BIO 551  Current Topics in Microbiology  Spring 2014

Days, time, and place: Class will meet from 2:00-3:15 pm M W in Room 408

Instructor:  Catherine C. Davis, Ph.D., FIDSA
Resident Professor, Department of Biology
Phone: 402-280-1877
E-mail: catherinedavis@creighton.edu
Office Hours: Mondays 3:30-4:30 p.m.
             Tuesdays 10:30-11:30 a.m.
             By appointment – Please contact instructor via e-mail

Note: It is anticipated that we will have several national experts provide some lecture material (live) Via WebEx or in person. Announcements or changes will be made to lectures in class.

Course description: A lecture/discussion course focused on topics related to the field of microbiology – specifically infectious diseases. Topics may include but are not limited to the aspects associated with infections of humans. We will explore how these diseases affect(ed) populations on a holistic basis, etiologic agents, unique mechanisms associated with the pathogenesis of disease, pathogenic mechanisms of microbes, host resistance-susceptibility, biological mode of action of treatments, and discuss strategies for prevention. This course is listed as a certified writing class and thus, a major project associated with it will be the crafting of a research paper on a topic that is assigned to you. The finale of the class will involve Class participants will present their paper in a 20-minute class presentation that includes a minimum of 5 minutes for class questions and discussion.

Required Texts:


Sherman IW. 2007. Twelve Diseases that Changed Our World ASM Press, Washington DC

Additional information will also be obtained through discussion of selected journal articles. These articles will appear on Blue line – usually one week before they are discussed.

Course objectives:

The purpose of this year’s BIO 551 course is to expose students to the impact of infectious diseases globally by appreciating the richness of strategies that microbes use to cause disease as well as the strategies the host can use to prevent disease or
make it susceptible under the right conditions. Biological approaches for treatment as well as preventive strategies will be reviewed. We will accomplish this through discussions of primary and review articles as well as assigned chapters in your textbooks. Application of the approach to “dissecting” the pathogenesis of infectious diseases will be used by students to construct their research review topic paper. The paper will be constructed in an iterative process as drafts will be submitted to Dr. Davis via Blue line on required dates, a one on one review session will be held with the student for recommended/required revisions and a final paper will be submitted before. The final paper will provide the substance for the in class presentation on the topic. I hope to instill in students an appreciation for the breadth of this topic and the excitement that exists in this area.

Requirements
Attendance
Class Participation
Paper discussions
Quizzes on the assigned reading material/lecture topics
Exams
A presentation on their term paper topic
A term paper

It is anticipated that the students will be prepared at each class to discuss the topic and/or interact with guest lecturers on the topic identified via a question and learn strategy

The oral presentation will serve as the final exam score. You will need to develop a PowerPoint presentation to accompany your oral presentation. Please contact Dr. Davis at least two week’s in

Final grades will be based on the following scale:

90-100 A
88.0-89.9 B+
80.0-87.9 B
78-79.9 C+
70-77.9 C
60-69.9 D

The scale may be adjusted or “curved” at the discretion of the instructor. Individual final grades may be “rounded-up” at the discretion of the instructor.

Make-up Exams
No make-up exams or quizzes will be given. The score recorded for the quiz

Withdrawals, Change of grade options, Incompletes, Drops, etc.: Please consult the current Schedule of Classes for these deadlines and procedures. You are responsible for making theses choices prior to the deadline dates.
Attendance Policy:
Students are expected to attend class, as class participation is a requirement. You are expected to provide written communication to instructor at least one hour in advance of class if you will be absent.

Discussion Facilitators
Early in the semester, each student will be assigned, usually with a partner, to facilitate one of the eight student-led discussions

Facilitators lead, not dominate, their discussion. They help everyone learn collaboratively. They come prepared to explain the experimental techniques important to the assigned article(s), but primarily they develop additional questions specific to the article(s) and stimulate discussion both in class on discussion day. Facilitators are encouraged to especially post links to related on-line information, before and after the in-class discussion. In addition, at least two days before each discussion, facilitators will post on the course Blue line website at least two questions designed to help start the in-class discussion. These two questions will usually be discussed first, by two-three students or in the group as a whole. Ideally, active discussion will involve the entire group.

