

Course Number: OCB 6716

Course Title: Fisheries Population Dynamics (3 credit hours) (Spring 2017)

Instructor: Dr. Yuying Zhang, BBC 358,
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Class Time: T Th 11:00 - 12:15

Office Hours: T 13:00 - 16:00 & Th 13:00 - 14:00

Class Location: BBC 362, MMC HLS 216 (T 11:00 - 12:00; then use skype) and 416 (Th 11:00 - 12:00)

Course Justification:

The knowledge of fisheries population dynamics is used by fisheries scientists to develop effective fisheries management strategies. It has become more evenly spread around the world in the managements of single-species and multi-species fisheries. The demand for fisheries scientists with knowledge of fisheries population dynamics is increasing in the USA job market due to the mandates of the reauthorized Magnuson-Stevens Fishery Conservation and Management Act. However, the supply of qualified fisheries scientists is limited (see U.S. Dept. Commerce and U.S. Dept. Education 2008 NOAA Tech. Mem. NMFS-F/SPO-91). To help addressing this shortage, it is necessary to develop a fisheries population dynamics course in the Florida International University.

Course Description:

This course is designed to introduce graduate student knowledge and skills in fisheries population dynamics. Statistical techniques will be presented. On the other hand, this course also focuses on learning stock assessment models. One of stock assessment models will be interpreted in each class (e.g. fish life history models, production model, dynamics pool models, stock-recruitment model, Virtual population analysis, and so on).

Course Objectives:

- Expose students to stock assessment models and tools that are commonly used by quantitative fisheries biologists.
- Train students in interpreting models and statistical results with regard to analysis of fish dependent/independent data.
- Prepare students with “the ability to conduct scientific research in fishery population dynamics/stock assessment and related fields”.

Learning Outcomes:

Students will learn how to

- use appropriate quantitative methods in analyzing data collected from fisheries,
- estimate vital parameters (e.g., size, density, growth, recruitment, and mortality) for fisheries,
- describe quantitatively the dynamics of fish populations,

- quantitatively evaluate current status of a fishery and alternative management strategies through formal stock assessment process, and
- understand and interpret uncertainties associated with the assessment in managing fisheries resources.

Course Outline/Major Topics (the schedule may change depending on progress in the course)

- Week 1) - 2) Introduction: a general review of population dynamics, fisheries data, and stock assessment & basic statistic knowledge, i.e. determining sampling sizes, fisheries survey design, field-survey/experiment based approaches for estimating fish population abundance, Monte Carlo methods: bootstrap and jackknife...
- Week 3) Basic fishery population dynamics knowledge, i.e. biological recruitment versus fisheries recruitment, different mortality rates and their relations... & basic fish population dynamics models, i.e. symbols used in fisheries, catch equation, exponential survival equation...
- Week 4) No Class (the Glaser Seminar week)
- Week 5) Fitting models to data & various error estimators.
- Week 6) Fish life history models, i.e. Von Bertalanffy growth function (VBGF), logistic growth equations; modeling growth for species that are difficult to age, maturation process...
- Week 7) Lab I
- Week 8) Production model
- Week 9) Virtual population analysis (VPA) and VPA calibration (Homework I due)
- Week 10) Spring break
- Week 11) Single age-based model & Statistical catch at size analysis
- Week 12) Lab II
- Week 13) Dynamic pool models & stock-recruitment models (Homework II due)
- Week 14) Lab III
- Week 15) Fisheries management & NOAA Fisheries Toolbox (final project due and presentation)

Course Grading:

1. Final project report (40 points) and presentation (20 points).
2. Homework I (20 points) and Homework II (20 points).

The project report should be more than 3 pages (12 pt, 1 inch margin, single space), but no more than 5 pages. All the homework needs to be submitted **via email** with two attached files: one in WORD and the other in EXCEL. Please write your first name, last name, course number and homework number in your message's subject line so that it is not confused with other assignments and filed in the wrong folder! If it is a late homework with an approved extension, please add the word "extension" in the subject line.

Textbooks:

(Recommend, but not required) Haddon, M. 2001. Modelling and Quantitative Methods in Fisheries. CRC Press.

Over the semester, reading materials and lecture notes will be sent to students before class. Students are expected to show up with a laptop with EXCEL installed.

Late homework/Extension/Make-up exam or quiz:

No points are awarded for late homework without arrangement or communication before the due date. If you cannot finish the work by deadline, please contact the instructor (you can call or email) and make an arrangement for an extension before the deadline. (The extension should be no more than one week.) When you apply for an extension, please provide a valid university-approved excuse. You should also specify when your homework will be submitted, and this becomes your new deadline. Please note that the instructor will not notify you when work is late, since deadlines are clearly posted for you in course materials.

Students who simply do not show up for the exam will not be allowed to take a makeup exam and will receive a score of 0. If there is any reason that a student cannot have his/her exam/quiz, please also provide a valid university-approved excuse.

Examples of university-approved excuses include: medical emergencies (with Medical Doctors' note), death of members of immediate family, car accidents (with a police report) and natural events such as hurricanes, floods, or fires that causes the closure of Biscayne Bay Campus.

Sexual Harassment Policy:

The Faculty Senate voted to require each professor to include a statement about this in the syllabus. FIU's sexual harassment policy is available online:

http://www.fiu.edu/hr/eop/Forms/Policies/Sexual_harassment.pdf

Cheating or plagiarism will not be tolerated! As a student of Florida International University, you should be honest in your academic endeavors. You should not represent someone else's work as your own. You should not cheat, neither aid in another's cheating. Students caught cheating during an examination or plagiarizing will be subject to the Academic Misconduct procedures and penalties.

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

A: >92%

A-: 90-92%

B+: 87-90%
C+: 77-80%
D+: 67-70%
F: <60%

B: 83-86%
C: 73-76%
D: 63-66%

B-: 80-82%
C-: 70-72%
D-: 60-62%