The University of Texas at El Paso
College of Science
Department of Biological Sciences

Biol 4395
Infectious Disease Co-Evolution
Spring, 2015

Lecture: M/W 10:30-11:50 PM  Liberal Arts Building 209

Instructor: Dr. Charles Spencer
Office: Bioscience Research Building 5.148 (x8776)
E-mail: ctspencer@utep.edu

Office Hours: M/W 1:00-3:00 PM (or through prior appointment).

Required Text: Diseases and Human Evolution by Ethne Barnes
Evolution in Health and Disease by Stearns and Koella

Reference Text: 1) Immunology textbook
2) Any timely evolutionary text.

Course Objectives: This course is intended to expose students interested in the biomedical and medical fields to the interactions between hosts and pathogens. The main objective of this class is to develop the students’ understanding of how hosts and infectious microbes have co-evolved and continue to evolve as each adapts to the other. The topics of infection, evasion, suppression and compromise will be discussed relative to the development of the immune response in immunologically and genetically diverse populations. This will be a theoretical/practical discussion class based upon the principals of microbiology, epidemiology and evolution.

Activities/Assignments: There will be three exams and the final. In addition, there will be two major projects and minor assignments in-class or on Blackboard.

Make-up Policy: Make-ups will only be allowed for absences excused for professional or medical reasons (e.g., illness, doctor, interviews, conferences, single individual conflicts) at the professor’s discretion.

Grading Procedure: Your grade will be distributed as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>In-class exams</td>
<td>20%</td>
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<tr>
<td>Presentations</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Class assignments</td>
<td>25%</td>
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<tr>
<td>In-class participation</td>
<td>5%</td>
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<tr>
<td>Grand Total</td>
<td>100%</td>
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A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69%
F = Below 60%
**Grade Disputes:** The professor is the ultimate knowledgeable source at the University. Disputes over grades received may be brought to the professor’s attention for review. If the professor deems the grade erroneous based upon the material covered during the course, the grade may be subsequently altered. During review, the entire document is subject to review.

**Attendance Policy:** Attendance is critical to understanding this material and completing in-class and assigned work; therefore, attendance is required at all classes. Students with more than 6 unexcused absences may be subject to administrative withdrawal.

**Drop Policy:** The UTEP Spring 2015 deadline is April 6, 2015. The College of Science will remain aligned with the University and not approve any drop requests after that date.

**Incomplete Policy:** All grades of Incomplete must be accompanied by an Incomplete Contract that has been signed by the instructor of record, student, departmental chair, and the dean. A grade of Incomplete is only used in extraordinary circumstances confined to a limited event such as a missed exam, project, or lab. If the student has missed a significant amount of work (e.g. multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.

**Academic Integrity:** Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another person's as one's own. And, collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.

**Civility:** Active participation is an important component of this class and hence figures prominently in the grading scheme. The use of cell phones, PDAs, tablets or computers for socialization not related to the class is prohibited. Side discussions not related to the topic at hand should be kept for after the class period is over. You will be expected to respect individual students’ opinions.

**Disability:** If a student has or suspects she/he has a disability and needs an accommodation, he/she should contact the Disabled Student Services Office (DSSO) at 747-5148 or at dss@utep.edu or go to Room 106 Union East Building. The student is responsible for presenting to the professor any DSS accommodation letters and instructions.

**Military:** If you are a military student with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact the professor as soon as possible with those dates so alternate arrangements can be made for completion or postponement of assignments.
Course Schedule

Part 1: General Concepts
   I) Epidemiology Principals
   II) Evolutionary Principals
   III) Techniques
   IV) Human Genetic diversity

Project I: Microbiology of your pathogen

Part 2: Evolutionary microbiology
   I) Evolutionary origins
   II) Genome analysis
   III) Population structure
   IV) Antibiotic resistance
   V) Vaccine avoidance and selection
   VI) Virulence
   VII) Emergence of new diseases
   VIII) Parasites

Project II: Host-Pathogen coevolution

Part 3: Noninfectious and degenerative diseases (time permitting)
   I) Aging
   II) Metabolic diseases
   III) Cancer

EXAMINATION (FINAL)
Cumulative

Project I: A pathogen of interest

Each student will select a specific medically relevant pathogen of interest for their focus throughout the remainder of the course. Project I will consist of an in-class presentation of the distribution of, health threat from, pathogenicity of and host response to said organism. These presentations will be scheduled late February to early March.

Project II: Evolution of the host-pathogen interaction

Using the background information obtained in Project I and the course material, each student will prepare a poster ribbon (1’ wide x 3’ tall) diagramming and explaining how the host and pathogen have co-evolved over time. These posters will be presented at a “mini-symposium” to be arranged in April.