BIOL (MSCI) 537: Introduction to Aquaculture
Spring 2017
Section E01 CLS 102
TTh 6:00-7:15

Instructor: Mr. Leo Rose
Office: 2726 Fish Hatchery Rd. West Columbia, SC 29172 (or)
Thomas Cooper Library (by appointment)
Phone: (803) 609-7013
Email: rosel@dnr.sc.gov (put BIOL (MSCI) 537 in subject line)

Description: Introduction to Aquaculture (3 credit hours) – BIOL (MSCI) 537 provides a detailed introduction into aquaculture system design, aquatic organism culture and the practical and technical aspects of fish husbandry. Completion of either Ecology and Evolution (BIOL 301) or Biology of Marine Organisms (MSCI 311) is a prerequisite to BIOL (MSCI) 537.

Purpose: To provide an introduction to the practical and scientific aspects of culturing freshwater and marine organisms for commercial markets, species conservation and fisheries management.

Learning Outcomes: By the end of the semester, successful students should be able to do the following:

- Explain how aquaculture has contributed to the economy and food supply and discuss why aquaculture contribution is expected to change in the future.
- Identity and describe the major aquatic farming methods. Understand the benefits and negatives of each method and when the application of each method is appropriate.
- Demonstrate an understanding of the engineering design principles for constructing earthen ponds that are optimized for aquaculture applications.
- Describe and distinguish between all the major components (unit processes) in recirculating and flow-through aquaculture systems. Understand the pros and cons of each type of process and recognize when one kind would be preferred over another.
- Combine learned design concepts with real world aquaculture criterion to design balanced recirculating aquaculture systems.
- Calculate mass balances and loading rates for various aquaculture systems.
- Describe in detail the methods used to produce up to eight different groups of aquatic organisms in an aquaculture facility.
- Evaluate the nutrition components in various feeds to determine the appropriate feed for various applications.
- Critically evaluate the operating costs of a hypothetical aquaculture farm and make recommendations to improve efficiency.
- Explain how varying feed conversion rates affect fish growth, profit, and water quality. Differentiate between good and poor conversion rates and identify techniques to maximize conversion efficiency.
• Perform calculations that demonstrate an understanding of safe live hauling rates for various species under a variety of conditions.
• Perform calculations to estimate total numbers of eggs, fry, fingerlings and adult fish in a system using various methods.
• Recognize effective quarantine and disease prevention techniques. Critically evaluate the ecological and economic costs associated with poor aquaculture techniques.
• Understand the importance of genetics when designing stocking and management programs.

Course Materials: Online resources, including class PowerPoint presentations, assignments and reading requirements distributed in class will be available through Blackboard.


Attendance: Students are obligated to complete all assigned work promptly, to attend class regularly, and to participate in whatever class discussion may occur. It is assumed that any information given out in class has been delivered to all students.

Absence from more than 10 percent of the scheduled class sessions, whether excused or unexcused, is excessive and may result in a grade penalty. In egregious cases, truancy will result in a failing grade. It is of particular importance that a student who anticipates absences in excess of 10 percent of the scheduled class sessions receives prior approval from the instructor before the last day to change schedule as published in the academic and refund calendars on the registrar’s Web site (http://registrar.sc.edu/).

Students who are late for class are expected to enter the class in as unobtrusive a manner as possible so as to not disrupt class or disturb other students that are already in attendance. Habitual tardiness will result in a letter grade deduction.

Cell phones must be turned off or set to “vibrate” while in class.

The use of computers or recording devices is allowed in class. However, if computer use is distracting to other students their use will be discontinued.

One all-day field trip required: The field trip is currently scheduled for April 6th although the date is subject to change depending on the hatchery schedule. Missing the field trip will result in a letter grade deduction and an additional assignment. Missing the field trip and the assignment will result in a fail in the class. Plan ahead.

