MARICULTURE TECHNIQUES (FAMA 5312)
Department of Life Sciences
Spring 2015

A. COURSE INFORMATION
   Course number/section:  FAMA 5312.001 (lecture) & 5312.101 (lab)
   Class meeting time:     M & R, 9:00AM – 10:40AM (lecture/lab may interchange)
   Class location:         CS 235
   Course Website:         https://bb9.tamucc.edu/ (Blackboard Sign In page)

B. INSTRUCTOR INFORMATION
   Instructor:             John Scarpa, Ph.D.
   Office location:        EN 319-D
   Office hours:           M, T, W, & R, 8:00-8:45 AM and by appointment
   Telephone:              (361) 825-2369
   e-mail:                 John.Scarpa@tamucc.edu
   Appointments:           Made at least 24 hrs in advance by phone or e-mail.

C. COURSE DESCRIPTION
   Catalog Course Description (http://catalog.tamucc.edu/mime/media/9/886/2014-2015+Graduate+Catalog.pdf): 3 sem. hrs. (2:2) The study and hands-on application of biological, mechanical, and other concepts required to develop the skills and techniques necessary for efficient operation and management of public and private aquaculture facilities.

   Extended Course Description
   Aquaculture is the controlled cultivation of aquatic organisms. It currently supplies about 50% of all consumed seafood. Traditional capture fisheries landings worldwide have been flat for the past 25 years at approximately 90 million metric tonnes. With an increasing world population and increasing global demand for seafood, aquaculture is the only method to meet demand. Aquaculture output is needed to increase 100% by the year 2030 to meet the global demand; it has been increasing at an annual rate of 6.2%.

   U.S. aquaculture production value is about $1.3B, but the U.S. still imports approximately 91% of its seafood, which has resulted in a U.S. seafood trade deficit of about $11.2 billion. Aquaculture is expanding globally necessitating the need for individuals trained in the different aspects of the industry to provide food for human consumption.

   The knowledge of aquaculture production systems and techniques may also be used for maintaining aquatic organisms for pleasure (hobbyist), education (zoos and aquariums), stock enhancement/restoration efforts, and science (e.g., zebrafish colonies for genetic studies, basic research of aquatic animals). This course will focus on recirculating systems design and operation, although certain aspects (e.g., water quality) will relate to pond systems, too.
D. **PREREQUISITES AND COREQUISITES**

**Prerequisites**
Undergraduate biology, chemistry, or physics science courses.

**Corequisites**
None

E. **REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES**

**Required Textbook**

**Optional Textbook(s) or Other References**

**Supplies**
Should possess lab coat and protective eye-wear for when working with chemicals.

F. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that
describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Perform conversions from English to metric units.
2. Define water quality variables and their typical ranges for aquaculture systems.
3. Measure the basic water quality variables in an aquaculture system using a variety of instrumentation or techniques and relate the values to culture needs.
4. Describe applicable equipment (e.g., biofilters, UV-sterilizers) and how they are used to maintain water quality in culture systems.
5. Describe the culture environment or methods for live feed (e.g., microalgae, brine shrimp, rotifers) production.
6. Describe, operate, and successfully maintain an aquaponic system.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

The course will be taught through traditional lectures with laboratory exercises that review and emphasize the lecture material. In addition, there will be a class project in which all students will participate in the construction, running, and maintenance of an aquaponic system. This class project will allow for students to learn first-hand the problems that may develop with a system without jeopardizing an actual commercial crop.

H. MAJOR COURSE REQUIREMENTS AND GRADING

The learning outcomes stated earlier will be assessed through a variety of methods as noted in the following table.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (2)</td>
<td>40</td>
</tr>
<tr>
<td>Class Project Report</td>
<td>20</td>
</tr>
<tr>
<td>Final Exam*</td>
<td>25</td>
</tr>
<tr>
<td>Lab and Class Participation</td>
<td>15</td>
</tr>
</tbody>
</table>

*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.

Grading: There will be a total of three (3) written exams. Exams may be composed of any, or all, of the following: multiple choice, matching, fill in the blank, problem solving and short essay. The final exam is a comprehensive exam. All exams count toward your class grade. No exam grade will be dropped. No make-up exams will be given. If an exam is
missed with proper prior notification, the test may be taken as soon as possible after the exam date, but no later than the following class day. If the exam is not taken a grade of zero (0) will be entered. No extra credit assignments will be given. There will be a class project that occurs outside of the normal classroom meeting time lab, which will be graded through participation and a class project report due at the end of the semester (style will be discussed in class). Class attendance and participation will also be factored into your final grade.

The grading scale is: A=90-100%, B=80-89%, C=70-79%, D=60-69%, and F=0-59%. All grades will be rounded to the nearest whole number, therefore, a grade of 89.50% would be rounded to 90% (A) and a grade of 89.49% would be an 89% (B). Last day to withdraw from class with a "W" is Wednesday, 15 April, and must be done by the student.

