A. COURSE INFORMATION

Course number/section: BIOL 5415.001; BIOL 5411.102 (lab)
Class meeting time: Lecture – 3:30-4:45 TR; Lab – 12:30-3:15 T; 12:30-3:15 R
Class location: Lecture – EN 107; Lab – ECMS 114
Course website: Blackboard

B. INSTRUCTOR INFORMATION

Instructor: Kim Withers
Office location: NRC 3205
Office Hours: 10-12 MW (my office), TR 9:30-11 (location TBA)
Telephone: 825-5907
Email: Kim.Withers@tamucc.edu
Appointments: Call to set up an appointment outside of office hours

C. COURSE DESCRIPTION

Catalog Course Description
Systematics, distribution, and ecology of estuarine macrofauna and macroflora. Weekend field trips and individual study required. Prerequisite: BIOL 3413. SMTE 0091 is a co-requisite for this course. Documented completion of this safety training is required early in the semester for continued participation in this course. Safety training given during a laboratory meeting early in the semester is required for continued participation in this course.

Extended Course Description
To study the ecology and organisms of estuarine systems along the Texas Gulf Coast, focusing on local habitats and communities through laboratory work and reading and discussion of current and classic estuarine literature. Extensive, in-depth study of the taxonomy and natural history of the polychaetes, molluscs, decapod crustaceans inhabiting local estuaries is the primary focus of the course. Extensive individual labwork and study outside of normal class hours are required for successful completion of the course.

D. PREREQUISITES AND CO-REQUISITES

Prerequisites
BIOL 3413 Invertebrate Zoology or permission of instructor

Corequisite
SMTE 0091 Biological Laboratory Safety Seminar

E. REQUIRED TEXTBOOKS, READINGS, & SUPPLIES

Required Textbooks
2. Set of taxonomic keys of marine and estuarine organisms. (Printshop; available in the TAMU-CC Bookstore)

Other Required References
Additional readings from the primary literature and other sources will be assigned throughout the semester.
Required Supplies
1. Lab Coat
2. Hard-soled scuba booties, old tennis shoes, or waders for field trips
3. Indelible ink pen
4. Plastic shoe box or similar (for carrying/storing specimens)
5. Lidded 5-gallon bucket (you can share with someone else, but they need to be on the same field trip)

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

By the end of this course, students should:
1. UNDERSTAND the processes and dynamics of estuarine ecosystems and communities
2. BE ABLE TO apply the proper tools and methods to correctly identify important estuarine invertebrates
3. KNOW AND BE ABLE TO identify common and uncommon estuarine invertebrates
4. PROPOSE & CARRY OUT a field study or laboratory experiment involving estuarine organisms or habitats
5. COLLECT pertinent data and analyze it using the proper descriptive and comparative statistics
6. PREPARE a research paper describing the results of the field or laboratory study
7. PRESENT the results of the research to the class

G. INSTRUCTIONAL METHODS & ACTIVITIES

Lecture
Lecture, readings with discussion, and case studies will be the bulk of the “lecture” portion of the course. Three case studies will be presented during the course. Graduate students will prepare a case study and then present it to the class. These case studies will be focused on important paradigms in estuarine ecology or the emergent properties of estuaries through the interpretation of data.

Case Study Preparation and Presentation

In groups of 2, students will prepare a data-intensive case study that will be used to teach undergraduate students about important paradigms in estuarine ecology and/or emergent properties of estuaries. At the same time, preparation of case study materials will require that graduate students think and write critically about those paradigms and/or emergent properties. See http://sciencecases.lib.buffalo.edu/cs/ for case study examples and resources to help you formulate the case study that you will prepare. Case studies should address one of the following topics, although other topics may be appropriate with my approval:

• Habitat complexity (for example, seagrass vs unvegetated habitats)
• Top-down vs bottom up processes
• Trophic cascades
• Nutrient recycling and regeneration (i.e. “benthic effect”)
• Natural/anthropogenic stress and estuarine community structure (e.g., heavy rainfall, eutrophication)
• Larval recruitment and estuarine community structure (pre-settlement vs post-settlement processes)

Lab (General)

In the lab, students will use dichotomous keys to identify estuarine invertebrate organisms from a curated teaching collection as well as from benthic core samples they collect from 5-7 estuarine habitats. Students will use the data they collect from the core samples to describe and compare invertebrate communities from at least 2 estuarine habitats and will also assemble an individual collection of polychaetes (more information below). Two lab practicals, covering taxonomy and other information on both the teaching collection and benthic samples will be scheduled. In addition, there will be 1 “key test” that will require students to identify 2 unknown species from each of the focal invertebrate categories (polychaetes, bivalves, gastropods, crabs, shrimp).

