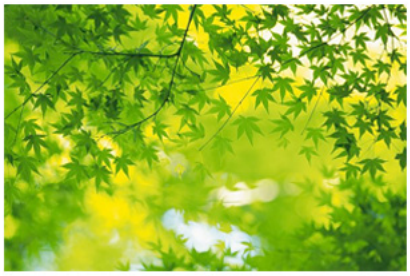
FAS 6339C
Advanced Quantitative Fisheries Assessment



4 credits Spring 2014

INSTRUCTOR
Robert Ahrens rahrens@ufl.edu
Office McCarty C room 402 Hours: I maintain an open door policy for students requiring assistance. Distance student can contact me via email to determine the best method for communication (Skype, phone, etc.). Set times for electronic meetings can be established for distance students and will be discussed at the beginning of the term.

COURSE LOCATION & HOURS
McCarty C 426 Lecture Period 3-4 9:35-11:30 T Lab Periods 3-5 9:35-12:35 R

TEACHING ASSISTANTS
Ed Camp edvcamp@ufl.edu

PURPOSE OF THE COURSE

Advanced Quantitative Fisheries Assessment is a graduate course offered by the Program in Fisheries and Aquatic Science covering topics related to fisheries stock assessment and management. This course will focus on modern stock assessment models, computational techniques, why these methods work, why they sometimes fail, and how they can be improved and used in evaluating management decisions.

The aim of this course is to provide students with concepts and methods needed to work effectively as a consultant or government scientist on common problems in applied fish biology. These problems range from analysis of fish habitat and population status in relation to conservation and environmental management issues, to fish stock and ecosystem assessment needed for sustainable harvest management.

The course is organized as two meetings each week, a two-hour lecture/tutorial session on a broad topic then a three-hour lab session to demonstrate specific assessment or gaming methods. All lab sessions are computer-based where students will learn spreadsheet, R, ADMB and other methods for data analysis. Students are expected to have experience with basic fisheries management concepts and calculations and an interest in building computer models to evaluate trade-offs in management decisions.

LEARNING OUTCOMES
By the end of the course, students should be able to demonstrate an understanding of the following concepts and techniques:

- Representing state dynamics in both single and multispecies models using various model structures
- Capturing spatial processes in using both spatially explicit and spatially implicit.
- Common problems in developing appropriate observation models and the methods required to meet model assumptions
- Likelihood and Bayesian methods for evaluating model credibility and parameter uncertainty
- Methods for forecasting and evaluating risk of management options
- Developing simulations to evaluate management strategies.
- Identify potential problems with data sets.
- Identify appropriate state dynamics model, observation model, and statistical methods for evaluating population or ecosystem attributes of interest.
- Develop computer code to perform these evaluations and present the results in an appropriate manner.
- Develop ecosystem models in the EwE framework.

CREDIT HOURS
This is a 4 credit "C" course, which means there is a lab associated with this course. Two credits of lecture equate to two hours of contact time per week, and one credit of lab throughout the entire semester. We will have 3 hours of lectures per week, and 3 lab hours.

FORMAT
This is a 4-credit course, consisting of instruction in both the classroom and computer lab. We will use the class meeting time for formal instruction including a combination of lecture, discussions, class activities, and computer labs. You are expected to actively participate during classes- expect to be called upon to answer questions, perform calculations, and work on group activities. The computer labs will reinforce and strengthen concepts learned in class through hands-on activities. During the computer lab you will develop assessment or simulation models aimed at providing advice to management (see description of assignments below).

REQUIRED MATERIALS
Much of the lab work done in FAS 6339C is conducted on computers. All participants are expected to have access to a computer that they can bring to lab sessions. Computers are expected to have a version of Microsoft Excel with Solver installed, a text editor with syntax highlighting, the R statistical software (*www.**r**-project.org*), Ecopath with Ecosim 6 (*www.ecopath.org*), and AD model builder (*admb-project.org*).

Text editors: Text pad http://www.textpad.com/, Tinn-R http://www.sciviews.org/Tinn-R/, R-studio http://www.r-studio.com/, Sublime www.sublimetext.com/, Emacs

You should also bring a laptop to each class. There is no required text for the course. Below are a number of suggested information sources. Additional readings will be provided on the course Sakai site.

Hilborn, R and C J Walters 1992. Quantitative fisheries stock assessment. ISBN 0412022710
Walters, C. J. 2001. Adaptive management of renewable resources. ISBN1930665431
Walters C.J. and S. J. D. Martell 2004. Fisheries Ecology and Management. ISBN 0691115451

All participants are encouraged to read Hilborn R. and M. Mangle 1997 The Ecological Detective. ISBN 0691034974.

ELECTRONIC COMMUNICATIONS
Course materials will be available through the Sakai e-learning site. You will find a link for handouts (syllabus, assignments, lab data) and for all presentations. Presentations may not be available prior to class and it is your responsibility to take notes. On occasion, an email will be sent to your UF email address regarding updates to the syllabus, clarifications of assignments, or changes in due dates. If you aren't doing so already, you should be checking your UF email on a regular basis. Assignment and final projects for individuals taking the class on campus are to be handed in during class times at any time before or on the date they are due. Individuals taking the class via distance can turn assignment in via email to the instructor before or on the day they are due.