Each student can earn up to 30 points for facilitating one discussion, including in-class leadership that day and web postings before and after the discussion. A grade sheet will be handed out before each discussion to class members for grading participation. Each student can also earn as many as 20 points over the semester for active participation (assigned per instructor judgment). Please contribute to the positive direction of discussion. Negative or rude comments will not be tolerated by the instructor and can result in loss of up to all participation-facilitated discussion points. Below are some points that you may want to think about for the discussions:

- What is the purpose of the research?
- How does the research fit into the context of its field? Is it attempting to settle a controversy, show validity of a new technique, or open up a new field of inquiry?
- What are the specific questions asked and/or discussed?
- Do you agree with the author’s rationale for studying the question in this way?
- What are the hypotheses?
- What were the experimental approaches used?
- Were the measurements appropriate for the questions the researcher was approaching?
- Were appropriate controls used?
- What is the one major finding?
- Were enough of the data presented so that you feel you can judge for yourself how the experiment turned out?
- Did you see patterns or trends in the data that the author did not mention? Were there problems that were not addressed?
• Do you agree with the conclusions drawn from the data?
• Are these conclusions over-generalized or appropriately careful?
• Are there other factors that could have influenced the results?

**Exams** are worth 100 points each
- Exam one: 100 points
- Exam two: 100 points
- Exam three: 100 points

**Paper**
- Draft one: 100 points
- Final draft: 100 points

**Facilitated Discussion**: 30 points

**Class Participation**: 20 points

**Presentation**: 50 points

**TOTAL**: 600 points

**Discussion Attendance**
Everyone’s learning is impaired if a student is late or fails to attend class on a discussion day.

**Term paper**

Each student is required to write a 25-page review paper (typed, double-spaced, 12 font, excluding the bibliography, figures and tables). A minimum of 25 references is recommended. This writing exercise offers you the freedom to accept the assigned topic or choose a particular host-pathogen interaction and dissect the molecular and epidemiological details of this interaction within an individual, a population, as well as history. The paper does not have to cover all the molecular details but could be focused on a particular aspect of the interaction. The only exception is that you cannot write on the topics discussed in class (see outline). Each paper has be unique and original work. The paper will be graded on content as well as structure. Consider your classmates as the audience. Ten points per day will be deducted automatically for each day that a paper is late.

Perhaps the most common mistake students make is to write essentially a series of miniature book reports. A related temptation is to quote or paraphrase, and neither practice are appropriate for scientific papers. A key to avoiding these temptations may be to take notes properly in the research stage. Jot down facts, questions, and ideas, carefully noting whether the ideas and questions came from your mind or from the author of an article. Construct an outline that best organizes

<table>
<thead>
<tr>
<th><strong>Student</strong></th>
<th><strong>Topic</strong></th>
<th><strong>Presentation Date</strong>*</th>
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<tbody>
<tr>
<td>Sean Awakuni</td>
<td>Leprosy</td>
<td>April 30</td>
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<tr>
<td>Justin Ching</td>
<td>Dengue Fever</td>
<td>April 30</td>
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</tbody>
</table>
Kyle Fonken          Shingles          April 28
Hayley Geisterfer  Kuru – Creutzfeld Jacob Disease   April 28
Amanda Kobayashi   Measles          May 1
Tracey Lau          Chaga’s disease       April 23
Robert Quon         Pneumococcal pneumonia April 23

If you wish to change your topic, please make an appointment with Dr. Davis and present the topic you wish to review with appropriate justification by January 24, 2014. Otherwise, the topic listed above, associated with the student’s name, will be the topic for the review paper and student presentation. If you wish to change your presentation date with another student, you and the other student will need to change the date with the written approval of Dr. Davis.