In this course, the Taxonomic Authority for all levels of taxonomy and all organisms is the Integrated Taxonomic Information System (ITIS): http://http://www.itis.gov/. Please remember that when species is asked for on a lab practical you must give BOTH genus and species, since the specific epithet CAN NEVER stand alone.
For lab practicals, you must know (= have committed to memory) the following levels of taxonomy for each group:

**Polychaetes:** Phylum, Class, Subclass, Order (when applicable), Suborder (when applicable), Family, *Genus species*

**Mollusca:** Phylum, Class, Subclass (when applicable), Order, Family, *Genus species*

**Crustacea:**

- **Crabs:** Phylum, Subphylum, Class, Subclass, Superorder, Order, Suborder, Infraorder, Family, *Genus species*
- **Shrimp:** Phylum, Subphylum, Class, Subclass, Superorder, Order, Suborder, Infraorder (when applicable), Family, *Genus, species*

### Field Trip

**Participation in one field trip is REQUIRED.** During the field trips you will collect the samples that will provide the material you will need to make your polychaete and crustacean collections.

In general:

1. Be on time, or you will be left behind.
2. Be prepared to get wet and muddy
3. Have weather appropriate gear, booties or other “wet” shoes, drinking water &/or lunch

### Research Project

Graduate students will perform an original field or laboratory study. Details of experimental design and procedure will be worked out in preliminary experiments (laboratory investigations) or through field surveys or observations since these will vary depending on the proposed investigations. After preliminary investigations are complete, graduate students will write up a formal experimental or survey design for approval. Once the design is approved, the student will carry out the investigation. Data will be analyzed using appropriate statistics, and written up as a paper for submission to a journal. The student will choose an appropriate venue during the proposal process and write both the proposal and the paper in that style. Graduate students will also present their paper in a brief (15-20 minute) scientific meeting style presentation.

The prospectus should contain a brief overview of the problem or questions (including literature citations), an explicit statement of the objective of the study or hypothesis to be tested and an explanation of the experimental design or research approach. Papers will be graded on both format and content (see attached grading sheet), particularly the appropriateness of the statistical analysis and the contextualization of results within the broader literature on the subject. Presentations will be graded based on completeness, clarity, brevity, appropriateness of visual aids, and ability to answer questions.

### Individual Organism Collections

1. You will probably have to make additional collections to meet this requirement – see me for gear such as seines etc.
2. 10 polychaete species from a minimum of 5 families. Each person must identify their own polychaetes.
3. 10 benthic crustaceans – this can be a mix of amphipods, isopods, cumaceans etc. Amphipods identified to family, isopods to species, others check with me.
4. 10 nektonic crustaceans – this should be a mix of crabs and shrimp. All should be identified to species
5. Have me (or one of my lab assistants) check off correct identifications on collection sheet as you identify. We will ask you to show us the key characters, so be sure you’ve done your own work.
6. A minimum of 1 INTACT, COMPLETE specimens of each species, but more is better since you’ll probably tear up a couple identifying them and I may need to tear up one to make sure you’re right. Specimens of the same species need not come from the same location.
7. Labeled in the following format using indelible, carbon-based ink; put your name and the date on the other side.

   **Family:**

   **Genus species**

8. You will need to provide a typewritten catalog with your specimens containing label information with your check-off collection sheet attached.
H. MAJOR COURSE REQUIREMENTS & GRADING CRITERIA

