

Evolution of Epidemics

Biology 804

Spring, 2019

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OFFICE HOURS: MWF 9:00 am – 10:00 am or by appointment

I. INTRODUCTION: EVOLUTION OF EPIDEMICS, THE CLASS

Plagues have caused suffering and death for humans for hundreds of years. These events have destroyed economies, ended wars, and changed the course of civilizations. Plagues have been the focus of fables, nightmares, art, and scientific breakthroughs. Attempts to combat the unseen lethal agents have ranged from the superstitious to the latest in scientific advancement. In this course, the history of plagues will be introduced, discussion on the pathogens that cause them and how those pathogens are evolving, and speculate about their possible future.

This class has implications in the present world. In the past few decades, there have been several completely new disease organisms that are responsible for epidemics and also changes in “old” infectious agents that are now capable of causing epidemics. Humans have also contributed to changes in infectious disease due to wars, natural disasters, reliance on high-density animal production, failures in public health, and greater population density. We will want to discuss this human contribution and how we might also reduce the appearance of epidemics...or even if this is possible.

II. COURSE OBJECTIVES

- Historical knowledge of plague causing organisms and their effects on mankind
- Knowledge of the origin and mechanisms of evolution of plague organisms
- Identification of the factors driving evolution with an emphasis on human roles
- Ideas about the future of plagues and epidemics. What should we expect?

III. REQUIRED MATERIAL

Computer and Software

Access to a computer with high-speed Internet access and Microsoft Office. If you have an Office Version older than 2007 you will need to download the converter program that allows you to read Office 2013 documents.

An updated PDF reader will also be needed to read course materials.

IV. WEB RESOURCES

For this class, the online course management system called Canvas will be used. This provides standard interfaces for grades, assignments, discussions, and other functions. There are two important things to remember about this system:

- 1) You **must check and use your UNK email address** to receive and send emails pertaining to this class.
- 2) Check the announcements page of Canvas for breaking news. Any information we need to get to the class as a whole will be on this opening page.

Since email is the preferred mode of communication for most online courses, I make an effort to be timely in my responses to problems and/or questions. Since I may not always have access to email or be in my office, emails will be answered within 24 hours on weekdays. Emails sent after 3 PM (CST) on Fridays and on weekends will be answered on Monday.

V. COURSE STRUCTURE

The course consists of recorded lectures, reading assignments, and online discussion boards. All materials for each week will be posted on the Canvas web site.

This is not a self-paced class. You will be expected to keep up with the pace of the course, and the course structure is designed to help with this. If this is your first distance class, you will find that these classes are fast paced. Everyone in these classes is busy with school, classes, and family. We understand, but if you fall behind, it is difficult to catch up. Please do not procrastinate, and let me know if you have a catastrophe befall you.

LECTURES

Audio lectures and the accompanying .PPT document will be posted in Canvas. (Remember that this information is copyrighted, so it is illegal to copy this material and distribute it without permission.) The accompanying powerpoints are not a substitute for viewing VidGrid lectures and reading papers. The powerpoints will allow you print and further listen to each lecture without the need to frantically copy each word spoken.

DISCUSSION BOARDS

Discussion boards will begin Monday and run through Sunday of the week. The discussion board will be structured a little different for this class. I want students to take a little more ownership of the discussion board. I have found that you learn a lot more if you are more responsible for your learning rather than just watching lectures. I want to divide the discussion board into two parts: **Participation** and **Leadership**.

Participation: Students will be expected to respond to the discussion questions and to other students' comments. The participation grade will be weighted by the quality and number of responses elicited by the student. There will be a total of 11 weeks with a discussion board component and each week will be worth 10 points. You will participate in 10 weeks and lead one week. You will therefore have 100 points for participation. Participation in class will be monitored and graded based on the following general criteria:

- 1) **Participate at least twice each week on different days.** You should check the discussion board a minimum of every other day and post comments, questions, etc. You are welcome to suggest other readings, websites, and similar materials that may carry discussion and inquiry in new directions. In order to keep a discussion going and to allow everyone to participate in a meaningful way, we need comments to be made throughout the course.
- 2) **The quality of your contribution.** This is somewhat subjective, but the more insightful your comments the better the quality of discussion will be. Your comments should generally consist of a short paragraph. Conciseness and clarity are necessary to keep the workload for this class to a reasonable level so page long postings are discouraged. Your comments should be supported with specific details, referenced, and relevant to the current topic of discussion. Posts about the weather, Canvas issues, or simple posting of a web link are not examples of posts that will count for credit.
- 3) **How well you interact with classmates.** Be nice. These are online discussions of scientific issues. You should read all postings, and you can respond to some of them. Your responses should demonstrate that you are aware of the discussion that has been taking place. Go beyond either simply "I agree" with someone, state your reasons. Be polite and constructive in your posts.

