VIROLOGY BIOL 5304
Department of Life Sciences
Summer II 2015 v8

A. COURSE INFORMATION

Course number/section: BIOL 5304.001
Class meeting time: MTWR 8:00 am-9:55 am
Class location: BH 202
Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Gregory W. Buck, Ph.D., Associate Professor
Office location: Center for the Sciences 251
Office hours: M 10:00-11:15 a.m.; TWR 1:00-2:15 p.m. or by appointment
Telephone: (361) 825-3717
e-mail: Gregory.Buck@tamucc.edu
Appointments: Preferred method is by e-mail

C. COURSE DESCRIPTION

Catalog Course Description
Survey of bacteriophages and major pathogenic plant and animal viruses including Baltimore classification, viral replication, and emerging viral diseases. Emphasis on analysis and review of primary literature on viruses.

Extended Course Description
This course is designed for M.S. students in Biology, Environmental Sciences, Marine Biology or Fisheries and Mariculture. This course will cover representative viruses in the three main groups of viruses infecting bacteria, animals, and some plants, including classification of viral groups, types of viral replication, molecular methods used to answer fundamental questions in virology. While students will be expected to know the molecular basis of pathogenesis (how viruses cause disease), the course does not aim to survey medical aspects of virology and taxonomy described in professional school (e.g., MD, DVM), nor viral treatment modalities. The course is offered to give graduate students a detailed survey of current literature on molecular virology by reading, critically analyzing, and discussing primary journal articles that focus on current virology research. Graduate students will also learn how to teach complex information to undergraduate students. Finally, graduate students will learn how to write a mini-grant in NIH format, a very useful skill for any future in science.

D. PREREQUISITES AND COREQUISITES

Prerequisites
BIOL 2416, BIOL 2421 and CHEM 1311/1111.
A majors’ course in microbiology is required (Texas Common Course no. BIOL 2421 or its equivalent) using one of the following texts: Lin, Prescott, Nester et al., Madigan et al., or Slonczewski and Foster. Persons having taken a mixed majors microbiology class (Common Course no. BIOL 2420) using the texts of Alcamo, Batzing, Baumann, Talaro and Talaro, or Totora et al. will need to supplement their knowledge base, and should discuss this with the instructor before taking the course. Also required are courses equivalent to genetics (BIOL 2416) at the level of Brooker, Hartl, Russel, Lewontin, Snustad or other texts, and organic chemistry (CHEM 3412). While not required, coursework in molecular biology (BIOL 3403) at the level of Watson, Weaver or Lewin; biochemistry (CHEM 4401/2) at the level of Stryer, Voet, Lehninger, or Devlin; and immunology (BIOL 4406) at the level of Abbas and Lichtman, Kuby, or Roitt would be beneficial.

**Corequisites**
Officially, there are none. However, students who have taken Cell Biology (BIOL 3410), Molecular Biology (BIOL 3403), Immunology (BIOL/BIMS 4406), Physiology (BIOL 3425), and Biochemistry (CHEM 4401/4402), and have the ability to integrate knowledge from these fields and from Genetics and Microbiology, do best in the course.

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

**Required Textbook(s)**
I would strongly suggest that students buy either the first or the second text listed here, as they might be helpful. However, you are NOT required to purchase any of these:
   While this text is preferred, I will not rely exclusively on it.
   You can also buy the e-book (ISBN 978-1-1182-1489-3) for less money; go to this site if interested: www.coursesmart.com


**Optional Textbook(s) and Web Sites**
14. http://www.virology.net/garryfavweb.html; Dr. David Sander’s “All the Virology on the Web” site; fairly accurate; accessed 05/21/2015.

Other References from Primary and Secondary Literature (Very Important papers are in bold font)

**Supplies**

Textbook(s) and copies of papers (do off library databases)—I will try to give copies of papers and place on Blackboard if I can legally do it without violating copyright laws, but for clarity of figures, you may wish to get color copies from databases.