EVALUATION AND PERFORMANCE CRITERIA

Evaluation Method	**Points / % of total**	
Assignments	80 pts	80%
Final Report	20 pts	20%

Letter grades will be assigned as follows: A (90-100) GPA 4, B (80-89) GPA 3, B+ (88-89) GPA 3.33, B (83-88) GPA 3, B- (80-82) GPA 2.7, C+(77-79) GPA 2.3, C (73-76) GPA 2, C-(70-72) GPA 1.7, D+(66-69) GPA 1.3, D (63-65) GPA 1, D- (60-62) GPA 0.7, E (<60) GPA 0
A complete explanation of the UF Grading policies can be found at :
http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html

At the very minimum, the student is expected to attend class, complete all assignments on time, and actively participate during class discussions. Students who complete the minimum requirements (i.e., just answering the assignment questions asked) should not expect to receive and A in the class. Student wishing to receive and A should go beyond the minimum required questions. Excuses for late work and absences—Assignments turned in on paper at the start of the class period or by 5 pm are considered on time. After that, late assignments will lose value at the rate of 10% for the first late day and 5% for each subsequent late day. Arrangements to hand in assignments late due to conflicts with absence due to field work and conferences must be made prior to the assignment due date. Failure to make arrangement will result in lost marks.

Assignments
Assignments will generally consist of exploring some aspect of population/ecosystem assessment. There will be 8 assignments over the course of the term. Assignments will generally follow the material presented in class. You will be required to submit a summary report of your

findings. Students expecting an A are expected to go beyond the basic questions you are asked to explore and provide a broader analysis of the topic explored.

Final Reports
At the beginning of the term you will be asked to gather the available data for a stock of interest. It is important to acquire this data early. You will then answer the three fundamental assessment questions: 1) what is the current stock status? 2) what was the historical mean productivity? 3) how have the components of net production changed over time? for your stock using a variety of single species assessment models ranging for structurally simple to structurally complex. Your results comparing the various assessment methods and findings will be presented in a final report.

ONLINE COURSE EVALUATION PROCESS

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

ACADEMIC HONESTY

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*" You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment*."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

SOFTWARE USE

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or

criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

SERVICES FOR STUDENTS WITH DISABILITIES

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, **www.dso.ufl.edu/drc/**

CAMPUS HELPING RESOURCES

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,* **www.counseling.ufl.edu/cwc/**

Counseling Services
Groups and Workshops
Outreach and Consultation
Self-Help Library
Wellness Coaching

- *Career Resource Center,* First Floor JWRU, 392-1601, **www.crc.ufl.edu/**

DISTANCE STUDENTS

Should you have any complaints with your experience in this course please visit http://www.distance.ufl.edu/student-complaints to submit a complaint.

COURSE SCHEDULE
this schedule is a guideline and material may change

Week	Date	Day	Type	Topic
1	7-Jan	T	Lec	Overview and introduction to fisheries assessment & Review of basic equations and definitions
1	9-Jan	R	Lab	Biomass dynamic models Excel and R
2	14-Jan	T	Lec	Basic ecological principles & Numbers dynamic model calculus review
2	16-Jan	R	Lab	Age structured modeling equilibrium analysis
3	21-Jan	T	Lec	Harvest strategies and tactics & Fitting models to data - likelihoods
3	23-Jan	R	Lab	Age structured modeling simulation evaluation
4	28-Jan	T	Lec	Recruitment & More likelihoods
4	30-Jan	R	Lab	Delay difference modeling
5	4-Feb	T	Lec	Estimating abundance & Parameter uncertainty I
5	6-Feb	R	Lab	Modeling Effort Dynamics
6	11-Feb	T	Lec	Information content in fisheries data & Cpue standardization
6	13-Feb	R	Lab	Cpue standardization
7	18-Feb	T	Lec	Effort Dynamics & Size and bag limit YPR
7	20-Feb	R	Lab	Equilibrium delay difference spatial optimization
8	25-Feb	T	Lec	Mark recapture and Biomass dynamic models in R
8	27-Feb	R	Lab	Stage based matrix models in excel and R
9	4-Mar	T	Lec	Spatial Dynamics & Multistate Modeling
9	6-Mar	R	Lab	Length based assessment models
10	11-Mar	T	Lec	Bioenergetic modeling
10	13-Mar	R	Lab	Growth type group models
11	18-Mar	T	Lec	Adaptive Management & Bayesian methods
11	20-Mar	R	Lab	Length based assessment in R
12	25-Mar	T	Lec	Modeling food web interactions Ecosystem modeling in EwE
12	27-Mar	R	Lab	EwE – Ecopath initialization (Florida lake model)
13	1-Apr	T	Lec	EwE – Ecosim dynamic ecosystem modeling EwE – Fitting ecosystem models to data
13	3-Apr	R	Lab	EwE - Ecospace
14	8-Apr	T	Lec	ADMB – Installing ADMB & ADMB – Growth Model
14	10-Apr	R	Lab	ADMB – MCMC
15	15-Apr	T	Lec	ADMB –Statistical catch-at-age model (BC Herring)
15	17-Apr	R	Lab	ADMB –Statistical catch-at-age model multiple fleets
16	22-Apr	T	Lec	ADMB –Statistical catch-at-age model simulation evaluation