Course description:
Mariculture techniques are presented from a historical perspective to the "state of the art" at research and commercial facilities. The techniques are further experienced through laboratory exercises and field trips.

Student learning outcomes:
As part of this course, students will:
1. Acquire a basic understanding and knowledge of specific requirements of different aquaculture production operations along with the key factors affecting the performance of these systems.
2. Master different techniques associated with the production of aquatic organisms in captivity.

Course Materials:

In addition, the following books are suggested for supplemental reading and can be found at the library:

An appointment can be scheduled for other time upon request.

**Grading**:  
Your final grade is based on the accumulation of points according to the following weights (%):

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percent of Final Grade</th>
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<tbody>
<tr>
<td>Take home Test I</td>
<td>25</td>
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<tr>
<td>Take home Test II</td>
<td>25</td>
</tr>
<tr>
<td>Seminar (written summary: 10.0%; oral-presentation: 10.0%)</td>
<td>20</td>
</tr>
<tr>
<td>Final Exam**</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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* There will be no direct grading of students with respect to lab. The lab exercises are meant as time for students to practice different techniques and skills associated with day-to-day operation of aquaculture facilities. However, topics and techniques discussed and demonstrated during the laboratories may appear in questions on the various exams.

**Entry to the classroom will be closed on the day of final exam soon as the first student to complete an exam has left the room. Students absent or arriving after room closure will receive a zero for the exam.

To enhance the student experience in aquaculture related research activities, each student may complete 40 h of internship during the semester in one of the research facilities in the area (TPWD, TAES, SMRF-FB; TAES-SMRL-PA; UTMSI-PA). You will need to provide a letter from the person in charge of the research facility to show that the internship was completed in order for you to receive the five credit-point.

**Grading Scale:**  
A = 100-90 points, B = 89-80 points, C = 79-70 points, D = 69-60 points, F < 60 points.
Class Participation:

Attendance is mandatory. Students are expected to attend all classes and labs. Should you miss a lecture or laboratory session, it is your responsibility to find out what you missed, get notes, learn about changes in the syllabus, etc. There are no excused absences. A missed grade will result in a score of ‘0’ for that assignment. Students with a university approved scheduled absence (athletics, military duty, etc.) must contact the lecture instructor well in advance of a scheduled absence. Exams may be taken early in those specific cases. Students who do not arrange to take exams ahead of time will not be eligible for this special consideration. A written excuse from the university department involved is required.

Failure to attend more than two class lectures/lab without the instructor’s prior consent will constitute a loss of 10 points from the student’s final grade. It is the student’s responsibility to check their own personal schedules to insure class attendance.

Seminar:

Each student will choose a seminar topic to be researched during the semester. On December 5, 2011, students are required to submit a written summary report in a form of a professional paper (e.g., Introduction, M&M, Results, Discussion, Literature cited) of their seminars. The report should include a printout of the computer literature search on the seminar topic. In addition, every student will give a 25-min oral presentation summarizing their work. The written and oral report will each count toward 10% of your final grade. Use of slides, overheads, live or preserved animal samples when applicable, is highly recommended.

Field Trips:

The following is a tentative list of field trips planned for this course.
1. Wastewater treatment plant, Corpus Christi
2. FAML - The University of Texas Marine Science Institute, Port Aransas.
3. GCCA - Marine Development Center, Flour Bluff, Corpus Christi.

Lab Sections & Instructors:

There is only one laboratory section for this course. Laboratory instructor for this course is Dr. Anthony Siccardi and Joshua Wilkenfeld (Asiccardi@ag.tamu.edu and josh.wilkenfeld@gmail.com, 937-2268).

Lab Materials:

Lab procedures call for active participation of the students in procedures associated with operating aquaculture facilities.

Academic Integrity:

All students are expected to conform to college level standards of ethics, academic integrity, grammar and spelling; review the appropriate pages of the TAMU-CC catalog and TAMU-CC student handbook. Failure to comply with these rules will result in dismissal from the course.
**Academic Dishonesty:**
Cheating in any form will absolutely not be tolerated. This includes asking for or providing help on an exam or quiz, plagiarism, or basically doing anything that substitutes one person’s work for another’s. Cases of academic dishonesty will be dealt with severely. Students caught cheating will receive a grade of ‘F’ for the course and the offense will be reported to the student affairs office.

**Grade Appeals:**
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Disabilities & Veterans Accommodations:**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.
## Tentative Course Outline:
This schedule is subject to changes, which will be announced in class.

