Evolution and Genetics of Marine Organisms - MARB 6341.001

Department of Life Sciences

Spring 2019

A. COURSE INFORMATION

Course number/section: MARB 6341.001
Class meeting time: 9-10:20 am MW
Class location: ECDC MSA 207
Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr David S Portnoy
Office location: HRI 213D
Office hours: MWF 3:15-5:00
Telephone: 825-2859
e-mail: david.portnoy@tamucc.edu
Appointments: Upon request when available

C. COURSE DESCRIPTION

Catalog Course Description

This course covers aspects of evolutionary biology and genetics as they apply to understanding diversity and biological processes in marine environments. Topics include the evolutionary history of marine life, macroevolution, microevolution and functional genomics.

Extended Course Description

This course will introduce students to the evolutionary history of life in the ocean. Students will also learn about modern evolutionary theory, processes of speciation and processes which create diversity and adaptive capacity within species. Finally, the course will touch on functional genetics and the use of modern molecular techniques to understand organismal evolution and function.
D. **PREREQUISITES AND COREQUISITES**

**Prerequisites**

MARB 6XXX Marine Organisms and Processes

**Recommended Preparation**

We recommend that students review evolution and genetic concepts by reading Unit 4 (Mechanisms of Evolution) and Unit 5 (Evolutionary History of Biological Diversity) in Campbell’s Biology 11th edition.

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

**Required Textbook(s)**

None

**Recommended**


**Supplies**

None

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. Understand the evolutionary history of eukaryotes and prokaryotes in the ocean.
2. Describe the underpinnings of modern evolutionary theory and associated concepts.
3. Demonstrate an understanding of evolutionary forces that lead to trait divergence and
speciation.

4. Explain microevolutionary processes and their effects on populations.

5. Understand the genetic underpinnings of important biological process in marine organisms.

6. Exhibit an ability to synthesize information and present ideas using acceptable scientific writing.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

This course will include traditional instructor-led lecture, student-led paper discussion and in class demonstrations (through video).

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>22%</td>
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<tr>
<td>Exam 2</td>
<td>22%</td>
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<tr>
<td>Final Exam</td>
<td>22%</td>
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<tr>
<td>Term Paper</td>
<td>22%</td>
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<tr>
<td>Discussion/Participation</td>
<td>12%</td>
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Term Paper

Each student will prepare an eight to ten-page term paper in the form of a literature review that addresses any one of the broad topics covered during lecture and classroom discussion. This paper should be written in the style of a specific and appropriate journal and should contain a minimum of twenty references.

Discussion

Each section will end with a student-led paper discussion. Every student must lead one discussion and the paper must be approved by the instructors one week prior to the discussion. Discussion leaders are expected to prepare a short presentation about the paper and topics/question to engage other students in the discussion. Participation in discussion is vital, for that reason a portion of the discussion/participation grade will reflect student participation when they are not the discussion leader.

COURSE CONTENT/SCHEDULE
<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>ASSIGNMENTS</th>
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</thead>
<tbody>
<tr>
<td>14-Jan</td>
<td>History of Evolutionary Thought</td>
<td></td>
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<tr>
<td>16-Jan</td>
<td>Phylogenetic Concepts</td>
<td></td>
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<tr>
<td>23-Jan</td>
<td>Phylogenetic Approaches</td>
<td>TBA</td>
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<tr>
<td>28-Jan</td>
<td>Speciation</td>
<td>TBA</td>
</tr>
<tr>
<td>30-Jan</td>
<td>Student Led Discussion</td>
<td>TBA</td>
</tr>
<tr>
<td>4-Feb</td>
<td>Natural History of Ocean Life</td>
<td>TBA</td>
</tr>
<tr>
<td>6-Feb</td>
<td>Viruses s</td>
<td>TBA</td>
</tr>
<tr>
<td>11-Feb</td>
<td>Prokaryotes</td>
<td>TBA</td>
</tr>
<tr>
<td>13-Feb</td>
<td>Eukaryotes</td>
<td>TBA</td>
</tr>
<tr>
<td>18-Feb</td>
<td>Plants</td>
<td>TBA</td>
</tr>
<tr>
<td>20-Feb</td>
<td>Animals I</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Activity</td>
<td>Notes</td>
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<tr>
<td>25-Feb</td>
<td>Animals II</td>
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<tr>
<td>27-Feb</td>
<td>Student Led Discussion</td>
<td>TBA</td>
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<tr>
<td>4-Mar</td>
<td>Exam I</td>
<td>TBA</td>
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<tr>
<td>6-Mar</td>
<td>Genetic Techniques I</td>
<td>TBA</td>
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<tr>
<td>11-Mar</td>
<td>Genetic Techniques II</td>
<td></td>
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<tr>
<td>13-Mar</td>
<td>Microevolution适 made Adaptation</td>
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<td>18-Mar</td>
<td>Migration Drift Processes</td>
<td>TBA</td>
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<tr>
<td>20-Mar</td>
<td>Population Genetic Approaches</td>
<td>TBA</td>
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<tr>
<td>25-Mar</td>
<td>Student Led Discussion</td>
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<tr>
<td>27-Mar</td>
<td>Exam 2</td>
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<tr>
<td>1-Apr</td>
<td>Functional Genomics: Replication, Transcription, Translation I</td>
<td>TBA</td>
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<tr>
<td>3-Apr</td>
<td>Replication, Transcription, Translation II</td>
<td>TBA</td>
</tr>
<tr>
<td>8-Apr</td>
<td>Gene Regulation</td>
<td>TBA</td>
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<tr>
<td>10-Apr</td>
<td>Student Led Discussion</td>
<td>TBA</td>
</tr>
<tr>
<td>15-Apr</td>
<td>Epigenetics</td>
<td>TBA</td>
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</tbody>
</table>
17-Apr | Developmental Genetics
22-Apr | Maternal Effects
24-Apr | Student Led Discussion
29-Apr | Open Date
3-May - 9-May | Final Exam

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

I. COURSE POLICIES

Attendance/Tardiness

Attendance is not taken but participation is graded and students are tested on materials presented in class. Therefore, both tardiness and lack of attendance are likely to negatively impact grades.

Late Work and Make-up Exams

A note is required to excuse students from all graded in class work such as exams, paper discussions and field trips. Students will be given a chance to make-up the work but it must be done in a timely manner.

Extra Credit

Extra credit may be available as bonus question on exams at the instructors’ discretion.

Cell Phone Use

Please refrain from using cell phones in class, this include texting, tweeting, posting or any other such shenanigans.
Laptop (Tablet) Use

Laptop use in class is permitted as long as the student is using it to facilitate the learning process. Appropriate uses include; taking notes, looking up materials during discussion and looking at relevant papers. Inappropriate uses include; checking email, looking at Facebook and playing Hello Kitty Island Adventure. If a student continually abuses the privilege of using a laptop in class they will be asked not to use it any more.

Food in Class

Eating in class is not prohibited unless it proves disruptive.

Missed Exam

In order to take an exam on a date different than the date listed in the syllabus students must provide official documentation explaining the reason for the absence (e.g. a doctor’s note). If possible student should notify the instructors before the exam date that they will not be able to attend, explaining the reason for their absence. Not all reasons for missing an exam are acceptable (e.g. planned family vacation) and students who do not get approval for missed exams may receive a zero. Documented illness is always an acceptable reason for missing an exam. Make-up exams must be scheduled as soon as possible and make-up exams will have different content than in-class exams.

Participation

Participation in class discussion and laboratory exercises are a graded component of this course

K. 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.

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- **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. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must be submitted. No student is eligible to receive a W without completing the official drop process by this deadline. 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.

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.