Course: BIOL 455- Evolution of Infectious Diseases

Instructor: (Tel.) 304.293.1791, (E-mail) rita.rio@mail.wvu.edu
Time: Fall 2013, Tues. & Thurs. 11:30-12:45
Location: LSB 3131
Office hrs. Mondays 2-3:00 PM or by appointment
Course format and credit hours: 3 hr lecture

Course synopsis:
Infectious diseases exert a tremendous impact on global health by causing significant mortality, morbidity, political and economic detriment. Microbes demonstrate the most accelerated evolutionary rates known, making them ideal models for the study of evolutionary processes. This class will increase student’s knowledge base of infectious diseases causes, their origins and biological factors associated with transmission and spread.

We will begin with general overviews of molecular evolution, microbiology, immunology, and epidemiological concepts. This background is critical for a fundamental understanding of the significance of pathogen biology and human ecology and behavior towards disease emergence, spread and control. We will then progress into exploring the integration of various factors (i.e. causative agents, host demographic behavior, chemical resistance, etc.) that are intrinsic to pathogen evolution, by examining specific diseases on a ‘case by case’ basis.

Expected Learning Outcomes: Upon successful completion of this course:
1. Students will interpret fundamental ecological, molecular and evolutionary processes towards pathogen development and associated virulence through historical time and space.
2. Students will analyze empirical and epidemiological studies, and theoretical principles in interpreting pathogen evolution towards the development and synthesis of a scientific manuscript.
3. Students will be able to predict, as well as comprehend the emergence, spread, and persistence of infectious diseases in host populations and subpopulations.
4. Students will gain familiarization with the use of various biomedical and genomic databases.
5. Students will review scientific literature on their ‘choice pathogen’ and orally present to both a professional and general audience.
Grading:
Contagion assignment 5%
Case study responses-5%
EXAM I-30%
EXAM II-30%
Final project (I. & II.)- 30%
   I. Final paper- 20%
   II. Presentation-10%
Total 100%

Grade Assignment:
  100–90= A
  89–80= B
  79–70= C
  69–60= D
  59–0= F
**Grading Policy:**
Makeups will be handled on an individual basis. Late papers are at the discretion of the instructor and will not normally be allowed except under extreme circumstances.
Exam grading appeals **must be made in writing 24 hrs after the exam is returned. The whole exam will be re-evaluated.**

**Expectations:**
1. Class participation will also benefit your final grade. Students are expected to communicate actively and intelligently both orally and written.

2. **Final project consists of a final paper and a corresponding 12 minute powerpoint (.ppt)** presentation. The oral presentation will be based on the scientific content of the selected disease agent, your use of cited visual aids, how effectively allotted time is used, your organization and articulation, and the handling of questions by members of the audience. Students may also improve their oral presentation score by asking sound and rational questions. A grading rubric for the final paper follows. **PRESENTATIONS MUST BE UPLOADED AT LEAST 24 HOURS PRIOR TO ASSIGNED DATE AND WILL BE REVIEWED BY DR. RIO.**

**Required text* (ALL RELEVANT CHAPTERS ARE AVAILABLE ON E-RESERVES):**

*In addition to journal articles assigned within syllabus


Biology 455, Evolution of Infectious Diseases
Final paper guidelines

Page limitations (not including cover page, figures & references): 10 pgs. Please note, I will stop reading at 10 pgs.

Format guidelines: 10-12 pt. Times or Arial font, 0.5 inch margins, 1.5 line spacing

Critical deadlines:

1. **September 2**- topic needs to be approved

2. **September 16**- 5 references need to be submitted with brief statements on how these contribute to the paper. Please note you are expected to use more than 5 references, but this is just to make sure that you are citing correctly and are heading in the right direction.

3. **December 9 (5 PM)**- Paper due in Rio mailbox located in the Biology main office (3rd floor LSB)

These sections **have to be** covered:

1. Life history: Where is the organism found habitat, host and countries, any social disparities in its dissemination, what disease(s) does it cause?
2. Medical diagnosis and disease descriptions.
3. Control strategies (medical and ecological)
4. Evolutionary aspects (transmission mode, resistance, selection pressures, any particular molecular/ecological factor under stronger selection)?
5. Describe virulence factors. Are there any species/strains with greater virulence?
6. Epidemiological data- national and international prevalence
7. Societal impact
8. Economic impact
9. Future forecasts
10. Include links to appropriate sites and reference citations. PLEASE SEE ME IF YOU DO NOT KNOW HOW TO DO THIS APPROPRIATELY.

