

CEDAR CREST COLLEGE
Biology 362 – Microbial Pathogenesis
Course Syllabus - Part I - Overview
Spring 2006

INSTRUCTOR INFORMATION

Instructor: Dr. Amy J. Reese
Office: Science Center 110
Phone: 610-437-4471, x3517
Email: ajreese@cedarcrest.edu
Office Hours: Monday 1 – 2 pm, Tuesday 4 – 5 pm, Wednesday 1 – 2 pm, Thursday 4 – 5 pm, and Friday 10 – 11 am. Other hours by drop-in or appointment.

GENERAL COURSE INFORMATION

Biology 362: Microbial Pathogenesis, 4 credits (3 if not taking lab)
Course website: <http://www2.cedarcrest.edu/academic/bio/areese/index.html>
Course Prerequisites: BIO 227, 231, and 222 or permission of the instructor
Course Description:

Some microorganisms can go from being innocent bystanders in the body (commensal) to being dangerous pathogens. Others have the capacity to single-handedly cause a wide range of diseases. Stable vaccines have been developed to treat some diseases, but others, such as influenza require yearly changes, and still others, such as HIV/AIDS, remain elusive to vaccine treatments. This course will address these topics and introduce the microorganisms responsible for many common diseases. Material from this course will provide useful background for someone considering further study in medicine or health, as well those interested in biotechnology and microscopy applications. Topics will include immunology, virology, parasitology, and medical mycology and bacteriology. Lectures, laboratory work, discussion of current events/outbreaks where applicable, literature research, individual and group projects will be integral parts of this course.

Textbooks and materials:

- Marjorie Kelly Cowan and Kathleen Park Talaro, *Microbiology: A Systems Approach*, 1st ed., McGraw Hill, 2006 (recommended).
- Marjorie Kelly Cowan, *The Microbe Files*, Benjamin Cummings, 2002 (required).
- Philip M. Tierno, *The Secret Life of Germs: Observations and Lessons from a Microbe Hunter*, Atria, 2001 (required).

Format:

Lecture 3 hours per week in 212 Alumnae Hall

Laboratory 3 hours per week in Oberkotter Center for Health and Wellness – lab 2

Schedule:

The specific schedule for lectures and lecture exams follows the general course information in this handout.

Laboratory schedules can be found on the separate handout *Biology 362, Microbial Pathogenesis, Laboratory Schedule*

Course Objectives:

At the completion of the course, the student should be able to:

1. Describe the different types of pathogens, classical symptoms and likely affected body sites.
2. Discuss the specific health risks associated with particular groups based on age, location, leisure activities, health status, pets, and previous medical history.
3. Understand basic immunology and the interactions between host and pathogen.
4. Understand issues of commensal flora, organism transmission, and portals of entry.
5. Become familiar with common terminology associated with medical microbiology.
6. Discuss preventions, precautions, vaccinations, community health, cultural issues, biohazard levels, and the role of the media in issues of human health.
7. Learn various laboratory methods appropriate for clinical or research applications of medical microbiology.
8. Understand concepts of pathogenicity, virulence, disease mechanisms, antibiotic resistance, and types of disease outbreaks.
9. Describe roles of acute, chronic, symptomatic, asymptomatic/subclinical, and reactivation in disease settings.
10. Be familiar with approaches to diagnosis, case study analysis, and basic treatment concepts.

COURSE OUTCOMES & ASSESSMENT

Course Outcomes:

1. The student will learn critical analysis skills for encountering microbiology and microbial pathogenesis in the general public media and for articulating the science behind such material.
2. The student will be able to identify common pathogens associated with infectious diseases, and predict most affected body sites and symptoms.
3. The student will be able to observe a new case study and systematically know what pieces to look for and how to predict causative microbial agents and appropriate diagnosis.
4. The student should have a sound foundation for further work in areas of diseases affecting human health practices and research.

