A. COURSE INFORMATION

Course number/section: BIOL 5415.001; BIOL 5415.101 (lab)
Class meeting time: Lecture – 11-12:15 TR; Lab – 12:30-3:15 R
Class location: Lecture – ECMS 207; 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 COREQUISITES

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)

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

Student assessment will include results of lab practicals (exams), key test (lab exam), critical thinking writing assignments and case study preparation and presentation, and a significant research project that will require a prospectus, data collection, and data analysis, with oral and written communication of the results. The goal is for the student to have a broad understanding of estuarine ecology, a detailed knowledge of how estuarine organisms are identified, and very specific knowledge of the taxonomy and identity of local polychaetes, gastropods, bivalves, crabs, and shrimp. See “G. Instructional Methods & Activities” for how material will be presented and details of the topics and categories of knowledge that will be covered and “H. Major Course Requirements and Grading Criteria” for a detailed table that relates each of the listed student learning objectives (outcomes) with its means of assessment.

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 and crustaceans (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 the field trip is REQUIRED. During the field trip 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 my lab assistant) 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
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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.

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<thead>
<tr>
<th>Letter</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>98</td>
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<tr>
<td>A</td>
<td>95</td>
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<td>A-</td>
<td>92</td>
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<tr>
<td>B+</td>
<td>88</td>
</tr>
<tr>
<td>B</td>
<td>85</td>
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<tr>
<td>B-</td>
<td>82</td>
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<tr>
<td>C+</td>
<td>78</td>
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<td>C</td>
<td>75</td>
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<td>C-</td>
<td>72</td>
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<td>0</td>
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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>Concept Analysis Exercise</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) – see the last page**

**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)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work). In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day 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**
  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.

I. **OTHER INFORMATION**

• **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**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.
### Schedule

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>
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<tbody>
<tr>
<td>1</td>
<td>1/15, 1/17</td>
<td>What is an Estuary? Intro to Keying, Study Organisms I</td>
</tr>
<tr>
<td>2</td>
<td>1/22, 1/24</td>
<td>Polychaetes Study Organisms I</td>
</tr>
<tr>
<td>3</td>
<td>1/29, 1/31</td>
<td>Molluscs Field Trip (Saturday 2/2) – preferred date Study Organisms I</td>
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<tr>
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<td><strong>Grad Student Research Prospectus Due</strong></td>
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<tr>
<td>4</td>
<td>2/5, 2/7</td>
<td>Crustaceans Field Trip (Saturday 2/9) – alternate date Sample Washing, Processing Study Organisms I</td>
</tr>
<tr>
<td>5</td>
<td>2/12, 2/14</td>
<td>Miscellaneous Organisms Sample Washing, Processing OR Sample Processing, ID Study Organisms I</td>
</tr>
<tr>
<td>6</td>
<td>2/19, 2/21</td>
<td>Estuarine Ecology Sample Processing, ID Study Organisms I</td>
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<tr>
<td>7</td>
<td>2/26, 2/28</td>
<td>Estuarine Ecology Lab Practical I (Start at 11)</td>
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<td>8</td>
<td>3/5, 3/8</td>
<td>Continue Concept Analysis Exercise (qualifier exam format) Sample Processing, ID Study Organisms II</td>
</tr>
<tr>
<td>9</td>
<td>3/12, 3/16</td>
<td>Spring Break</td>
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<tr>
<td>10</td>
<td>3/19, 3/21</td>
<td>Case Study Sample Processing, ID Study Organisms II</td>
</tr>
<tr>
<td>11</td>
<td>3/26, 3/28</td>
<td>Tuesday TBA Field Study Data Due 1 (100%) Field Study Data Due 2 (80%) – Last chance to turn in (by 3 pm) Study Organisms II Polychaete Collections</td>
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<td>Thursday: No lecture, open lab following Key Test Key Test (begin at 11)</td>
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<tr>
<td>12</td>
<td>4/2, 4/4</td>
<td>Case Study Field Study Data Due 2 – Late (80%) – Last chance to turn in (by 3 pm) Study Organisms II Polychaete Collections DUE by 3 pm</td>
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<tr>
<td>13</td>
<td>4/9, 4/11</td>
<td>TBA Study Organisms II Polychaete Collections</td>
</tr>
<tr>
<td>14</td>
<td>4/16, 4/18</td>
<td>UG Presentations Study Organisms II Polychaete Collections DUE by 3 pm</td>
</tr>
<tr>
<td>15</td>
<td>4/23, 4/25</td>
<td>Grad Presentations (Tuesday only) Lab Practical II – Start at 11 UG Extended Abstract Due (All)</td>
</tr>
<tr>
<td>16</td>
<td>4/30</td>
<td>Grad papers due</td>
</tr>
<tr>
<td></td>
<td>Final Exam Day</td>
<td>TBA</td>
</tr>
</tbody>
</table>

*Field Trip 2/2 (Alternate date will be reserved in case of postponement due to weather).*

Meet at staging area at 8:45 am; leave at 9 am, return by 4 pm