Outline (May be modified with written concurrence of Dr. Davis)
Disease
   Clinical Features
   Historical Impact
Etiological Agent
   Phenotypic Characteristics
   Genotypic Characteristics
   Cells/Tissues/Organs Affected by microbe-etiological agent
   Interactions
Pathogenic Mechanisms of organisms
Host susceptibility characteristics
Disease Pathogenesis in Host
Public Health Implications
   Current epidemiology
   Calculate $R_0$
   Prevention Strategies (Vaccines, etc.)
Bibliography (Minimum of 25) references in peer-reviewed literature

Resources

The University Policy on Academic Honesty applies to your term paper. At a minimum, you must:
1. Compose your own sentences and
2. Cite the sources of all facts and ideas that are not your own original discoveries.

The intent of this assignment is also violated if a previously written paper is adapted for this course. This course is a Certified Writing Course (CWC) under the Core Curriculum of the College of Arts and Sciences. Please see the attachment regarding the definition of a CWC.

Dates and specifics
The first and second submissions are worth 100 points each. The final presentation is worth 50 points and will be the average of the points submitted by the audience (all students present and the instructor). You are encouraged to review your slide presentation with Dr. Davis at least one week prior to your presentation as well as working with the podium for loading the presentation.

The term paper project stretches over the entire semester, with a graded assignment marking the culmination of each of four project stages. All assignments will be submitted, graded, and returned electronically.

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Individual reading assignments from the textbooks appear below and the individual review papers will be posted on Blueline at least one week in advance of discussion.

Stage one – Concurrence of topic by January 29, 2014
Send the “doi” link to the dropbox on the website for two articles that you have selected for it.

Stage 2 – Start filling in the outline of your paper with the information that you identify. Seek help from Mary Nash, Reinert-Alumni Library and/or Dr. Davis during this time period.

Stage 3 – Your initial term paper a bibliography with the “doi” for all of your references used in your bibliography is due by 6 p.m. on March 17 to the Blueline drop box. This assignment is worth 100 points. You will receive your graded paper with comments by April 1.

Stage 4 – Your second and final term paper, a folder with all the articles’ “doi” in the dropbox on Blueline. This is due May 1 by 6 p.m.

