Ecology of Fresh Waters (BIOL 5412.001)
Department of Biological Science
Fall 2018

A. COURSE INFORMATION

Course number/section: Biol 5412.001 (Lecture & Lab)
Class meeting time: Lecture: 4:00pm-5:20pm TR/Lab: 1:00pm – 3:50 pm T
Class location: Lecture: Oconnor 207/ Lab: CS 240
Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Christopher J. Patrick, Ph.D.
Office location: HRI 121
Office hours: M,W,& F, 3:00-5:00 PM and by appointment
Telephone: 361-825-6022
e-mail: Christopher.patrick@tamucc.edu
Appointments: Made at least 24 hrs in advance by email

C. COURSE DESCRIPTION

Catalog Course Description
3 Semester Hours (3:3) the study of the functional relationships and productivity of aquatic communities as they are affected by their physical, chemical, and biotic environment. The influence of man’s activities on these systems will be the focus of the course.

Extended Course Description
Freshwaters constitute less than 1% of the water on earth, and yet the importance of groundwater, streams, rivers, wetlands, and lakes to both terrestrial ecosystems and marine ecosystems cannot be overstated. Freshwater ecosystems are host to a bewildering array of biodiversity and globally important biogeochemical cycles, subsidize terrestrial ecosystems, and act as transport systems for connecting the terrestrial and marine environments.

As human populations are expanding the human demand for freshwater resources and magnitude of human alteration of the landscape is growing at a similar rate. Limnology, the study of inland waters, is fundamental for a general understanding of ecology and is critically important for adopting a systems viewpoint of near-shore estuarine and coastal ecology. This course will focus on giving students a general understanding of Limnology and will highlight two topics particularly relevant for South Texas: the ecology of semi-arid freshwater systems and linkages between the landscape and nearshore marine environment.

D. PREREQUISITES AND COREQUISITES

Prerequisites
BIOL 3428 - Principles of Ecology.
Corequisites
SMTE 0091 - Biological Laboratory Safety Seminar

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)

Optional Textbook(s) or Other References

Supplies

Should possess lab coat and protective eye-wear for working with chemicals and other potentially hazardous substances during lab. Should also possess clothing and protective footwear that can be submerged and get wet (examples: hip waders, wellington boots, neoprene booties, chaco sandals, etc)

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. Measure the basic water quality variables in the field and lab using a variety of instrumentation or techniques and related to the study needs.
2. Sample freshwater systems for benthic invertebrates and fish using a suite of standard approaches used in bioassessment
3. Identify common freshwater taxa using dichotomous keys and with access to a stereomicroscope and forceps
4. Analyze data using appropriate descriptive and comparative statistics
5. Demonstrate understanding of processes and dynamics of freshwater ecosystems and communities by interpreting data collected in the field and by synthesizing peer reviewed literature

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 two class projects that spans
the entire semester. One project will be completed with BIOL 4405 where the data from all of the individual labs are synthesized and the students write a manuscript in the style of peer reviewed literature comparing several study sites. This class project will allow for students to learn first-hand the challenges of conducting a complete ecological study from start to finish. The second project specific to BIOL 5412 will be a group meta-analysis project. Graduate students will identify a topic of interest in freshwater ecology and will perform literature review and meta-analysis on that topic under the guidance of Dr. Patrick. Each student will be responsible for a section of the literature review task and a section of the manuscript writing task. The goal is to eventually submit the group paper to a peer reviewed journal.

**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>
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<tbody>
<tr>
<td>Exams (2)</td>
<td>15</td>
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<tr>
<td>Class Project Report</td>
<td>15</td>
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<tr>
<td>Literature Review Project</td>
<td>35</td>
</tr>
<tr>
<td>Final Exam*</td>
<td>10</td>
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<tr>
<td>Lab and Class Participation</td>
<td>25</td>
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</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 88.50% would be rounded to 89% (A) and a grade of 88.49% would be an 88% (B).