Also, individual presentation of the papers in powerpoint (.ppt) format will be given November 18-December 9. Presentations must be uploaded 24 h prior to presentation in Professor Rio’s office. It is highly recommended that you set up a meeting ahead of time. Please allow at least 20 minutes for individual meetings, as these presentations will also be critiqued for content, grammar, and clarity at this time.

**Some potential paper topics**

*Please note these are just suggestions, I am very flexible with the topics to be examined. But, the topics do need to be in the area of infectious diseases and approval of the topic is required. A disease can not be covered in lecture or by more than one student.*

 Nosociomal infections
 Foodborne disease
 Waterborne disease
 Fungal disease
PAPERS WILL BE EVALUATED ACCORDING TO THE FOLLOWING GRADING RUBRIC

(90-100): A highly professional and outstanding manuscript, which reflects a clear appreciation of the integrative properties of sections 1-9. It is well organized and presented, with an excellent development of ideas and description of technical issues, reflecting substantial insight and genuine critical analysis of the subject. Well-supported arguments are included. The text and figures are clear and concise, showing that the author is in control of the standard conventions of American technical prose. Outstanding supporting details, generated from primary scientific details, cited appropriately. Excellent use of primary literature references to produce a proposal with excellent breadth and depth. A paper of this quality demands time, organization, and attention to detail.

(80-89): A very good manuscript, which responds to the problem and shows evidence of clear thought, careful design and good planning. Well organized and correctly presented, with adequate supporting details, it is of satisfactory professional quality. The writing is clear. There are minor errors and/or omissions that detract from the overall quality of the proposal. Some connections between sections 1-9 are presented, but could have been elaborated further.

(70-79): A satisfactory manuscript, which fulfills the requirements of the course, showing a moderate level of attention to design. There is minor evidence that the reader has intellectually absorbed the appropriate primary literature that has been read and very little synthesis of sections 1-9. There may be several omissions, errors, or examples of inadequate technical understanding; writing deficiencies; or lack of clarity that render it unacceptable for immediate submission in a professional setting. There is no evidence of any particular strengths that would mark this proposal above average. One of the 9 sections may have not been developed sufficiently.

(60-69): A sub-standard manuscript, which would not be acceptable professionally without a major revision. There may be problems with the logical flow of the design, inadequate attention to thoroughly evaluating the primary literature, poor development of ideas, and/or it may be poorly written, lack structure and presented insufficiently. This is a below-average essay that fulfills the assignment but exhibits major problems in writing. Two of the 9 sections may have been neglected.

(1-59): The majority of the manuscript is erroneous, does not adequately address sections 1-9. Greater than 2 sections have been omitted. The manuscript contains poor documentary presentation. This is an essay that relates to the topic but is so poorly presented that it fails to fulfill the assignment. It fails to present its basic ideas, either because of poor organization and lack of clarity or because the writing reflects a lack of control over the basic conventions of standard American prose. Such an essay may have an abundance of sentence boundary problems, poor use of idiom, inappropriate diction (words used incorrectly), spelling inaccuracies, or verb tense problems.

(0): This is an essay that represents dishonest work by the student, principally the use of ideas or writing which are clearly not one’s own work. Refer to the West Virginia University Undergraduate Catalog for the University policy on Academic Dishonesty.
Academic integrity: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at http://www.arc.wvu.edu/admissions/integrity.html. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Social justice Statement: “WVU is committed to social justice and academic honesty. It is my intent to establish and maintain a nurturing learning environment based upon open communication, mutual respect, mutual acceptance of responsibilities, and non-discrimination. Our university does not discriminate on the basis of race, sex, age, veteran status, disability, sexual orientation, color, national origin, or religion. Any suggestion as to how to further such an environment will be given serious consideration.”

The class will be conducted in accordance with the University’s policies and procedures contained in the WVU Student Handbook.

Disability Statement: Please advise me if you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class. Students should contact (G-30 Mountainlair, 304-293-6700, access2@mail.wvu.edu) for assistance in documenting disabilities. Also, the Carruth Center now provides screening and testing for Learning Disorders and ADHD. Students can contact the Downtown (304-293-4431) or Health Sciences locations (304-293-6972) for information.

Evacuation Plan: From LSB 3131, take a left out the door and then immediately your first left to set of stairs. Proceed down the stairs to outside exit.