Assessment:

1. The students will take 3 major lecture exams and a comprehensive lecture final exam on the content areas.
2. Students will prepare for and participate in weekly discussions on current events, case studies, and related course topics. Each student should prepare at least one typed page of discussion points with references for each discussion. Additional points raised during the discussion should be added by hand to the prepared page, and both pieces submitted at the end of class as a part of discussion preparation. During these discussions, each student should plan on verbally contributing at least one point of prepared and referenced material towards each discussion.
3. Students will research, write, and present an analysis and critique of an account of microbial pathogenesis in the news or TV coverage. Further details will be discussed in class. Completion of the assignment should include:
 - a. the original article and source,
 - b. any related story follow ups
 - c. current microbiology research using texts, CDC information, and other reliable sources
 - d. analysis of the science presented in the article
 - e. lay description of the issue
 - f. summary for the report and to be shared with the class
4. Four quizzes will be given in the laboratory to assess the ability of the students to understand the methodology and data interpretations of the techniques covered in the lab.
5. Each student will participate in one on-going lab project as well (worth one quiz grade), to investigate natural remedies in microbial control and practice experimental design and evaluation.

STUDENT ASSESSMENT & EVALUATION

Grading & policies:

550 points	Lecture
250 points	Laboratory work
200 points	Cumulative final lecture exam
1000 total	

See separate handouts *Biology 362 – Course Syllabus – Part II - Lecture Schedule* and *Biology 362 – Course Syllabus – Part III – Laboratory Assignments* for grading breakdowns and policies.

Final grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
%	93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	73-76.9	70-72.9	67-69.9	60-66.9	<60

STUDENT RESPONSIBILITIES AND COURSE POLICIES

Assignment & Attendance policies:

1. Students are expected to be at class and in the laboratory on time and as scheduled. Attendance will be recorded.
2. Assignments and labs are to be done as scheduled and work to be handed in on time. Missed laboratory work must be made up at the responsibility of the student. Points will be deducted for late or absent work.
3. Students are responsible for making up and covering material missed during absences. Find a note-taking and study buddy early in the course.
4. Expected absences for extenuating circumstances should be discussed in advance with me.
5. All lecture and laboratory exams must be taken as scheduled, the exceptions are family emergencies or medical reasons. In these cases, students are to contact the Dean of Students (Joan Laffey) or the Director of Academic Services (Christine Spindler) with appropriate documentation. These offices will contact me as soon as possible. If the above is not followed or an exam is not taken as scheduled, the student will receive a zero for that test.
 - Joan Laffey: 610-437-4471, x3371; jmlaffey@cedarcrest.edu; Allen House
 - Christine Spindler: 610-437-4471, x4628; cmspindl@cedarcrest.edu; Admin. Bldg 213

Academic Policies:

1. I fully support student observance of Honor Philosophy as is stated in the Cedar Crest College Catalog under Academic Policies and Services and as reflected by examination statements:

“The Cedar Crest Honor Philosophy states that students shall uphold community standards for academic and social behavior in order to preserve a learning environment dedicated to personal and academic excellence. Individuals who accept the honor of membership in the Cedar Crest College community of scholars pledge to accept responsibility for their actions and the effect their actions may have on other members of the College community.”
2. I fully support the Classroom Protocol that is implicit in the Honor Philosophy, including appropriate behavior and respect for instructors and classmates. Activities within the classroom should not detract from the learning of other students. Activities within the laboratory must not detract from the learning of other students, nor endanger the safety of individuals or equipment.
3. I fully support student observance the Academic Standards of Integrity set out by the Cedar Crest College Catalog as is stated under Academic Policies and Services

“All Cedar Crest Students shall:

 - *Submit only work that is their own.*
 - *Adhere to the rules of acknowledging outside sources, as defined by the instructor, never plagiarizing or misrepresenting intellectual property.*
 - *Neither seek nor receive aid from another student, converse with another when inappropriate, nor use materials not authorized by the instructor.*
 - *Follow the instructions of the professor in academic situation or environment, including the taking of examinations, the following of laboratory procedures,*

the preparation of papers, and the proper and respectful use and sharing of College facilities and resources, including library and computing resources.