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Laboratory</th>
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| Aug. 29 | **Introduction:** Syllabus, species list, oral presentation and seminar overview, and scheduled field trips.  
            **Lecture:** Aquaculture overview. **Location:** Texas AgriLife-Flour Bluff.  
            **Laboratory:** Overview of the shrimp facility at Texas AgriLife-Flour Bluff. **Location:** Texas AgriLife-Flour Bluff. |
| Sep. 5  | Lecture: Labor Day (No class)                                                                 |
| Sep. 12 | **Lecture:** Pond management equipment and supplies: Pond preparation, fertilization, feeding, water quality control, growth monitoring, harvest equipment. **Location:** Texas AgriLife-Flour Bluff.  
            **Laboratory:** Use of cast/seine nets in ponds/tanks to harvest shrimp, overview of proper shrimp sampling techniques, shrimp inspection for diseases. **Location:** Texas AgriLife-Flour Bluff. |
| Sep. 19 | **Lecture:** Introduction to algae culture for larval feeds species of major interest; contaminants and pest organisms; production systems. **Location:** Texas AgriLife-Flour Bluff.  
            **Laboratory:** Basic techniques: Maintenance of stock cultures at Flour Bluff, media and seawater preparation, “sterile” techniques, cell counts with hemocytometer, calculations. **Location:** Texas AgriLife-Flour Bluff. |
| Sep. 26 | **Lecture:** Water intake, pumps, pipes, ponds’ outlet structures and power sources for mariculture operations. **Location:** Texas AgriLife-Flour Bluff.  
            **Laboratory:** Proper techniques to: glue PVC/cPVC pipe, patch fiberglass tanks, patch EPDM liners and maintenance of pumps/probes. **Location:** Texas AgriLife-Flour Bluff. |
| Oct. 3  | **Lecture:** History and renewed interest in production of algae biomass for biofuel and bio-products. Current and upcoming research at Flour Bluff. Species of current interest, nutrient regimes, production systems (photo bio-reactors versus open raceways), production strategies (keeping commercial scale operations in mind). **Location:** Texas AgriLife-Flour Bluff.  
            **Laboratory:** Daily operations in outdoor raceways systems: Water treatment, cleaning and disinfecting raceways, stocking, monitoring water quality, controlling CO₂, evaluating contaminants, counting methods with Nannochloropsis, harvesting methods. **Location:** Texas AgriLife-Flour Bluff. |
Oct. 10  Lecture:  Closed recirculating systems design, operation and control.  
**Location: Texas AgriLife-Flour Bluff.**

Laboratory:  Field trip to FAML and Texas Parks and Wildlife.

Homework:  First take-home test (DUE 10-17 at start of class).  Provide a 
topic for a seminar.

Oct. 17  Lecture:  Evolution of maturation/reproduction techniques, including the 
early days of wild spawners.  “Modern” maturation methods,  
broodstock development programs, current commercial maturation 
systems.  Tagging, ablation, diet, physical control of system and 
environmental conditions.  Bait shrimp – a special maturation case.  
**Location: Texas AgriLife-Flour Bluff.**

Laboratory:  Tagging, hormones, lights, timers, photo and thermoperiod.  
Shrimp sperm-counts and evaluation, artificial insemination.  Egg 
counts and evaluation (when we have spawns).  **Location: Texas 
AgriLife-Flour Bluff.**

Oct. 24  Lecture:  Disinfection and solids removal, heating, cooling, aeration and 
degassing systems.  **Location: Texas AgriLife-Flour Bluff.**

Laboratory:  Operation and maintenance of: sand filters, DE filters, foam 
fractionators, inline heaters, and bag filters.  **Location: Texas 
AgriLife-Flour Bluff.**

Oct. 31  Lecture:  Shrimp hatcheries and larval rearing systems: Life history; EZ 
identification of larval stages; hatchery objectives; feeding routines 
and tables; planning production in a commercial setting;  
biosecurity.  **Location: Texas AgriLife-Flour Bluff.**

Laboratory:  Calculating feeding requirements; population estimates; larval 
evaluation; hatching Artemia; harvesting; PL counts, packing & 
shipping.  Note: The actual date of this lecture and lab will depend 
on activity and cooperation of the F5 generation Litopenaeus 
setiferus broodstock currently in operation.  **Location: Texas 
AgriLife-Flour Bluff.**

Nov. 7  Lecture:  Effluent water characterization.  Overview of appropriate tests such 
as turbidity, total suspended solids (TSS), volatile suspended solids 
(VSS), settleable solids (SS), five-day carbonaceous biochemical 
oxxygen demand (cBOD₅).  **Location: Texas AgriLife-Flour Bluff.**

Laboratory:  Proper use of automated water quality equipment to determine 
ammonia, nitrite, nitrate and phosphorus levels.  Determination of 
TSS, VSS, SS and alkalinity of aquaculture waters.  **Location: 
Texas AgriLife-Flour Bluff.**

Homework:  Second take-home test.  (DUE 11/14 at start of class).

Nov. 14  Lecture:  Field trip to Corpus Christi water treatment facility.
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<tr>
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<tr>
<td>Nov. 21</td>
<td>Use of constructed wetlands in aquaculture. Guest lecture (Brandon Klim). <strong>Location: Texas AgriLife-Flour Bluff.</strong></td>
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<tr>
<td>Nov. 28</td>
<td>Aquaculture of alternative species: Zebrafish aquaculture. <strong>Location: Texas AgriLife-Flour Bluff.</strong></td>
<td>Preparation of experimental feeds, larval stage determination, use in toxicology/medical testing. <strong>Location: Texas AgriLife-Flour Bluff.</strong></td>
</tr>
<tr>
<td>Dec. 5</td>
<td>Students’ Oral Presentations. Written reports due.</td>
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<tr>
<td>Dec. TBD</td>
<td>Final Exam.</td>
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