Grades will be assigned on exams (e.g., lab practicals) as percentages, i.e., the number of correct responses divided by the total number of possible responses for PASSING GRADES ONLY. Writing assignments (e.g., Case studies, project reports) will be assigned letter grades (e.g., A+, C- etc.) that will be converted to percentages based on the scale below. ALL FAILING GRADES (i.e. C’s or percentages <70%) or missed assignments will be counted as ZEROs. The final grade will be determined based on the AVERAGE OF THE PERCENTAGES including any/all ZEROs. This grading scheme is designed to ensure that you must pass most assignments to receive a passing grade in the course.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>98</td>
</tr>
<tr>
<td>A</td>
<td>95</td>
</tr>
<tr>
<td>A-</td>
<td>92</td>
</tr>
<tr>
<td>B+</td>
<td>88</td>
</tr>
<tr>
<td>B</td>
<td>85</td>
</tr>
<tr>
<td>B-</td>
<td>82</td>
</tr>
<tr>
<td>C+</td>
<td>78</td>
</tr>
<tr>
<td>C</td>
<td>75</td>
</tr>
<tr>
<td>C-</td>
<td>72</td>
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<td>F</td>
<td>0</td>
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</tbody>
</table>

The grading elements are:

<table>
<thead>
<tr>
<th>Element</th>
<th>Student Learning Outcome</th>
<th># of assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Study write up and presentation</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lab Practicals</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Key Test</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Polychaete/Crustacean Collection</td>
<td>2,3</td>
<td>1</td>
</tr>
<tr>
<td>Field Trip Participation/Sample washing</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Research Prospectus</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Research Paper</td>
<td>5, 6</td>
<td>1</td>
</tr>
<tr>
<td>Research Presentation</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

Graduate students MUST make a C or better. No curve will be applied to lab practicals. Graduate students are expected to learn quickly. Graduate students are also held to high standards when case studies and research reports are graded. There will be NO MAKEUPS for lab practicals or key tests. No late assignments will be accepted.
### I. COURSE CONTENT/SCHEDULE (TENTATIVE)

**I RESERVE THE RIGHT TO ALTER THE LECTURE OR LAB SCHEDULE AT ANY TIME**

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/19</td>
<td>Syllabus, Introduction</td>
<td>No lab</td>
</tr>
<tr>
<td>2 1/24, 1/26</td>
<td>Estuarine Ecology, Polychaetes</td>
<td>Intro to Keying, Study Organisms I</td>
</tr>
<tr>
<td>3 1/31, 2/2</td>
<td>Molluscs, Crustaceans <strong>Grad Student Research Prospectus Due</strong></td>
<td>Study Organisms I <strong>Saturday (2/4)– Field Trip</strong></td>
</tr>
<tr>
<td>4 2/7, 2/9</td>
<td>Crustaceans con’t, Miscellaneous Organisms</td>
<td>Sample Washing, Processing, ID Study Organisms I <strong>Saturday (2/11) Field Trip Alternate date</strong></td>
</tr>
<tr>
<td>5 2/14, 2/16</td>
<td>No lecture, Sample washing or open lab</td>
<td>Sample Washing, Processing, ID Study Organisms I</td>
</tr>
<tr>
<td>6 2/21, 2/23</td>
<td>Case Study</td>
<td>Sample Processing, ID Study Organisms I</td>
</tr>
<tr>
<td>7 2/28, 3/2</td>
<td>Case Study Questions or Quiz</td>
<td><strong>Lab Practical I (Tuesday only)</strong> Groups from 12:30-1:50; 2-3:20, 3:30-4:15 as needed</td>
</tr>
<tr>
<td>8 3/7, 3/9</td>
<td>TBA</td>
<td>Sample Processing, ID Study Organisms II</td>
</tr>
<tr>
<td>9 3/14, 3/16</td>
<td>Spring Break</td>
<td></td>
</tr>
<tr>
<td>10 3/21, 3/23</td>
<td>TBA</td>
<td>Sample Processing, ID Study Organisms II</td>
</tr>
<tr>
<td>11 3/28, 3/30</td>
<td>No lecture, open lab following Key Test</td>
<td><strong>Field Study Data Due 1 (100%) Key Test</strong></td>
</tr>
<tr>
<td>12 4/4, 4/6</td>
<td>TBA</td>
<td><strong>Field Study Data Due 2 – Late (80%) – Last chance to turn in (by 3 pm)</strong> Study Organisms II Polychaete Collections</td>
</tr>
<tr>
<td>13 4/11, 4/13</td>
<td><strong>Grad Student Presentations</strong></td>
<td>Study Organisms II Polychaete Collections</td>
</tr>
<tr>
<td>14 4/18, 4/20</td>
<td>UG Presentations (Tuesday only) Presenters turn in self evaluations <strong>Grad Student Papers Due</strong></td>
<td>Open lab Tuesday, Thursday Polychaete Collections DUE Thursday by 3 pm</td>
</tr>
<tr>
<td>15 4/25, 4/27</td>
<td>UG Presentations Continue Presenters turn in self evaluations Extended Abstract Due (All)</td>
<td><strong>Lab Practical II – Thursday Only</strong> Groups from 12:30-1:50; 2-3:20; 3:30-4:15 as needed</td>
</tr>
<tr>
<td>16 5/2</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>Final Exam Day</td>
<td>TBA</td>
<td></td>
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</table>

