Applied Aquaculture Genetics - FAS 6932/4932

1. Overview

The goal of this course is to provide students with the background knowledge and practical methodologies for the current technologies used for genetic improvement of fish and shellfish aquaculture and fishery resource management. This course will be a combination of online lectures, group discussions, and video demonstrations to keep students with the most updated advancements.

Genetics is an important and fast-developing discipline within the sciences. Accordingly, the application genetics on aquaculture and fisheries can move quickly with new technologies. Development of specific stocks with superior performance through genetics manipulations is always the key to increase quantity and quality of aquaculture products, and new generation of analytic techniques can advance the monitoring and management of natural fishery resources. Through this course, students, especially graduate students, from the FAS program can be equipped with the knowledge about genetic basic mechanisms and the current advanced technologies for their future career development. This course also fills the gap in the current FAS graduate curriculum.

- 3 Credits
- Spring Semester every year
- Online with synchronous meetings
- http://elearning.ufl.edu/

Course Prerequisites:

Basic biology or genetics courses (not necessarily College Genetics course)

Instructor: Dr. Huiping Yang

Fisheries and Aquatic Sciences Program (building #544, office #12)
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- Please use the Canvas message/Inbox feature for fastest response.
- Office hours: available by email or phone; office visits available by appointment.

Teaching Assistant: To be decided.

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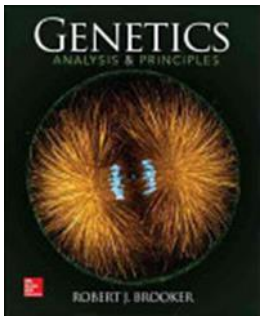
Textbook(s) and/or readings:

There is no required text for the course. However, based on the feedback from previous students, one genetics text book (see picture on the right) is recommended as a supplementary reading material. Online readings will be provided for each learning topic. These materials will include published scientific research papers, review papers, and general basic principles from textbook in Aquaculture and Fish and Shellfish Biology.



2. Learning Outcomes

At the end of this course, each student will be able to:

- Master the knowledge behind the genetic modifications and improvements
- Understand the genetic approaches and technologies currently applied in aquaculture
- Understand the most updated genetic applications for fish and shellfish aquaculture
- Apply the knowledge from this course for their own research and extension projects
- Develop critical thinking for the fast-developing genetic modifications

3. Course Logistics

This course is entirely web-based and students may access lectures, readings, and supporting materials as they become available each week.

Learning modules consisting of a lecture, readings, supporting material, and a quiz are provided online for each topic. Learning modules build on previous modules so you should complete the learning modules in the order presented.

Each learning module has required readings (usually short papers) beyond the lecture. Class discussion will be required, graduate students needs to sign up one topic to moderate the class discussion. Based on feedbacks from previous students, class discussion will be setup as an online synchronous way. In addition, this information will be covered on quizzes and exams. These files will all be made available for you to view on your computer, save, or print. There may be references to additional (optional) readings and resources if you desire further investigation of a topic.

Technology Requirements:

- A computer or mobile device with high-speed internet connection.
- A headset and/or microphone and speakers; a web cam is suggested.
- Latest version of web browser. Canvas supports only the two most recent versions of any given browser. What browser am I using?
- [Voicethread: http://ufl.voicethread.com (more instructions will be provided)]

3.1 Assignments & Deliverables

Participation

Online watching of the lectures is required, and participation of discussion is also required.

Each week students will participate in an online discussion board based on that week's readings or other pertinent materials. Most discussion prompts will be provided. Graduate students will be leading one discussion per semester. Leading the discussion includes providing the prompt and facilitating the discussion. More details will be provided in Canvas.

The instructor will be available for Q&A sessions a few times per semester. More details will be provided in Canvas.