**Topics Schedule**

<table>
<thead>
<tr>
<th>DATE</th>
<th>Topic</th>
<th>Assignments</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>January 15</td>
<td>Introduction Resources for Paper</td>
<td>Reinert Library Presentation “Establishment of Infectious Diseases” Chap 1 Wilson, et al</td>
<td>C. Davis Mary Nash</td>
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<tr>
<td>January 20</td>
<td>Immune System</td>
<td>Chapters 2-4</td>
<td>C. Davis</td>
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<tr>
<td>January 22</td>
<td>Human Microbiome</td>
<td>Chap 5 Wilson, et al + 3 articles on</td>
<td>Dr. Lita Proctor NIH, via WebEx</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Chapters/Assignments</td>
<td>Instructor(s)</td>
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<tr>
<td>January 27</td>
<td>Immune System - Continued</td>
<td>Chapters 2-4 Wilson, et al</td>
<td>C. Davis</td>
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<tr>
<td>January 29</td>
<td>Koch and Major Changes in Understanding Infectious Diseases</td>
<td>Chapter 6-7 Wilson, et al</td>
<td>C. Davis</td>
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<tr>
<td>February 3</td>
<td>Measurement of Infectivity and Virulence</td>
<td>Chapter 8 Wilson, et al</td>
<td>C. Davis</td>
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<tr>
<td>February 5</td>
<td>Strategies for Evasion</td>
<td>Chapter 11 Wilson, et al</td>
<td>C. Davis</td>
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<td>February 10</td>
<td>Toxins and other Factors</td>
<td>Chapter 12 and article on Superantigens</td>
<td>C. Davis</td>
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<td>February 12</td>
<td>Virulence Regulation - Quorum Sensing Biofilms</td>
<td>Chapter 14 Wilson, et al Assigned article(s)</td>
<td>C. Davis</td>
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<tr>
<td>February 17</td>
<td>Exam I</td>
<td>Exam I</td>
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<tr>
<td>February 19</td>
<td>Vaccination</td>
<td>Chapter 17 Wilson, et al</td>
<td>C. Davis</td>
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<td>February 24</td>
<td>Potpourri of Gram Positive Infections</td>
<td>Chapter 18 Wilson, et al</td>
<td>C. Davis</td>
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<td>February 26</td>
<td>Potpourri of Gram Negative Infections</td>
<td>Chapter 19 Wilson, et al</td>
<td>C. Davis</td>
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<tr>
<td>March 3</td>
<td>MRSA and Antibiotic Resistance</td>
<td>Chapters 15-16 Wilson, et al Assigned article(s)</td>
<td>Dr. R. Goering (tentative)</td>
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<td>March 5</td>
<td>Exam II</td>
<td>Material Since Exam I</td>
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<td>March 10</td>
<td>Spring Recess</td>
<td>No Class</td>
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<tr>
<td>March 12</td>
<td>Spring Recess</td>
<td>No Class</td>
<td>No Class</td>
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<tr>
<td>March 17</td>
<td>Cholera</td>
<td>Chapter 3 Sherman Assigned article(s) First draft of paper due to Dr. Davis by 5:00 p.m.</td>
<td>C. Davis S. Awakuni</td>
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<tr>
<td>March 19</td>
<td>Smallpox</td>
<td>Chapter 4 Sherman Assigned article(s)</td>
<td>C. Davis J. Ching</td>
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<td>March 24</td>
<td>Bubonic Plague</td>
<td>Chapter 5 Sherman Assigned article(s)</td>
<td>C. Davis H. Geisterfer</td>
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<td>March 26</td>
<td>Syphilis</td>
<td>Chapter 6 Sherman Assigned article(s)</td>
<td>C. Davis K. Fonken</td>
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<td>Date</td>
<td>Topic</td>
<td>Chapter/Assignment</td>
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<td>March 31</td>
<td>Tuberculosis</td>
<td>Chapter 7 Sherman</td>
<td>C. Davis</td>
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<td>Assigned article(s)</td>
<td>T. Lau</td>
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<td>April 2</td>
<td>Malaria</td>
<td>Chapter 8 Sherman</td>
<td>C. Davis</td>
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<td>Assigned article(s)</td>
<td>R. Quon</td>
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<td>April 7</td>
<td>Yellow Fever</td>
<td>Chapter 9 Sherman</td>
<td>C. Davis</td>
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<td>Assigned article(s)</td>
<td>A. Kobayashi</td>
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<td>April 9</td>
<td>1918 Influenza</td>
<td>Chapter 10 Sherman</td>
<td>C. Davis</td>
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<td>Assigned article(s)</td>
<td>All Discuss</td>
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<td>April 14</td>
<td>Polio</td>
<td>Review PBS Tape on</td>
<td>C. Davis</td>
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<td>Polio on Reserve in</td>
<td>All Discuss</td>
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<td>Reinert Library +</td>
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<td>Assigned article(s)</td>
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<td>April 16</td>
<td>“Catch up Time”</td>
<td>Meet with Dr. Davis</td>
<td>All</td>
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<td>April 21</td>
<td>Easter Monday</td>
<td>Easter Monday</td>
<td>No Class</td>
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<tr>
<td>April 23</td>
<td>Presentations</td>
<td>See schedule</td>
<td>See schedule</td>
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<tr>
<td>April 28</td>
<td>Presentations</td>
<td>See Schedule</td>
<td>See schedule</td>
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<tr>
<td>April 30</td>
<td>Presentations</td>
<td>See Schedule</td>
<td>See schedule</td>
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<tr>
<td>May 1</td>
<td>Additional time</td>
<td>Final Paper due to</td>
<td>See schedule</td>
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<td>for Presentations</td>
<td>Dr. Davis by 6:00</td>
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<tr>
<td>May 7</td>
<td>EXAM III</td>
<td>All material since</td>
<td>All</td>
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<tr>
<td>8 a.m.</td>
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<td>Exam II</td>
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</tbody>
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Note: Last day to apply for Pass/No Pass status or change credit to Audit, February 13, 2014. Last day to withdraw from course with a W in March 24, 2014.

Please do not schedule travel for Holiday breaks before the completion of class assignments/tests. Unexcused absences will mean that the material, exam, etc. cannot be made up and the material will be forfeited.