- *Abide by the Cedar Crest Computer Use Policy.*
- *Not submit the same work for more than one course without instructor approval.”*

4. I fully support the Statement on Academic Dishonesty or Plagiarism set out by the Cedar Crest College Catalog as is stated under Academic Policies and Services.
 - Plagiarism will result in an “F” for the assignment and will be reported to the Vice President for Academic Affairs and the Dean of the Faculty.
 - Cheating in lecture or lab will result in failure of the course.
 - No books or papers are to be used during the exam period unless otherwise instructed.
 - Exams should be written in ink.

Academic Services:

Disabilities Services and Academic Support

- Students with documented disabilities who may need academic accommodations should discuss these needs with me during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center and visit the site http://www2.cedarcrest.edu/acadadvising/ada_file.html.
- The Advising Center provides many resources, such as study skills resources, through their website <http://www2.cedarcrest.edu/acadadvising/index.html> or on campus site in the Administration Bldg, room 213.

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Spring 2005 – Lecture Schedule

TEXTS: Marjorie Kelly Cowan and Kathleen Park Talaro, *Microbiology: A Systems Approach*, 1st ed., McGraw Hill, 2006 (recommended).

Marjorie Kelly Cowan, *The Microbe Files*, Benjamin Cummings, 2002 (required).

Philip M. Tierno, *The Secret Life of Germs: Observations and Lessons from a Microbe Hunter*, Atria, 2001 (required).

Additional material will be provided to supplement text.

Lecture schedule subject to change if needed.

DATE	LECTURE	FOR CLASS
Jan 18 – W	Themes and goals of the course (lecture & lab) Discussion of historical impact, ways to classify diseases & organisms Overview of the microbes of infectious diseases, review of organism types	Begin reading <i>The Secret Life of Germs</i> for after break, Cowan text: Tables 4.4, 5.2, 5.3, 5.4, 6.5
Jan 20 – F	Human host and biota, microbial mutualism, infection progression & steps of a successful pathogen	Cowan - Chapter 7.2 Chapter 13.1 – 13.2 Insights 13.1 – 13.4
Jan 23 – M	Disease Tracking- Epidemiology	Chapter 13.3 Insights 13.5-13.6
Jan 25 – W	Steps and types of diagnosis Ways to identify microbes, specimens, phenotypic & genotypic methods	Microbe Files (MF) intro Chapter 17.1 – 17.4 Insight 17.1
Jan 27 – F	<ul style="list-style-type: none"> <i>Discussion 1: Epidemiology & Public Health-discussion of at risk groups from age, leisure activities, location, health status, pets, and previous medical history, global concerns role of cultural issues</i> 	Research and prepare for in-class discussion
Jan 30 – M	Immunology methods	Chapter 17.5 Insight 17.2
Feb 1 – W	Immunology methods	Chapter 17.5
Feb 3 – F	<ul style="list-style-type: none"> <i>Discussion 2: Modes of chemotherapy and key treatments</i> 	Research and prepare for in-class discussion, Chapter 12, supplements
Feb 6 – M	Exam I (material through immunology methods)	
Feb 8 – W	Non-specific host defenses – 1 st line of defense, Other lines of defense and what is involved in them	Chapter 14.1 – 14.3
Feb 10 – F	<ul style="list-style-type: none"> <i>Discussion 3: Microbes fighting back, issues of resistance, medical implications</i> 	Prepare for in-class discussion on topic