**F. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

By the end of this course, students should be able to perform these at a level of 80%:

1. Describe the structure and components of viruses;
2. Explain various cellular and molecular different techniques used in virology, along with their advantages and limitations;
3. Distinguish between various types of viral replication between positive and negative-stranded DNA or RNA viruses;
4. Explain the molecular basis of pathogenesis for diseases caused by selected viruses;
5. Compare and contrast emerging viral etiological agents in terms of molecular mechanisms of disease;
6. Critique scientific methodology and approaches in studying the etiology of viral infectious agents;
7. Justify research results and discussions found in current primary literature;
8. Write a credible, ORIGINAL grant proposal in NIH or NSF format;
9. Present and teach scientific material orally in a form appropriate to the targeted audience

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

1. **Two exams** (Mid-Term and Final, 100 pts. each)—Exams may be split over 2-3 days
   a. Mid-Term exam will be a mixture of short answer, essay, multiple choice (including Type K), descriptive T/F, and cases. Exams may be in-class or take-home, or a combination of both. Class exams normally take 75-90 minutes in length.
   b. *If a take-home exam is given*, it will have a finite time limit outside of class. You are free to use any sources for the take-home exam, including any materials on-line, in the library, from your peers in the class. However, you are NOT free to ask faculty at TAMU-CC or elsewhere, graduate students here at TAMU-CC or elsewhere, or undergraduates who have previously taken this course. I also reserve the right to “split” the exams into take-home and in-class components. Missed exams will be allowed make-up only under approved TAMU-CC guidelines, and will be
total essay, and will differ in format than the regular exams.

3. Oral Final Exam
   i. Initially, class members will have only five attempts or questions; they will reach in an envelope and take a random question.
   ii. Students must attempt an answer within two minutes and finish within five minutes; if you pass, that counts as an attempt.
   iii. Extra attempts may be allowed if all class members have had five attempts, provided that all questions have not been answered. If a student answers a question with a low number of possible points (10 pts or fewer), I will give them an additional opportunity.
   iv. If students have answered all the questions they feel they need to achieve the desired grade, they are free to leave.
   v. Students may use the white board or overhead projector to describe their answer.
   vi. No help can be given by other students, or from laptops, tablets, smart phones, notes, texts, or your own copy of the annotated papers.

2. Paper Discussion (25 pts each; total 50 pts.)—Students will be asked to lead class discussions of primary journal articles. To make sure people don’t rest after their time, I reserve the right to give quizzes to the class. All students will do two presentations, if there are not too many students in the class. If you cannot lead the class when you are asked, I will give you another opportunity if there are valid emergency reasons (family illness or accidents, deaths, funerals). Other events (professional school and job interviews) will be determined on a case-by-case basis. For non-legitimate excuses (as determined by professor), I may deduct 12.5 points for each discussion, and ask you to try again. Students can be asked to do more than two discussions, either for required credit, extra credit or no credit. Caveat: If class size is >25, instructor reserves the right to limit students to one paper discussion worth 50 pts. I WILL increase number of paper discussions required if <15 students are in class. Paper discussions may be used as substitutes for quizzes.

3. Quizzes (50 pts total): Instructor will give 1-5 quizzes, ranging from 5 to 25 points total. Due to the shortened summer session, it is unlikely that make-ups will be given for quizzes. I reserve the right to use any diagnostic assessments as quiz grades. Extra quizzes beyond five, as well as additional paper discussions, may be used for make-up or for extra credit.

4. Mini-Grant Proposal (150 pts): Grad students do not work with undergraduates on the poster and the group project. Instead, graduate students will turn in a mini-grant proposal in NIH or NSF format (former preferred, worth 150 pts. The proposal will consist of the following sections: Specific Aims/Project Description, Background/Significance, Experimental Design, Timetable, and Bibliography. This proposal should consist of 7-10
double-spaced pages, excluding cover page) on a virus of your choice—I prefer that grad students work on a virus not covered in class or in case studies. This mini-proposal will include formulation of at least two separate Specific Aims that are hypothesis-driven, with the experimental design logically following from the Specific Aims. The bibliography must contain at least 10 sources, of which seven must be primary literature and a maximum of one review and one Internet source.

