification (Beach and Sea Grass), YSI, HOBOs,
11/4	Data Analysis and Statistical Methods	
11/11	Veterans Holiday- No Class	
11/18	Principles of Preparing Scientific Presentations and Reports	Nekton community composition- nearshore seining (artificial beach, beach, tidal creek); Trawling, Plankton, YSI, HOBOs,
11/25	Thanksgiving Break- No Class	
12/2	Group Presentations/Reports Due	
12/9	Final Exam	

Credits: 4

Prerequisites: Successful completion of Marine Biology and Oceanography OCB 3043 or Ecology PCB 3043.

Lab fees: Lab fees will be assessed.

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Course Description: An introduction to field ecology with emphasis on methods used in marine ecology research and is intended to serve as an Upper Division Elective Course in Distribution Category A: Ecology. Students will be exposed to and actively implement principles of the scientific method, critical thinking and experimental design through the use of a variety of field methods (i.e., direct biological collections and remote sensing) with their corresponding analytical tools (e.g., Matlab, SAS, Sigma Plot, SPSS). These skills will allow students to analyze ecological questions and by applying critical thinking skills, succinctly summarize and interpret collected data and develop conclusions based on findings. Lecture periods will consist of a combination of both traditional lecture and field components offering a wide perspective and hands-on approach to marine ecology. In addition to the introduction to field methods, students will be exposed to common statistical and plotting packages to be applied during report and presentation preparation.

Learning outcomes: Students will be able to: 1) Develop competency in principles of data collection techniques commonly employed in field research, 2) Examine and integrate principles of the scientific method and experimental design into hypothesis-based field based experiments; 3) Apply analytical tools to summarize data and develop skills to interpret results, develop conclusions and succinctly present findings to a peer-audience.

Major Topics:
Principles of the Scientific Method, critical thinking, and bias
Ecological succession
Physicochemical properties of water and water quality monitoring
Methods of nekton collection, identification and meristics
Visual abundance survey methods
Subtidal habitat classification
Photogrammetric techniques
Hydroacoustic techniques and processing
Ecological and environmental analysis techniques
Principles on preparing reports and scientific presentations

Course Format: Class will meet once a week for a 6-hr period. One class period (6 hours) will comprise part lecture/discussion/data analysis/field activities. Clothing: Bring clothes appropriate for use in the field. Bring clothes that will protect you from getting cut and be prepared to get wet.

Grading: A 90 – 100%; B 80 – 89%; C 70 – 79%; D 60 – 69%; F < 60%

Lecture will include a Midterm Exam, a Final Exam, and a Group Presentation. Lab will include 4 Field Reports with data generated through mandatory participation in the field work. The following will serve as the grading structure:

Midterm Exam:	15%	Lecture
Final Exam:	15%	Lecture
Participation	20%	Lab
Assignments	20%	Lab
Group Presentation:	30%	Lecture
Total	100%	

Exams will comprise short answer and essay questions tuned to evaluate students' comprehension of the fundamentals of sampling methods presented and analytical techniques employed.

Group assignments: Class will be separated into groups of several students, where groups will be responsible for cooperatively conducting field-sampling activities. Each group will be provided a composition notebook for use in recording field activities; each group will be responsible for

developing activity-specific reports from which field notes will serve as the foundation for the submitted lab reports. The instructor will provide a template for students to follow.

Lab reports will consist of a descriptive narrative explaining methods and outlining the approaches employed, as well as hypothesis to be tested for each field experiment. Lab reports should include appropriate analyses based on lecture discussions and outside readings and provide simple statistics describing trends observed. Results presented should reflect the observed patterns and be supported by the statistical analyses applied. The report should also include a discussion section outlining the interpretation of the results and significance of findings. Additionally, the discussion should include an explanation of the potential biases inherent in the techniques applied and their potential implications on the observed results.

At the conclusion of the semester, groups will present a summary of the semester activities including results and conclusions based on field experiments.

Course website: Blackboard will be used for hosting of course material.

Texts:

Gotelli, N.J. and A.M. Ellison. 2004. A Primer of Ecological Statistics. Sinauer Associates, Inc., Sunderland, MA. USA.

Murphy, B.R. and D.W.E. Willis. 1996. Fisheries Techniques (2nd ed). American Fisheries Society, Bethesda, MD, USA.

Scheiner, S.M. and J. Gurevitch. 2001. Design and Analysis of Ecological Experiments. Oxford University Press, USA.

Sutherland, W. J. 2006. Ecological Census Techniques, A Handbook. Cambridge University Press.