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Class #</th>
<th>Date</th>
<th>Topic</th>
<th>Readings/Assign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22-Jan</td>
<td>Aqua Systems (Pond, RAS) Overview/Conversions</td>
<td>Chap 1</td>
</tr>
<tr>
<td>2</td>
<td>26-Jan</td>
<td>Water Quality (T, S, DO, pH, NH₃, NO₂, NO₃)</td>
<td>Chap 2</td>
</tr>
<tr>
<td>3</td>
<td>29-Jan</td>
<td>Water Quality Lab (measurements)</td>
<td>Chap 2</td>
</tr>
<tr>
<td>4</td>
<td>2-Feb</td>
<td>Water Quality (Alkalinity, Hardness, Carbonate)</td>
<td>Chap 2</td>
</tr>
<tr>
<td>5</td>
<td>5-Feb</td>
<td>Water Quality Lab (measurements)</td>
<td>Chap 2</td>
</tr>
<tr>
<td>6</td>
<td>9-Feb</td>
<td>Biofiltration</td>
<td>Chap 7</td>
</tr>
<tr>
<td>7</td>
<td>12-Feb</td>
<td>Biofilter Design</td>
<td>Chap 8</td>
</tr>
<tr>
<td>8</td>
<td>16-Feb</td>
<td>Biofilter Lab (construct and measure)</td>
<td>Chap 7 &amp; 8</td>
</tr>
<tr>
<td>9</td>
<td>19-Feb</td>
<td><strong>Exam 1</strong></td>
<td>Study for Exam</td>
</tr>
<tr>
<td>10</td>
<td>23-Feb</td>
<td>Aquaponics Theory</td>
<td>Chap 19</td>
</tr>
<tr>
<td>11</td>
<td>26-Feb</td>
<td>Culture Units</td>
<td>Chap 4</td>
</tr>
<tr>
<td>12</td>
<td>2-Mar</td>
<td>Aquaponics Lab (construct and run)</td>
<td>Chap 19</td>
</tr>
<tr>
<td>13</td>
<td>5-Mar</td>
<td>Algae Culture</td>
<td>Brown (2002)</td>
</tr>
<tr>
<td>14</td>
<td>9-Mar</td>
<td>Algae Culture Lab (and follow growth)</td>
<td>SRAC Pub #5004</td>
</tr>
<tr>
<td>15</td>
<td>12-Mar</td>
<td>Fluid Mechanics and Pumps (&amp; airlift lab)</td>
<td>Chap 12</td>
</tr>
<tr>
<td>16</td>
<td>16-Mar</td>
<td>Spring Break (no class)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>19-Mar</td>
<td>Spring Break (no class)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Date</td>
<td>Event</td>
<td>Notes</td>
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<tr>
<td>18</td>
<td>23-Mar</td>
<td>Field Trip (TBD)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>26-Mar</td>
<td><strong>Exam 2</strong></td>
<td>Study for Exam</td>
</tr>
<tr>
<td>20</td>
<td>30-Mar</td>
<td>Gas Transfer</td>
<td>Chap 10</td>
</tr>
<tr>
<td>21</td>
<td>2-Apr</td>
<td>Waste Measurement</td>
<td>Chap 6</td>
</tr>
<tr>
<td>22</td>
<td>6-Apr</td>
<td>Ozonation and UV-Irradiation</td>
<td>Chap 11</td>
</tr>
<tr>
<td>23</td>
<td>9-Apr</td>
<td>Biosecurity Lab (bact + UV), Aquapoinc systems breakdown</td>
<td>Chap 11</td>
</tr>
<tr>
<td>24</td>
<td>13-Apr</td>
<td>Aquatic Animal Diseases</td>
<td>Chap 16</td>
</tr>
<tr>
<td>25</td>
<td>16-Apr</td>
<td>Aquatic Animal Disease Lab (bact &amp; Dermo)</td>
<td>Chap 16</td>
</tr>
<tr>
<td>26</td>
<td>20-Apr</td>
<td>Live Feed Culture (Rotifers/Brine Shrimp)</td>
<td>SRAC Pub #701 &amp; 702</td>
</tr>
<tr>
<td>27</td>
<td>23-Apr</td>
<td>Live Feeds Lab (rotifer count/brine shrimp decap)</td>
<td>SRAC Pub #701 &amp; 702</td>
</tr>
<tr>
<td>28</td>
<td>27-Apr</td>
<td>System Management and Operations</td>
<td>Chap 15</td>
</tr>
<tr>
<td>29</td>
<td>30-Apr</td>
<td>PVC and fiberglass Lab</td>
<td>handout</td>
</tr>
<tr>
<td>30</td>
<td>4-May</td>
<td>Aquaponics Lab Report due, Review class</td>
<td>Study for Final Exam</td>
</tr>
<tr>
<td>31</td>
<td>7-May</td>
<td><strong>Final Exam (Comprehensive)</strong></td>
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</tr>
</tbody>
</table>

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. **COURSE POLICIES**

**Attendance/Tardiness**

Each student’s individual career experiences provide valuable perspective to their peers. Therefore, it is critical that you attend class regularly to be a partner in this enhanced learning environment. At each class meeting, attendance will be noted. It is each student’s responsibility to contact the instructor directly (phone or e-mail), in advance, if class will be missed. The instructor will not accept late work without valid reasons. Students with a university approved scheduled absence (athletics, military duty, etc.) **must** contact the instructor well in advance (>72 hrs) 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.