Feb 13 – M	Innate response – 2 nd line of defense, fevers	Chapter 14.4 Insights 14.1 – 3
Feb 15 – W	Specific immunity	Chapter 15.1 – 15.3
Feb 17 – F	<ul style="list-style-type: none"> <i>Discussion 4: microbiology in the media, future of clinical microbiology</i> 	Prepare for in-class discussion, paper handout
Feb 20 – M	Recognition of antigens, B cells, and antibody production	Chapter 15.4 – 15.5 Insight 15.1
Feb 22 – W	T-cell response and cell-mediated immunity, types of immunity	Chapter 15.6 – 15.7
Feb 24 – F	Immunizations	Chapter 15.8 Insights 15.2 – 15.3, tables
Feb 27 – M	Exam II (microbial control through T-cell immune response)	
Mar 1 – W	Disorders in immunity & allergies, reactions that lyse foreign cells,	Chapter 16.1 –16.3, Insight 16.1 – 16.2
Mar 3 – F	<ul style="list-style-type: none"> <i>Discussion 5: pros and cons of vaccinations</i> 	Prepare for in-class discussion on topic
Mar 6 – 10	BREAK	BREAK
Mar 13 – M	Immune complex reactions, delayed reactions, autoimmune reactions and immunodeficiency	Chapter 16.4 - 14 Insight 16.3 – 16.5
Mar 15 – W	Infectious diseases of the upper respiratory tract	Chapter 21
Mar 17 – F	<ul style="list-style-type: none"> <i>Discussion 6: <u>The Secret Life of Germs</u></i> 	Complete reading and prepare discussion topics
Mar 20 – M	Infectious diseases of the upper respiratory tract	Chapter 21
Mar 22 – W	Infectious diseases of the lower respiratory tract	Chapter 21
Mar 24 – F	Infectious diseases of the skin & eyes	Chapter 18
Mar 27 – M	Infectious diseases of the skin & eyes	Chapter 18
Mar 29 – W	Infectious diseases of the gastrointestinal tract	Chapter 22
Mar 31 – F	<ul style="list-style-type: none"> <i>Discussion 7: case studies (respiratory, skin & eyes)</i> 	Prepare for in-class discussion on topic
Apr 3 – M	Exam III (immunizations through skin & eye infections)	
Apr 5 – W	Infectious diseases of the gastrointestinal tract	Chapter 22
Apr 7 – F	Infectious diseases of the cardiovascular and lymphatic systems	Chapter 20
Apr 10 – M	Infectious diseases of the cardiovascular and lymphatic systems	Chapter 20
Apr 12 – W	<ul style="list-style-type: none"> <i>Discussion 8: case studies (gastrointestinal, cardiovascular & lymphatic system)</i> 	Prepare for in-class discussion on topic
Apr 14 – F	BREAK	
Apr 17 – M	BREAK	
Apr 18 – T	M schedule Genitourinary	Chapter 23
Apr 19 – W	Genitourinary	Chapter 23
Apr 21 – F	Genitourinary	Chapter 23
Apr 24 – M	Infectious diseases of the central nervous system	Chapter 19
Apr 26 – W	Infectious diseases of the central nervous system	Chapter 19
Apr 28 – F	<ul style="list-style-type: none"> <i>Discussion 9: case studies (genitourinary, CNS)</i> 	Prepare for in-class discussion on topic

May 1 – M	<i>Presentations</i>	
May 3 – W, F schedule	<i>Presentations</i> <i>Evaluations</i>	
TBA	FINAL EXAM (from gastrointestinal through central nervous system; as well as general overview)	

LECTURE POLICIES

Lecture: 3 exams
Preparation and contributions to weekly discussions
Paper & presentations
1 lab/lecture cumulative final

Grading policies:

1. Lecture breakdown:
 - 300 points = 3 exams, 100 points each
 - 100 points = weekly discussion write-up (10 points each discussion, 10 points presentation comments)
 - 150 points = research paper (100 points), class presentation (25 points), and general public presentation (25 points)
 - 200 points = cumulative final (lecture)
2. Attendance at lectures is expected and will be recorded.
3. This is an upper level course with roughly one third of lecture time scheduled as discussion. Students are expected to prepare for and participate in these discussions as a part of their content material and grade. See course overview.
4. There is no extra credit associated with the course.
5. A sense of scientific and medical microbiology excitement and intrigue is associated with the course!
6. All exams must be taken as scheduled; the exceptions are family emergencies or medical reasons as described above. If the above is not followed or if an exam is not taken as scheduled, the student will receive a zero for that test.
7. The student is responsible for making up and covering material missed during absences.
8. Plagiarism will result in an “F” for the assignment and will be reported to the Vice President for Academic Affairs and the Dean of the Faculty.
9. Cheating will result in failure of the course.
10. No books or papers are to be used during the exam period unless otherwise instructed.
11. Exams should be written in ink.