

College of Engineering, Forestry and Natural Sciences
Microbiology 375/575 – Ecology of Infectious Disease
Spring 2012
3 hrs, 3 credits

Instructors: Dr. Fernando Monroy

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RM 236

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Lectures: M, W 3:25 - 4:40PM, Room 256, Building 21

Office Hours:

TBA

Course prerequisites:

BIO 181, Microbiology 205

Course description:

This course will cover the challenge presented by microorganisms, how microorganisms survive in the environment and retain their ability to infect, how the host responds to the challenge and will discuss what challenges lie ahead for both humans and microbes.

Outcomes for this course: Building on your introductory microbiology knowledge; upon completion of this course, you will have a broad understanding of the ecology of infectious diseases in humans and animals and be prepared to succeed in more advanced, senior level classes Immunobiology and Medical Microbiology.

Textbook: **The Microbial Challenge: Human-Microbe Interactions** by Robert I. Krasner – SECOND EDITION

Nature of the course:

New, emerging, and reemerging infections are a major public health problem today, yet 35 years ago, it was predicted that infectious diseases would soon be conquered. Accounts of infectious diseases currently appear almost daily in newspapers and in popular magazines; flesh-eating streptococci, *Escherichia coli*-contaminated strawberries, *Salmonella* disease, Ebola virus, mad cow disease, SARS, Influenza and AIDS top recent headlines and conjure up frightful images. Excellent books, including *The Hot Zone* and *The Coming Plague*, have appeared in bookstores. Several years ago the movie *Outbreak* captured the public's interest. News stories warn of the continued threat of the use of biological weapons. In the days after the terrorist attacks on the World Trade Center and the Pentagon, anthrax spores were strategically disseminated to individuals in the government and the media, resulting in a large number of cases of anthrax, some of which proved to be fatal. Had newspapers been available in ancient times, hieroglyphics would have revealed the presence of infectious diseases and even acts of using microorganisms as weapons. Descriptions of what are probably leprosy and tuberculosis appear in the Bible. This is not surprising; after all, microbes were the first inhabitants of the earth, as evidenced by the fact that fossils dating back 3 billion years are those of primitive bacteria. This course will explore infectious diseases as they relate to the interaction of microorganisms with the human host. It will cover the challenge presented by the microorganisms, how the host responds to the challenge and will discuss what challenges lie ahead for both humans and microbes. Besides the textbook, there will be additional reading and writing assignments, including evaluation of primary journal articles that discuss the ecology of microorganisms and disease outbreaks. There will also be invited speakers.

Part I. The Challenge

- Chapter 1: Identifying the Challenge
- Chapter 2: The Microbial World
- Chapter 3: The Beneficial Aspects of Microbes: the Other Side of the Coin
- Chapter 4: Bacteria
- Chapter 5: Viruses
- Chapter 6: Bacterial Genetics

Part II: Microbial Disease

- Chapter 7: Concepts of Microbial Disease
- Chapter 8: The Epidemiology and Cycle of Microbial Disease
- Chapter 9: Bacterial Diseases
- Chapter 10: Viral Diseases
- Chapter 11: Protozoans and Helminths and the Disease They Cause

Part III. Meeting the Challenge

- Chapter 12: The Immune Response
- Chapter 13: Control of Microbial Disease
- Chapter 14: Partnerships in the Control of Infectious Diseases

Part IV: Current Challenges

- Chapter 15: Biological Weapons
- Chapter 16: Current "Plagues"
- Chapter 17: The Unfinished Agenda

Exams and assignments for this class:

There will be 2 in class exams worth 100 points each and a final, cumulative exam worth 150 points for the course. The final exam may or may not be optional – this will be up to the discretion of the professor. There will also be: a) a written assignment worth 40 points, and b) a virus model worth up to 10 points required of all students for a total of 400 points. The 2 in class exams will be on **February 27th** and **April 18th**. The written assignment is due on **March 28th**. There are **NO EXCEPTIONS** to these dates, the exams will not be moved and there will be **NO MAKEUP** exams or assignments. The date for the final exam is **Tuesday, May 8th at 3PM**. *Class participation will also play an important role in the overall grade* of the student and may increase or decrease the student's final letter grade. Class attendance is not mandatory. However, attendance is strongly suggested if a passing grade is desired. On a regular basis, material from outside the textbook will be provided that the students will be responsible for. In addition, written assignments will be issued routinely as a way to check for student's attendance and participation. Students with 3 absences will be dropped from the class. The virus model is due on **April 11 and 16th** before class starts.

For the Graduate portion of this class – BIO 599, the graduate students will turn in an additional assignment every other week. The assignment will be reading and critiquing a primary journal article relevant to the current topic of discussion in class. The critique will be a **typed, 1 page summary** of the paper. Review articles, while extremely good for an introduction into a topic, do not count as a primary research article. Summaries **longer than 1 page** will not be graded and the students will not earn points for that assignment. Detailed information regarding the assignment and expectations will be handed out the first full week of class.

The graduate students may be expected to 'teach' one lecture about subjects we are covering or related to their research during our lectures/class periods in April.

Grades:

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|---------------|---|
| 90% to 100% - | A |
| 80% to 89% - | B |
| 70% to 79% - | C |
| 60% to 69% - | D |
| Below 60% - | F |

The final grade may be curved, but this is **not** likely. The 2 in class exams **will NOT be** curved. The decision to curve will be based on the class performance as judged by the numerical scores at the end of the course. If a curve is applied, the same number of points will be added to the grade of all students. **THERE ARE NO MAKE UP ASSIGNMENTS.** Complete your work on time.

In class courtesy rules:

As a courtesy to the instructor and your classmates, cell phones are not allowed in class. If you are caught using your phone or any other device not related to class, you will be asked to leave the classroom. If you are late to class which it is unavoidable, please use the back door of the classroom. This will prevent any distractions in class.

Any students caught cheating, either in the tests and written assignments, will be dealt with under the guidelines and policies of Northern Arizona University. The complete policy on academic integrity is in Appendix F of NAU's Student Handbook. If a student is caught plagiarizing during any phase of the class, they will at minimum earn a zero on that assignment and as a maximum be given an F for the course and be automatically dropped from the class.

Specific University policies such as the Safe Working and Learning Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity policies are available on the NAU web page or in the Student Handbook.