Students are encouraged to contact the instructor anytime they are not achieving their intended level of success, prior to taking any other action. Students who need to
withdraw must complete an official form and submit it consistent with college policy no later than the official published date. “Incomplete” grades are awarded only when an emergency prevents a student from completing a minor portion of the course assignments. Active participation is a part of your grade. It includes (1) asking questions; (2) answering questions with supportive evidence; (3) responding to other student’s comments, etc. Students are expected to be on time for class, to address others with respect, and to project an attentive and concerned demeanor.

Late Work and Make-up Exams
All exams count toward your class grade. No exam grade will be dropped. No make-up exams will be given. If an exam is missed with proper prior notification, the test may be taken as soon as possible after the exam date, but no later than the following class day. If the exam is not taken a grade of zero (0) will be entered.

Extra Credit
No extra credit assignments will be given.

Cell Phone Use
The use of cell phones and other personal electronic devices (PEDs) are prohibited during class. All cell phones must be turned off during the class period. If you are emergency personnel (i.e., EMT, fire, or police) you may set your device to vibrate. Any student who uses a cell phone to make or answer a call, send and read text messages or e-mails (other than IRSC emergency messages), or any other use of a personal electronic device during class may have that device confiscated and be asked to leave class, which will be considered an absence for that class. No student has the right to disturb the teaching and learning process. Voice recording of lectures is allowed, but no video or photography are allowed during class.

Laptop Use
Laptop computers and tablets may be used in the classroom for taking notes, as long as they are not a nuisance to other students. However, laptops shall not be used for items as noted above for cell phones or PEDs.

Food in Class
There is NO eating or drinking in the classroom.

Missed Exam
If an exam is missed with proper prior notification, the test may be taken as soon as possible after the exam date, but no later than the following class day. If the exam is not taken a grade of zero (0) will be entered.

Participation
Four or more absences, with the exception of death in the nuclear family, sick child/spouse, or personal sickness may result in a failing grade at the discretion of the instructor. You must contact the instructor by phone message or e-mail before class to let the instructor know of your absence.
Other
Cheating is defined as:
- Copying to any extent the work of another student
- Intentionally assisting another student during an examination
- Having access to material related to an examination during an examination
- Possessing or having access to unauthorized copies of an examination
- Departing from any stated examination conditions
*Cheating or other academic dishonesty for exams and assignments will not be tolerated and will result in a Failing (F) grade for the class and suspension.

Plagiarism: The Merriam-Webster Dictionary defines plagiarism as "To pass off as one’s own words or ideas of another.”
Plagiarism involves:
- Submitting another person's work as one's own
- Submitting work from any source that is not properly acknowledged by footnote, bibliography, or reference within a paper
- Submitting work pieced together from phrases and/or sentences from various sources without acknowledgement
- Submitting work with another person's phrase(s) rearranged without acknowledgement
- Submitting work that uses any phrase, sentence, or stylistic mannerism without acknowledgement
- Omitting quotation marks from any directly quoted material
- Failure to use three dots (...) to indicate omission of one or more words
- Any other actions deemed to be plagiarism by the faculty

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior. See Full University Policy at [http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity](http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity)

- **Classroom/Professional Behavior**
  A professional courteous behavior must be exhibited while in class. Students are in the class to learn and distracting behavior will not be tolerated. There is NO eating or drinking in the classroom.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course by Friday, April 10, 2015. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must submitted. After April 10, 2015 a student will not be allowed to drop a course.
• **Grade Appeals (College of Science and Engineering)**

As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, 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 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), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

• **Disability Services**

Disability Services (DS) is the hub for coordinating services and accommodations to ensure accessibility and utilization of all programs for all Texas A&M University-Corpus Christi students with disabilities. Our services are designed to meet the unique educational needs of enrolled students with documented permanent or temporary disabilities. DS provides intake and consultation services to students seeking to register with our office. DS reviews an individual’s documentation of disability and assesses eligibility for services and the determination of reasonable accommodations. For more information visit the Disability Services Office at 116 Corpus Christi Hall or go to [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

**L. OTHER INFORMATION**

**Methods of Achieving Success:** Achieving success in this course will require a time commitment outside of class that averages three to six hours per week for reading and studying. Students benefit from actively participating in care of the aquaponic system, classroom discussion, and lab demonstrations and activities.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.