**H. COURSE CONTENT/SCHEDULE**
<table>
<thead>
<tr>
<th>DATE (By WEEK)</th>
<th>TOPIC</th>
<th>Class Time</th>
<th>Chapters</th>
<th>Lab</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>8/27</td>
<td>Introduction, Course Syllabus, Why Limnology?River Continuum Concept; Channels &amp; Flow</td>
<td>(2 lecture, 1 lab)</td>
<td>1,2,3</td>
<td>Mention the Ecological Modelers Primer, Discuss the laboratory plan, Graduate students discuss meta-analysis, Walk outside (in shade) and do the basics of sampling</td>
<td>Quiz</td>
</tr>
<tr>
<td>9/3</td>
<td>Chemistry of Freshwaters</td>
<td>(2 lecture, 1 lab)</td>
<td>4</td>
<td>Trip to Aransas River near Skidmore, TX After Sampling is complete, demonstrate transient storage</td>
<td>Quiz, Transient Storage Assignment</td>
</tr>
<tr>
<td>9/10</td>
<td>Solute Dynamics</td>
<td>(2 lecture, 1 lab)</td>
<td>11</td>
<td>Trip to Fernando Creek in Alice, TX After Sampling is complete, demonstrate retention</td>
<td>Quiz, Methods write-up for habitat assessment due</td>
</tr>
<tr>
<td>9/17</td>
<td>Physical Factors &amp; Biota</td>
<td>(2 lecture, 1 lab)</td>
<td>5</td>
<td>Trip to Mission River in Refugio, TX After Sampling is complete, demonstrate transient storage</td>
<td>Quiz, Methods write-up for biotic sampling due</td>
</tr>
<tr>
<td>9/24</td>
<td>Exam 1 /</td>
<td>(1 lecture, 1 lab)</td>
<td>10</td>
<td>Trip to Garcitas Creek near Victoria, TX After Sampling is complete run a short retention experiment</td>
<td>Quiz, Methods write-up for biotic sampling due</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Lecture Format</td>
<td>Laboratory/Field Work</td>
<td>Assignments/Exams</td>
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<tr>
<td>10/01</td>
<td>Community Ecology Part 1 and Macroinvertebrate Taxonomy</td>
<td>2 lecture, 1 lab</td>
<td>Trip to Placedo Creek near Victoria TX</td>
<td>Quiz, Methods write-up for all study sites due</td>
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<tr>
<td>10/08</td>
<td>Stream Communities</td>
<td>2 lecture, 1 lab</td>
<td>Macroinvertebrates (picking and identification)</td>
<td>Quiz, Short answer on impact of intermittency on stream community structure</td>
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<tr>
<td>10/15</td>
<td>Species Interactions</td>
<td>2 lecture, 1 lab</td>
<td>Macroinvertebrates II (picking and identification)</td>
<td>Quiz, macroinvertebrate methods write up due</td>
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<td>10/22</td>
<td>Trophic Relationships of Macroinvertebrates</td>
<td>2 lecture, 1 lab</td>
<td>Water Chemistry laboratory – all samples processed in lab</td>
<td>Quiz, water chemistry methods write up due</td>
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<tr>
<td>10/29</td>
<td>Exam 2/ Start of Energy Flow</td>
<td>1 lecture, 1 lab</td>
<td>Residual samples processed and Metabolism</td>
<td>Quiz, metabolism method and analysis write up due</td>
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<tr>
<td>11/05</td>
<td>Metabolism &amp; Organic Matter budgets</td>
<td>2 lecture, 1 lab</td>
<td>Residual samples processed</td>
<td>Quiz, detailed outline due for comments</td>
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<tr>
<td>11/12</td>
<td>Paper Discussions</td>
<td>2 lecture, 1 lab</td>
<td>Assigned readings + Project and Lab Group meetings</td>
<td>Residual samples processed and Metabolism</td>
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<tr>
<td>11/19</td>
<td>Reading Days &amp; Thanksgiving Holiday – No Class Thursday</td>
<td>2 lecture, 1 lab</td>
<td>Class Time for group project meetings and lab reports</td>
<td>Quiz, metabolism method and analysis write up due</td>
<td></td>
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<tr>
<td>11/26</td>
<td>Energy Base of Aquatic Systems</td>
<td>None</td>
<td>Class Time for group project meetings and lab reports</td>
<td>Class Lab Manuscript Due,</td>
<td></td>
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<tr>
<td>12/3</td>
<td>Conservation &amp; Human Impacts and Review session</td>
<td>2 lecture, 1 lab</td>
<td>Class Time for group project meetings and lab reports</td>
<td>Class Lab Manuscript Due,</td>
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<tr>
<td>12/10</td>
<td>Final Exam Week</td>
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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.

I. 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
Over the course of the semester there will be several opportunities to gain extra credit in the form of bonus questions on exams or extra assignment. The sum total of extra credit offered will equal 3% of the total course grade, thus giving a student who does all of the extra credit the opportunity to boost their grade of 87% to an “A”, 77% to a “B”, etc.

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 TAMUCC 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/photography are allowed during class, except with instructor permission.

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 or in the lab.

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 by then a grade of zero (0) will be entered. If the final is missed without proper prior notification and arrangement, a grade of zero will be entered for the final exam.

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
Plagiarism and Cheating will not be tolerated.

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

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.

J. COLLEGE AND 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.

  http://disabilityservices.tamucc.edu/

- 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.

K. 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.

- 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 the field work, 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.