Reading Assignments and Quizzes will be announced.

**LAST DAY TO DROP IS FRIDAY APRIL 7, 2017 BEFORE 5 PM.**

*Field Trip TBA (Alternate date will be reserved in case of postponement due to weather)*

1. Meet at staging area at 8:45 am; leave at 9 am, return by 4 pm
J. COURSE POLICIES

Attendance/Tardiness

You are expected to attend every lecture and lab. Courtesy dictates that you will be on time for lecture. For case studies and associated discussion activities you will not get credit for the in-class portion if you do not attend class that day.

Make sure that you arrive at the time directed for assembly, not at the time of departure. We will leave promptly at the time of departure. **YOU WILL BE LEFT BEHIND IF YOU ARE NOT ON TIME.**

Late Work and Make-up Exams

Late work is not accepted.

For case studies and associated discussion activities you will not get credit for the in-class portion of the activity if you do not attend class that day. You may be offered the opportunity to complete the outside of class portion – but you should make those arrangements **PRIOR** to the absence.

Make-up lecture exams are only given in the case of extreme circumstances, such as hospitalization or death. Documentation of the circumstances through the appropriate on-campus division will be expected and arrangements must be made **PRIOR** to the exam for a make-up exam to be given.

There are **NO** make-ups given for lab exams. You must take the lab exam on the day it is scheduled.

Extra Credit

There is **NO** such thing as “extra credit” in this class. In the words of Spongebob Squarepants and Mrs. Puff:

Spongebob: “Mrs. Puff, I don’t feel like I really did anything.”
Mrs. Puff: “That’s how extra credit is supposed to feel.”

For more about my attitude toward extra credit, see this article by Jack Slay Jr. [http://chronicle.com/article/No-Extra-Credit-For-You/44956](http://chronicle.com/article/No-Extra-Credit-For-You/44956)

Cell Phone Use

Please turn off and stow your cell phone when you come to class.

Laptop Use

Many studies have shown that laptops in the classroom are mostly a distraction (to both you and the people around you); this article describes some of the issues [http://www.newyorker.com/tech/elements/the-case-for-banning-laptops-in-the-classroom](http://www.newyorker.com/tech/elements/the-case-for-banning-laptops-in-the-classroom). You may get more words than when you take notes on the computer but the increased number of words does not translate into better grades on quizzes or tests.

While more words were recorded, with more precision, by laptop typists, more ended up being less: regardless of whether a quiz on the material immediately followed the lecture or took place after a week, the pen-and-paper students performed better. The act of typing effectively turns the note-taker into a transcription zombie, while the imperfect recordings of the pencil-pusher reflect and excite a process of integration, creating more textured and effective modes of recall. D. Rockmore, “The Case for Banning Laptops in the Classroom” *The New Yorker*, 6 June 2014.

I think you are generally better off to take notes by hand and transcribing them later. I will tolerate laptop use in class as long as you limit yourself to taking notes. I will also ask that if you use a laptop you sit in a particular area of the classroom so that you do not distract other students and so that I can more easily monitor your laptop use. If I see you are doing other things, like surfing the web, I will ask you to turn the laptop off.
Food in Class

Food or drinks are allowed in the lecture classroom, but cannot be taken into the lab.

Missed Exam

See “Late Work and Make-up Exams” policies above.

K. COLLEGE & 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

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 7, 2017. 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 be submitted. After April 7, 2017 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, and the College of Science and Engineering Grade Appeals webpage at 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 (http://disabilityservices.tamucc.edu/)
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 (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

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.

Statement of Academic Continuity
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

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.