Epid 560 - Mechanisms of Bacterial Pathogenesis (Fall 2016)

Class: - MW 8:30 am to 10 am, Room M1170 SPH-II.

Professor: Carl F. Marrs
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M5116 SPH-II

Course Description: Microbial structures and their relation to basic mechanisms of bacterial pathogenesis; structure, function, and genetics of bacterial toxins; and host resistance and immunity. Discussions of pathogenic organisms of major public health importance, diseases caused, and their epidemiology.

Course Materials: Epid 560 Canvas site contains all lectures as powerpoint presentations; plus lecture notes, and .pdf’s of required readings.

Pre-requisites: Graduate status, Introduction to Microbiology and Introduction to Genetics, or permission of instructor.

Course Goals: The goals of this course are to have the students gain a basic understanding of the kinds of virulence factors used by pathogenic bacteria to cause disease, how we discover and study those traits, and how we can make use of this knowledge for treatment and prevention of bacterial diseases.

Competencies: With this course students should fulfill the following Hospital & Molecular Epidemiology Program Competencies (1-6): (3) General understanding of the principles of infectious diseases, infection prevention, microbiology, molecular biology and genetics; (4) In depth knowledge in at least one of the following: microbiology, molecular biology, genetics or infection control.

Course Requirements: Course grades are based on a total 500 point scale, with two mid-term exams worth 100 pts each, a term paper worth 100 pts, and a comprehensive final exam worth 200 pts.

Classroom Expectations/Etiquette:

Attendance at lectures is recommended but not required. There are no set office hours, but students can set appointments to get caught up on material if they miss a lecture or if they would like additional help understanding some of the material presented.
Academic Conduct:
The faculty and staff of the School of Public Health believe that the conduct of a student registered or taking courses in the School should be consistent with that of a professional person. Courtesy, honesty, and respect should be shown by students toward faculty members, guest lecturers, administrative support staff, community partners, and fellow students. Similarly, students should expect faculty to treat them fairly, showing respect for their ideas and opinions and striving to help them achieve maximum benefits from their experience in the School.
Student academic misconduct refers to behavior that may include plagiarism, cheating, fabrication, falsification of records or official documents, intentional misuse of equipment or materials (including library materials), and aiding and abetting the perpetration of such acts. Please visit [https://sph.umich.edu/student-resources/mph-mhsa.html#conduct](https://sph.umich.edu/student-resources/mph-mhsa.html#conduct) and select the first blue bar labeled, “Policy on Student Academic Conduct Standards and Procedures Handling Alleged Violations” for the full SPH Code of Academic Conduct and further definition of these terms.

Student Well-being:
SPH faculty and staff believe it is important to support the physical and emotional well-being of our students. If you have a physical or mental health issue that is affecting your performance or participation in any course, and/or if you need help connecting with University services, please contact the instructor or the Office of Academic Affairs.

Student Accommodations:
Students should speak with their instructors before or during the first week of classes regarding any special needs. Students can also visit the Office of Academic Affairs for assistance in coordinating communications around accommodations. Students seeking academic accommodations should register with Services for Students with Disabilities (SSD). SSD arranges reasonable and appropriate academic accommodations for students with disabilities. Please visit [https://ssd.umich.edu/topic/our-services](https://ssd.umich.edu/topic/our-services) for more information on student accommodations.
Students who expect to miss classes, examinations, or other assignments as a consequence of their religious observance shall be provided with a reasonable alternative opportunity to complete such academic responsibilities. It is the obligation of students to provide faculty with reasonable notice of the dates of religious holidays on which they will be absent. Please visit [http://www.provost.umich.edu/calendar/religious_holidays.html#conflicts](http://www.provost.umich.edu/calendar/religious_holidays.html#conflicts) for the complete University policy.

Course Topics/Reading List:

Wednesday, Sept. 7       Introduction and Human Microbiota (Module 1)

Required readings:
Sept. 12 to Sept. 14  Genomic Locations of Bacterial Virulence Genes and Transfer of Genes Between Bacteria (Module 2)

**Required readings:**


Monday, Sept. 19  Toolbox of Molecular Techniques for Studying Bacterial Virulence Genes (Module 3)

**Required readings:**


Wednesday, Sept. 21  Chemotaxis, Flagella and Protein Secretion (Module 4)

**Required readings:**


Sept. 26 to Sept. 28  Pili & Adhesins (Module 5)

**Required readings:**


Monday, Oct. 3  Extracellular Proteases (Module 6)

**Required reading:**


Wednesday, Oct. 5  Review for First Exam

Monday, Oct. 10  NO CLASS – SPH Symposium

Wednesday, Oct. 12  Exam 1

Monday, Oct. 17  NO CLASS – Fall Recess
Wednesday, Oct. 19  Term paper topics due

Wednesday, Oct. 19  Bacterial Toxins (Module 7)

**Required reading:**

Oct. 26 to Oct. 31  Invasion and Intracellular Growth (Module 8)

**Required readings:**

Wednesday, Nov. 2  Phase & Antigenic Variation (Module 9); Capsules (Module 10)

Monday, Nov. 7  Review for Second Exam

Wednesday, Nov. 9  Second Exam

Monday, Nov. 14  Streptococcal M – Proteins (Module 11)

**Required reading:**

Wednesday, Nov. 16  LPS (Endotoxin) & LTA (Module 12)

**Required readings:**

Monday, Nov. 21  Nutritional Immunity (Module 13)

**Required readings:**

Wednesday, Nov. 23  NO CLASS
Nov. 28- Nov. 30  Regulation of Virulence Genes (Module 14)

**Required readings:**

Dec. 5 to Dec. 7  Chemotherapy and Antibiotic Resistance (Module 15)

**Required readings:**

Monday, Dec. 12  Review Session (*Term papers due*)

Tuesday, Dec. 20  Final Exam  8 am – 10 am