A comprehensive makeup exam will be available on May 1 for those with an excused absence (arranged one week in advance with Dr. Davis, documented medical illness, death or serious illness in the immediate family)

Overall organization of the paper

The paper must be based on information you gathered on our topic by reading current literature. You have to use scientific style in writing this paper. All literature used in writing this paper has to be cited throughout the paper and listed in a bibliography at the end of the paper. Set your page margins to 1” on
all sides. Use either 12 point Arial or Times New Roman fonts. The paper should be at least 25 double-spaced pages with at least 25 pages using the reference style for *Clinical Microbiology Reviews*. Your paper should have a Cover Page that has a descriptive title, your name and the date, followed by an Abstract or summary of your paper (250-400 words), and a subtitled body that includes and introduction, main body of the paper with subtitled sections, a conclusion, and a bibliography.

See Dr. Davis during office hours if you need further clarification.

Grading of the paper.

“A” papers

Content:

1. The paper is a complete response to the assignment.
2. The paper is thoughtful and sophisticated.
3. All major conceptual areas are clearly and completely presented.
4. Primary, high-quality journal articles predominate.
5. The information is current, generally includes articles within the last 5-10 years (although “classic references, are allowed)

Organization:

1. The thesis is clear and fully developed
2. Various components of the paper are completely supported by citations and experiments/observations.
3. The flow of ideas is clear and concise.

Structure:

1. The author is concept-oriented so that the paper represents a synthesis of ideas accompanied by experimental/observational support
2. There is a logical flow of ideas in the paper.
3. Paragraphs are carefully organized and constructed using concise sentences.
4. The paper is free of repetition.
5. A range of appropriate sentence structures is used throughout the paper.

Mechanics:
1. A correct bibliographic style is used consistently.
2. Typing errors are minimal.
3. There are few errors (non serious) in grammar, spelling, and/or punctuation.

“B” papers

Content:
1. The paper is direct but not necessarily complete response to the assignment
2. The paper is thoughtful. Contemporary articles do not predominate.
3. Most of the major conceptual areas are clearly and completely presented
4. Primary sources are used, but there are many more superficial sources.

Organization:
1. The thesis is clear and fully developed.
2. Various components of the paper are completely supported by citations and experiments/observations.
3. The flow of ideas is clear and concise.

Structure:
1. The author is concept-oriented so that the paper represents a synthesis of ideas accompanied by experimental/observational support.
2. There is a logical flow of ideas in the paper
3. Paragraphs are reasonable organized and well constructed.
4. The paper is free of repetition
5. A range of appropriate sentence structures is used thorough the paper.
6. Sentences are concise.

Mechanics:
1. A correct bibliographic style is used occasionally.
2. Typing errors are minimal.
3. There are a few serious errors in grammar, spelling, and/or punctuation.

“C” papers

Content:
1. The paper is a direct but not complete response to the assignment.
2. The paper is superficial.
3. Many of the major conceptual areas are presented.
4. Mainly superficial, secondary sources are used. Research is outdated.

Organization:
1. The thesis is developed but not completely clear.
2. Some but not all of the major components of the paper are supported by citations and experiments/observations.

Mechanics:
1. An inappropriate bibliographic style is used
2. Typing errors are frequent.
3. There are serious errors in grammar, spelling, and/or punctuation.

D and F papers show deteriorations from some to too many of the items presented above in the outline.

**Academic honesty**
The University Policy on Academic Honesty applies to all quizzes, examination, and writing assignments and appears in the current edition of the Creighton University Undergraduate Student bulletin.

Please note that if you are found to have engaged in an act of academic dishonesty in this course you may receive a range of serious penalties, from receiving a 0 for the assignment to receiving an “F” for the course.
Class etiquette:
Please turn off cell phones prior to class. Please do not talk, sleep, read non-class materials, or anything else that may be disruptive to others in the class. Do not participate in instant messaging on your computers. If you are using them for notes, do not also work on Facebook, etc. Do not pack-up your books and begin leaving the room until the end of class. This is rude to your fellow students and instructor. Also, be respectful of your instructor. If you disagree with the way the class is run, see your instructor during office hours. Poor etiquette can affect your grade at the discretion of the instructor.

Cancellations
If for some reason I need to cancel a class, I will announce this via Blueline or through authorized postings.