---The final date for deciding which virus will be the subject of your proposal is July 9, but you are free to decide earlier.

---The grant proposal is due July 16. I WILL NOT ACCEPT LATE Mini-GRANT PROPOSALS FROM GRAD STUDENTS—if you think you might be late, turn it in early!

5. Power-Point Presentation (150 pts): I expect each grad student to give a 20-30 minute Power-point talk involving some aspect of their grant proposal to the class. You must include the general aspects of the virus studied (viral type, replication, host, diseases caused, unique features of virus); you may want to discuss why your proposal is worth studying, and what you hope to accomplish. Part of the presentation grade will be determined by the undergraduates in the audience. This presentation will be done Aug. 3-4, but if there are many undergraduate projects, I may ask you to do this on the days of the oral final exam.

Viruses not covered in class (use for Pre-Proposal and Poster)

<table>
<thead>
<tr>
<th>Feline Calicivirus</th>
<th>Arteriviridae (Equine arteritis)</th>
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<tbody>
<tr>
<td>Iridoviridae (lymphocystis Virus)</td>
<td>ssRNA Satellite viruses (Tobacco necrosis satellite virus)</td>
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<tr>
<td>Papillomavirus (Cottontail Rabbit Virus)</td>
<td>Coltivirus (Colorado Tick Fever virus)</td>
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<tr>
<td>Poxviridae (Molluscipoxvirus: Molluscum contagiosum virus)</td>
<td>Walleye Dermal Sarcoma virus</td>
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<tr>
<td>Picornavirus (Black Cell Queen Virus; Parechovirus)</td>
<td>Bovine viral diarrheal virus</td>
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<tr>
<td>Circovirus (Chicken Anemia)</td>
<td>Turkey Astrovirus</td>
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<tr>
<td>Cricket paralysis virus</td>
<td>Yellow Head Virus</td>
</tr>
<tr>
<td>Tombusvirus</td>
<td>Deltaretrovirus (Bovine leukemia virus)</td>
</tr>
<tr>
<td>Tauro shrimp virus</td>
<td>Reovirus (Orbivirus: Blue tongue virus)</td>
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<tr>
<td>Rhabdoviridae (Ephmerovirus)</td>
<td>Salmonid pancreas disease virus (alphavirus)</td>
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H. MAJOR COURSE REQUIREMENTS AND GRADING

Introduction--Please note that Instructor may modify assignments, number of assignments and point values depending on number of students in class. Also note that “any mid-term grades posted on S.A.I.L. and Blackboard are not official University grades, not a guarantee of final grades and are never updated; once they are posted they cannot be changed even if your grade in the class does change.”

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>16.7</td>
</tr>
<tr>
<td>Oral Final Exam</td>
<td>16.7</td>
</tr>
<tr>
<td>Quizzes</td>
<td>8.3</td>
</tr>
<tr>
<td>Paper discussions</td>
<td>8.3</td>
</tr>
<tr>
<td>Mini-Grant Proposal</td>
<td>25</td>
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<tr>
<td>Power Point Presentation</td>
<td>25</td>
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</tbody>
</table>

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Jul 6</td>
<td>Introduction to Virology; History, Structure, Replication</td>
<td>1, 2, 3 Acheson</td>
<td>Form Groups for Pre-Proposal</td>
</tr>
<tr>
<td>T Jul 7</td>
<td>Molecular Biology tools for viral studies</td>
<td>Not in Acheson; see ancillary texts</td>
<td></td>
</tr>
<tr>
<td>W Jul 8</td>
<td>Viral Pathogenesis &amp; Immunology</td>
<td>4, 33, 34, 35 Acheson</td>
<td>Choose virus for Pre-proposal and Poster; Norovirus and M-like cells J Viro</td>
</tr>
<tr>
<td>R Jul 9</td>
<td>ss (+) RNA viruses-- Picornavirus, Flavivirus, Corona, Toga; ds: Reoviruses</td>
<td>11, 12, 13, 14 Acheson</td>
<td>Graduate Proposal virus topic due; Paper TBA</td>
</tr>
<tr>
<td>W Jul 15</td>
<td>Hepadnaviridae</td>
<td>30 Acheson</td>
<td>Paper TBA</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Topic</td>
<td>Authors</td>
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<tr>
<td>R Jul 16</td>
<td>Mid term Exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T Jul 21</td>
<td>Herpesvirus contd; Retrovirida</td>
<td>28, 29 Acheson</td>
<td>Paper TBA</td>
</tr>
<tr>
<td>W Jul 22</td>
<td>Retrovirida contd</td>
<td>28, 29 Acheson</td>
<td></td>
</tr>
<tr>
<td>M Jul 27</td>
<td>DNA Viruses III: Papilloma, Polyoma, Pox</td>
<td>21, 22, 26 Acheson</td>
<td>Papillomavirus Mokili et al 2013</td>
</tr>
<tr>
<td>T Jul 28</td>
<td>Mimiviruses</td>
<td>27 Acheson</td>
<td>Oysters and Mimivirus Andrade et al Arch Viro 2015</td>
</tr>
<tr>
<td>W Jul 29</td>
<td>Emerging Viruses or Bacteriophages</td>
<td>TBA</td>
<td>Pawluk et al MBio (2014)</td>
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<tr>
<td>R Jul 30</td>
<td>Undergrad Posters</td>
<td></td>
<td></td>
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<tr>
<td>M Aug 3</td>
<td>Undergrad Posters; Grad Presentations</td>
<td></td>
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<tr>
<td>T Aug 4</td>
<td>Graduate Presentations or TBA</td>
<td></td>
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<tr>
<td>W Aug 5</td>
<td>Oral Final Exam</td>
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<tr>
<td>R Aug 6</td>
<td>Oral Final Exam</td>
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</table>

Handouts:
1-Viruses not covered in class
2-Reverse Transcription
B—v5 Fusions
C--v7 Abridged History of Virology
D--v6 Molecular Biology Methods
E—v3 Viruses and Immunology
F—v4 Baltimore Classification

Papers to be read this Summer for Paper Discussion


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
Students are expected to attend every scheduled class meeting and to be on-time. It is the responsibility of the student to obtain any material missed during an absence from his/her classmates. Power Points are not placed in the library and placement on Blackboard will be limited.
Late Work and Make-up Exams
Students will be given a Late Assignment Penalty for tardy work: 10% assignment grade deduction per class day late. However, after the 3rd day, late assignments will not be accepted. In-class late assignments are defined by being turned in after 8:15 am.

The exception is for the Grant Proposal –this assignment will not be accepted if it is late! I have NEVER been able to turn in a grant that was late to ANY funding agency—federal, state or local.

Please note that class assignments may be sent to me by e-mail or slid under my office door; tardiness is determined by the time noted on the instructor’s Inbox, but allowances can be made for server problems. Files contaminated by viruses, spyware, and worms will not be accepted. DO NOT ASK THE CUSTODIANS to let you into my office to place an assignment on my desk.

Extra Credit
A minimum of ~30 pt extra credit is assured as pre- and post-test assessments. No make-ups are given for pre- and post-tests. Other extra credit assignments may be given at instructor’s prerogative. Instructor is not obligated to give make-up assignments for extra credit opportunities, whether excused or unexcused. The ONLY possible exception is for students with a university-approved scheduled absence. The make-up (if given) may not be the exact same assignment given to the class.

Cell Phone Use
DO NOT USE CAMERA PHONES IN LECTURE. DO NOT SEND TEXT MESSAGES DURING CLASS. Please turn off all cell phones, beepers, Bluetooth devices, Black Berrys, etc., before entering the classroom, or at least place them on silent mode. I would prefer that earpieces not be worn in lecture. DO NOT TAKE PHOTOS of Power Point slides or videos with your cell phone camera unless otherwise instructed. Recording of lectures with recorders can only be done with permission of instructor—please see me privately.

Laptop Use
I have no problems with any student using a laptop in class, as long as they are not looking at pornography, anime, videos, etc.

Food in Class
I prefer that you not eat or drink in class, but I will not throw you out or ask you to leave.

Missed Exams
Students have two choices for making up exams due to excused absences. They can do an all-essay make-up exam, or doubling the grade on the final exam. There is no make-up for missed quizzes, or for missed exams due to unexcused absences. Missed extra credit
opportunities may or may not be given make-up assignments, depending upon the nature of the assignment. Please note that instructor determines what is not excused. I define excused absences as emergency visits to the ER or physician or dentist; job, graduate and professional school interviews; death of close family members (siblings, in-laws, parents, aunts or uncles, step-parents, grandparents or great-grandparents, first cousins), or University-approved absences as described in the Catalogue and Student Handbook.

Participation
I expect that all members in the class will participate in the questioning, discussions, and interactions within the lecture. Formal assessment of class participation is not done as part of grade, but I do informally monitor it, and I will note it if you ask me for a letter of recommendation.

Others
I will use rubrics to describe how assignments will be graded. These documents have been placed on Blackboard.

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.

- **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. You (the student) must initiate the paperwork in the Student Services Center (the “Round Building”). 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.

Deadline to drop course with a “W” grade: F July 24
Deadline to withdraw from University for the summer session: T Aug 4

- **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 (ADA of 1990, including the ADA Amendments from 2008 (PL 110-325), 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.

This act also includes **returning veterans** who may be experiencing cognitive
and/or physical access issues in the classroom or on campus. 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/

If you need disability accommodations in this class, please contact the instructor as soon as possible. If you have mobility problems, are pregnant, or you may have a history of seizures, please notify the instructor PRIVATELY so that assistance can be given in case of fire drills or emergencies. Please have your Faculty Notification Letter from the Disabilities Service Office when you talk with Dr. Buck.

- **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.

  If class is cancelled due to a pending hurricane, that information is sent via your islander.tamucc.edu account. **It is strongly suggested that students have a functioning islander.tamucc.edu account!!** I will also try to send it within Blackboard 9.1, as stated above. **I will not send out personal information regarding grades through other types of e-mail servers, only through islander.tamucc.edu. Please make sure this account is working.**

L. **OTHER INFORMATION**

- **Academic Advising**
  Undergrads: 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.

  Biology/MARB/ ECSI Grad Students: By the end of your first year, you should have chosen a Graduate Advisory Committee (GAC), including a Chair and members, and completed a degree plan signed by your GAC.
College of Education Grad Students: Please go to the College of Education Academic Advising Center on the second floor of the Faculty Center.

• Hints on doing well in course
This course is considered to be an introduction to graduate school. First, read the syllabus. Second, re-read the syllabus. Third, read the syllabus again.

Next, read the assigned text chapters. Read the papers assigned. If you have problems reading primary literature, I would suggest that you go to the bookstore and buy *Reading Primary Literature: A Practical Guide to Evaluating Research Articles in Biology* by Christopher M. Gillen (Pearson/Benjamin-Cummings). The ability to read, analyze, and dissect primary literature should have been learned in Pro Skills.

This course aims to do higher-level critical thinking, not just memorize the textbook and regurgitate facts. I have taught this course since 2003. Students who have taken it tell me this course was very beneficial in their ability to think critically, and it prepared them for PhD graduate and professional school.

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.