Expectations: All students are expected to:

• Attend class regularly and participate in any in-class activities.
• Read the assigned portions of the text following its presentation in lecture.
• Make serious attempts to complete homework assignments.
• Use the resources available, including the office hours of the professor and help sessions, to learn the course material.
**Grading and examinations:** Grade evaluations will be made based upon the following:

- Highest grade exam: 30%
- Middle grade exam: 30%
- Lowest grade exam: 15%
- Homework/Quiz/Assignments: 25%
- Total: 100%

Each exam will consist of 100 points; your exam with the lowest score will be given half the weight of the other two exams. You will be given 60 minutes to complete each exam. The final test is not a cumulative exam. The grade scale is:

- 100-90% = A
- 88-90 = B+
- 80-88 = B
- 78-80 = C+
- 70-78 = C
- 68-70 = D+
- 60-68 = D
- <60 = F

Missing an exam will result in letter grade deduction over and above the zero (0) received for the exam. Make up examinations can be provided given medical or other emergency. Justification for make-up exams must be provided in writing by the attending physician or other appropriate persons depending upon the emergency.

**Grad students will be required to complete an additional project:** Graduate students will be required to complete an independent research project and present the information to the rest of the class during a regular scheduled class session. **This assignment will make up 20% of your final grade** and will be accounted for in your assignment grade (e.g. 25% = 20% presentation; 5% other assignments).

**Cheating on exams or other violations of the Carolina Honor Code:** Students are expected to participate fairly in all assessments. Cheating on exams or other violations of the Carolina Honor Code will be reported to the Office of Academic Integrity. Possession of a cell phone or other wireless communication device during an exam will be assessed as the intention to cheat and the student will receive a grade of 0 for that exam.

**Office Hours:** Mr. Rose’s office hours will be by appointment.

**This syllabus should be used as a guideline and may change.**
## Aquaculture Class Schedule

**BIOL (MSCI) 537 - Spring, 2017 - E01**

### Part I  
**Aquaculture Engineering**

<table>
<thead>
<tr>
<th>Jan</th>
<th>10 (01)</th>
<th>Introduction and Objectives of Aquaculture</th>
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<tbody>
<tr>
<td></td>
<td>12 (02)</td>
<td>Status and Distribution of Aquaculture</td>
</tr>
<tr>
<td></td>
<td>17 (03)</td>
<td>Water quality</td>
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<tr>
<td></td>
<td>19 (04)</td>
<td>Mass Balances, Loading Rates, Fish Growth</td>
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<tr>
<td></td>
<td>24 (05)</td>
<td>Impoundments and Ponds</td>
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<tr>
<td></td>
<td>26 (06)</td>
<td>Flow-Through Systems and Net Pens</td>
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<tr>
<td></td>
<td>31 (07)</td>
<td>Unit processes 1</td>
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</tbody>
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**Feb**  
2 (08) Unit processes 2 / Aquariums (Guest speaker)
7 (09) Recirculating Aquaculture Systems
9 (10) **First Exam (Covers Part I)**

### Part II  
**Cultured Organisms**

<table>
<thead>
<tr>
<th>Feb</th>
<th>14 (11)</th>
<th>Tilapia</th>
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<tbody>
<tr>
<td></td>
<td>16 (12)</td>
<td>Catfish</td>
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<tr>
<td></td>
<td>21 (13)</td>
<td>Mussels and other mollusks (Guest speaker)</td>
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<tr>
<td></td>
<td>23 (14)</td>
<td>Sportfish production (Bass and Bream)</td>
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<td>28 (15)</td>
<td>Shrimp (Guest speaker)</td>
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**Mar**  
2 (16) Trout and Salmon
7/9  
**Spring Break (no class)**
14 (17) Induced Spawning
16 (18) Striped and Hybrid Striped Bass
21 (19) Student Lectures or Barramundi
23 (20) **Second Exam (Covers Part II)**

### Part III  
**On the Farm**

<table>
<thead>
<tr>
<th>Mar</th>
<th>28 (21)</th>
<th>Harvesting, Hauling, Processing and Stocking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 (22)</td>
<td>Nutrition</td>
</tr>
</tbody>
</table>

**Apr**  
4 (23) Farm Economics
6 (24) **Field Trip (mandatory)**
11 (25) Fish Health Management
13 (26) Genetics
18 (27) System Management
20 (28) **Third Exam (Covers Part III)**