Quizzes & Final Exam

Quizzes with multiple or yes/no choices will be posted and will be due within the lecture week. Scores with the quizzes will be accumulated as a component (30%) of the final score. Group discussion will be also due within the week for each topic on the discussion board, each

week the student who sign up to lead the discussion (undergraduate student can choose to participate only) need to wrap up the main points (accounting for a 20% of final score). There will be no mid-term exam.

The final exam will be a written project proposal. The topic could be any one from this course or any genetic modification related to the students' research major. Minimum two pages (single spaced) are needed with clear statements of the following components: Project Title, Goal, Objectives, Rationale, Strategic Approach, General Methodologies, and Expected Project Outcome. A minimum of 5 references are required (not included in the two pages). The final exam can be finished within the whole semester, due date will be posted online. This will account for a 50% of the final score. For undergraduate students, an alternative final exam, which is question-and-answer style, will be provided for their choice.

3.2 Grades & Grading Scale

30% of Quizzes (10 points each)
20% of group discussion (Learning modules)
50% of the final exam
100 points total

For information on current UF policies for assigning grade points, see details on the website:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Grading Scale (%)
A 90-100
B+ 85-89.99
B 80-84.99
C+ 75-79.99
C 70-74.99
D+ 65-69.99
D 60-64.99
E < 60

4. Course Content

Category 1. Basics

1) Introduction: History and application of genetics on aquaculture and fisheries
2) Basic background: cell cycle, mitosis, meiosis, gametogenesis
3) Molecular genetic basics: DNA, RNA, and Protein

Category 2. Conventional Genetics

4) Inheritance of quantitative and qualitative traits
5) Population genetics basics
6) Selective breeding, hybridization, and inbreeding

Category 3. Cellular genetics

7) Horizontal gene transfer
8) Polyploid production
9) Sex determination and manipulations

Category 4. Molecular Genetics

10) Genetic markers and genetic mapping
11) Gene expression (RNA, protein) and transcriptomes

Category 5. Tools and Techniques

12) Germplasm preservation
13) Flow Cytometer
14) Newly emerging technologies
DNA sequencing, CRISPR, Molecular Evolutionary Genetics Analysis, E-DNA

5. Readings

Primary class reading materials will be uploaded online every week with each lecture.

6. Policies and Requirements

This syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.

6.1 Late Submissions & Make-up Requests

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx
It is the responsibility of the student to access on-line lectures, readings, quizzes, and exams and to maintain satisfactory progress in the course.

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues MUST be accompanied by the ticket number received from the Helpdesk when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number—352-392-HELP = 352- 392-4357 (option 2).

6.2 Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning.

At approximately the mid-point of the semester, the School of Forest Resources & Conservation will request anonymous feedback on student satisfaction on various aspects of this course. These surveys will be sent out through Canvas and are not required, but encouraged. This is not the UF Faculty Evaluation!

At the end of the semester, students are expected to provide UF with feedback on the quality of instruction in this course using a standard set of university and college criteria (UF Faculty Evaluations). 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.

6.3 Netiquette: Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office.
http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf

6.4 Academic Honesty Policy

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 them 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 or 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.

6.5 University Policy on Accommodating Students with Disabilities:

Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

6.6 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.

7. Getting Help

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

- Learning-support@ufl.edu | (352) 392-HELP - select option 2 | http://elearning.ufl.edu
- Library Help Desk support http://cms.uflib.ufl.edu/ask
- SFRC Academic Hub https://ufl.instructure.com/courses/303721

7.1 Student Life, Wellness, and Counseling Help

- Counseling and Wellness resources http://www.counseling.ufl.edu/cwc/
- U Matter, We Care http://www.umatter.ufl.edu/
- Career Resource Center http://www.crc.ufl.edu/
- Other resources are available at http://www.distance.ufl.edu/getting-help for online students.

7.2 Student Complaint Process

The School of Forest Resources & Conservation cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFRC Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

- Students in online courses: http://www.distance.ufl.edu/student-complaint-process
- Students in face-to-face courses: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf