Mechanisms of Microbial Pathogenesis

COURSE DESCRIPTION
This course will be an introduction to molecular and cellular basis of microbial disease and the host response. Students will be given a comprehensive overview of representative model microbial systems to illustrate the mechanisms of disease pathogenesis and the influence of environment (i.e. host or ambient). Research papers on mechanisms of pathogenesis and host immune response will be discussed to provide awareness of scientific approaches used to investigate these processes.

LEARNING OBJECTIVES
Upon completion of this course the student should be able to:

1. Utilize specialized language relevant to pathogenic microbiology
2. Compare and contrast different microbial diseases, based on specific pathogenic properties utilized by microorganisms
3. Identify the roles of ecology and evolution in the spread of infectious diseases
4. Identify the roles that the host plays within an infectious disease. (i.e. innate and acquired immunity)
5. Describe microbial strategies to evade the immune response
6. Describe strategies microorganisms use to attach, invade and multiply in a host.
7. Understand the toxins and enzymes produced which contribute to pathogenesis
8. Critically analyze current literature relating to pathogenic microbiology.
9. Evaluate case studies describing specific host-pathogen interactions.
10. Critically evaluate current strategies in impeding microbial pathogenesis
**Major Course Requirements**

**Tentative Evaluation:** Your final grade will be based on the percentage you earn out of the total possible points. Individual extra credit is not possible, but bonus points may be built into exams or other assignments. Statistical manipulations, *if* used (at the Instructor’s discretion), will be performed only once, at the end of the semester. A 10-point grading scale will be used:

- **A** = 90 - 100 %
- **B** = 80 - 89.9 %
- **C** = 70 - 79.9 %
- **D** = 60 - 69.9 %
- **F** = 0 - 59.9 %

**Components of Course Grade (Tentative)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>MidTerm Exam</td>
<td>150</td>
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<tr>
<td>Final Exam</td>
<td>150</td>
</tr>
<tr>
<td>Student Led Discussion of Journals</td>
<td>150</td>
</tr>
<tr>
<td>Reading Reports</td>
<td>100</td>
</tr>
<tr>
<td>Quizzes/Homeworks/Other Assignments</td>
<td>As assigned</td>
</tr>
<tr>
<td>Attendance/Participation</td>
<td>50</td>
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**TENTATIVE TOTAL** = **600**

The time schedule may require adjustment. Should this be the case, the assignments and weighting may change. Additional assignments may or may not be provided at the Instructor’s discretion and depending upon opportunities. Such assignments might include seminar attendance, homeworks, group projects, reading assignments, quizzes, etc.

An assignment will likely be due during the last week of class.

Every attempt will be made to follow the time and evaluation schedules shown here. It is the student’s duty to attend each class session and be aware of all assignments, deadlines, changes, etc.

**Midterm Exam** will be a take home exam that will consist of short answer questions and an essay. The **Final Exam** will be a multiple choice exam that contains material from the entire semester.

**Student Led Discussion of Journals:** Students will be matched into groups and groups are responsible for leading the discussion on primary journals.

**Quizzes** may be given at any time in class. There will be no makeups. **Homeworks and other assignments** may be given in class. The other assignments may include seminar attendance, data interpretation, experimental design, calculations, opinion papers, research article summaries, etc. They will generally be due at the start of lecture class the following week. You are encouraged to get together and work on them as a group. However, unless specified otherwise, the assignments must be turned in individually and be written in your own words, NOT COPIED. An assignment grade of ZERO will be given if the work is not in your own words.

**Attendance to class is required.** Each student will be given a 2-absence grace allowance before losing attendance points.
RECOMMENDED TEXT


REQUIRED READINGS
Much of the lecture will be derived from assigned published manuscripts and the recommended text. Each of the papers that you will need for this class will be available for you to print from Blackboard. Be sure that you print the needed paper(s) and read them prior to the lecture for which it was assigned. You must bring a copy of these papers to class. Quizzes/Homework/Assignments will be derived from these papers and the lecture material. Recommended text will help you in understanding the concepts that will be highlighted.

READING REPORTS
(Due at the start of the next class session from which the journal was assigned)
We will discuss several recent articles from the literature. This will be used to relate the material covered in class to current work in the field of microbial pathogenesis. You are expected to read all articles prior to the assigned date. To ensure that the articles are read, you will be required to submit a reading report summarizing the contents of each article. Reading Reports are due by the beginning of class on the day on which the article is to be discussed and can be submitted electronically (Late reports will NOT be accepted. Reading Reports will not be expected for Review journals.)

* Provide the title, author(s), date and source of each reading.
* Indicate the senior author's affiliation (e.g. Department of Microbiology and Molecular Genetics, Michigan State University).
* In 1 - 2 sentences, summarize the main point(s) of the reading.
  For example: What was the hypothesis? Was it supported by the results?
* In 3 - 4 sentences each, describe what you consider to be the major strengths of the reading, the major weaknesses, and give your overall opinion/evaluation of the reading.
  Were all necessary controls included? Did the data support the conclusions?

REQUIRED UNIVERSITY POLICIES
Students with Disabilities and Veterans: All programs in Life Sciences (LSCI) comply with the federal Americans with Disabilities Act (ADA) of 1990, including the ADA Amendments from 2008 (PL 110-325). This anti-discrimination statute provides civil rights protection for persons with disabilities. This statute requires that all qualified students with disabilities be guaranteed a learning environment that provides reasonable accommodations of their disabilities. This act also includes returning veterans who may be experiencing cognitive, emotional and/or physical access issues in the classroom or on campus. If you are a returning veteran or you suspect that you may have a disability requiring accommodation, please contact the Office of Disability Services (located in Driftwood 101) at (361) 825-5816. Please contact this office in a timely manner, as they must review requests and prepare accommodations and send the accommodation letters.

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 the Instructor.

**Grade Appeals**
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 on 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 on the process, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, consult Texas A&M University-Corpus Christi University Procedure 13.02.99.C2.01 Student Grade Appeal Procedures (http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage (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 or the College of Science and Engineering Dean’s Office.

**Academic Advising:** The College of Science and 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. The College's Academic Advising Center is located in Center for Instruction--Suite 350, and can be reached at (361) 825-6094.

**Class Policies**
**Attendance:** Students are expected to attend every scheduled class and laboratory meeting. 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 only Power Points from certain sections will be placed on Blackboard™ 9.1, or on a website. For labs, the instructor (TA) should be notified PRIOR to lab if the student will be absent (except in emergency situations). Students must attend the laboratory section for which they originally registered. “Make-up” by attending other lab sections is NOT permitted except in emergencies, only with prior approval.

**Academic Integrity:** TAMUCC academic policies are in force, including standards for academic integrity & honesty, plagiarism, grammar and spelling. All policies are described in the TAMUCC catalogue and the Code of Conduct in the Student Handbook.
DO NOT SHARE WRITTEN INFORMATION BETWEEN PARTNERS ON REPORTS. THIS IS PLAGIARISM. ALL OFFENDING PARTIES WILL BE AWARDED A ZERO ON THE ASSIGNMENT. We also have to report all instances of cheating to the Dean of Students office on an Academic Misconduct form.

**Citation format:** Please use Council of Science Editors format. If you don’t know this, ask someone in Pro Skills! A useful link on this format is available at this URL: http://writing.wisc.edu/Handbook/DocCSE.html

**Professional Courtesy:** DO NOT USE CAMERA PHONES IN LECTURE OR LAB. DO NOT SEND TEXT MESSAGES DURING CLASS. Please turn off all cell phones, beepers, Bluetooth devices, Palm Pilots, Black Berrys, etc., before entering the classroom or laboratory, or at least place them on silent mode. I would prefer that earpieces not be worn in lecture or laboratory. DO NOT TAKE PHOTOS of Power Point slides or videos with your cell phone
camera unless otherwise instructed. Recording of lectures with tape recorders can only be done with permission of instructor.

Classroom 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 (including excessive text messaging) may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.”

List-serve: All students are on the Blackboard list serve for the course, and to a second opportunities-list serve. To subscribe, send a separate e-mail to opportunities-list-request@sci.tamucc.edu. Make sure that your e-mail appears in the “From” heading. In the subject heading, type “subscribe,” then send the e-mail. Next, you will receive a second message with a long set of letters and numbers in the subject line. You must also reply to that message in order to be subscribed to the list-serve.

After the initial message to subscribe, to send items on the list-serve, just type opportunities-list@sci.tamucc.edu (do NOT add –request after list). You may not receive the messages from the list-serve if your Internet service provider (Yahoo, Hotmail, Excite, Roadrunner, Grande, etc.) keep these messages from being placed in junk-mail. The University administration prefers that you use the islander.tamucc.edu accounts.

At the end of the course, send an e-mail that contains your e-mail address in the “From” heading to opportunities-list@sci.tamucc.edu. In the subject heading, type the word “unsubscribe,” then send the e-mail. I hope that students will continue to subscribe to opportunities-list@sci.tamucc.edu!

Dropping courses: I hope that students do not find it necessary to drop this class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. You as adults have to be the final judge of your action whether to drop or not. For students applying to professional or graduate school, you will have to explain why you dropped this class or any other class. Receiving a “W” is NOT automatic; you must initiate the paperwork in the Student Services Center (the “Round Building”). Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class.

Deadline to drop course with a “W” grade: July 25
Deadline to withdraw from University for the spring term: August 5
Preferred methods of scholarly citations  (Format from Microbiology journal)

Tentative Assessment Dates:
MidTerm Exam  July 10th 2014
Final Exam  August 7th 2014

**Tentative Lecture Topics**

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<tr>
<th>Lecture</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1-2</td>
<td>Introduction/Innate Immunity</td>
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<tr>
<td>3-4</td>
<td>Adaptive Immunity</td>
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<tr>
<td>5-6</td>
<td>Biology of Infectious Agents/Normal Human Microbiota</td>
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<tr>
<td>7-8</td>
<td>Bacterial Strategies for Evading or Surviving Host Defense Systems/ Midterm</td>
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<tr>
<td>9-10</td>
<td><em>Escherichia coli</em></td>
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<td>11-12</td>
<td><em>Pseudomonas aeruginosa</em></td>
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<tr>
<td>13-14</td>
<td><em>Staphylococcus aureus</em></td>
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<td>15-16</td>
<td><em>Streptococcus pneumoniae</em></td>
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<td>17-18</td>
<td><em>Helicobacter pylori</em></td>
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<tr>
<td>19-20</td>
<td><em>Human Papillomaviruses/Plasmodium falciparum</em></td>
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<tr>
<td>Review</td>
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<tr>
<td>Final</td>
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