Leadership: I will assign students a week to lead the discussion. You will mostly likely be working in pairs. The two students will come up with some additional topics that they wish to discuss their epidemic causing agent. This could include additional research to read, current statistics, or the future of their epidemic. This will not begin until Week 5 of class. I will assign students right away, but this will allow some time to see if students drop the class and to move students around if necessary. This will be worth 50 points, so I expect that students will have a good plan and the other students in the class will learn additional information about the epidemic during the discussion.

Additional Suggestions for Discussion Board: Most students participate most heavily on the weekends. Discussion topics and information should be posted by the leaders on the

weekend before the disease lecture. Students will then participate through Sunday of the next week. (Therefore there will be some overlap. New material will be posted for the next discussion that same weekend for the next topic, but do not start the next discussion until Monday please.)

QUIZZES

Quizzes over the lecture material and assigned readings will periodically occur over the course of the semester. All quizzes will be time limited as the use of notes is not permitted. The quizzes will take place on Canvas and ample time will be provided to take each quiz after the posting date. Announcements will be made when each quiz is posted.

EXAMS

Reading and understanding of scientific papers is crucial to the way science works. I believe that experience with primary scientific literature is a necessary part of the graduate experience. I will ask you to find and read both popular media and scientific source material. In addition to the core material on plagues, this course is designed to improve critical thinking skills. I expect everyone in the class to be able to read and write papers in scientific style.

Exams must be submitted as a .docx file through the Canvas TurnItIn function, not any other method or file type. Formatting is important for these documents. **Referencing is required!** Plagiarism is a serious offense academically. I will check papers for plagiarism and severe grade reductions can result. If you have any questions, please contact me **before** you turn in any papers.

VI. GRADES AND GRADING

Your Grade will be calculated as follows:

Graded Assignments	Points
Online Discussion (10 @ 10 pts each)	100
Online Discussion Leading	50
Online Quiz (10 @ 10 pts each)	100
Exam 1 Midterm	100
Exam 2 Final	100
Class Total	450

Grading Scale. Grades will be assigned using the standard grading scale for the Department of Biology, as follows: A (93-100%), A- (90-92%), B+ (88-89%), B (83-87%), B- (80-82%), C+ (78-79%), C (73-77%), C- (70-72%), D+ (68-69%), D (63-67%), D- (60-62%), and F (below 60%).

VII. ADDITIONAL INFORMATION

Students with Disabilities

It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students with documented disabilities. To receive accommodation services for a disability, students must be registered with UNK Disabilities Services Coordinator, David Brandt, in the Disability Services for Students office, 175 Memorial Student Affairs Building, 308-865-8214 or by email unkdso@unk.edu

Students Who are Pregnant

**It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students who are pregnant. To receive accommodation services due to pregnancy, students must contact Sue Pedersen in Student Health, 308-865-8218. The following link provides information for students and faculty regarding pregnancy rights.
<http://www.nwlc.org/resource/pregnant-and-parenting-students-rights-faqs-college-and-graduate-students>**

Reporting Student Sexual Harassment, Sexual Violence or Sexual Assault

Reporting allegations of rape, domestic violence, dating violence, sexual assault, sexual harassment, and stalking enables the University to promptly provide support to the impacted student(s), and to take appropriate action to prevent a recurrence of such sexual misconduct and protect the campus community. Confidentiality will be respected to the greatest degree possible. Any student who believes she or he may be the victim of sexual misconduct is encouraged to report to one or more of the following resources:

Local Domestic Violence, Sexual Assault Advocacy Agency 308-237-2599

Campus Police (or Security) 308-865-8911

Title IX Coordinator 308-865-8655

Retaliation against the student making the report, whether by students or University employees, will not be tolerated.

If you have questions regarding the information in this email please contact Mary Chinnock Petroski, Chief Compliance Officer (petroskimj@unk.edu or phone 8400).

Withdraw (W) and Incomplete (I) Grades:

Until the conclusion of the 5th week of the semester, you may withdraw from any class and receive a grade of "W." This grade does not count toward your grade point average and merely indicates that you withdrew from (or "dropped") the class. No instructor can withdraw a student from the roster; that is, if you stop coming to class the instructor cannot withdraw you from the class. The instructor will be forced to assign you a failing ("F") grade for the class. Withdrawing from a class involves filling out a simple form that the instructor and student both sign and returning this form to the registrar's office by the withdraw deadline.

Under very unusual circumstances, a grade of incomplete ("I") may be issued. An incomplete is not a substitute for a "W" (withdraw), and it is not a substitute for a poor or failing grade. An incomplete is issued if circumstances beyond the student's control prevent the student from completing the required work for the class by the end of the semester (example: the student is

hospitalized during final exam week). If you qualify for an incomplete grade, it is expected that you will receive this grade in all your classes. An incomplete grade will give you an extension to complete outstanding work only; it is not an opportunity to "start over" in the class. All outstanding work must be completed within one year or the "I" grade automatically converts to a failing ("F") grade. An incomplete grade will be considered only during the final six weeks of the semester, after the deadline for receiving a "W" has passed.

SCHEDULE FOR EVOLUTION OF EPIDEMICS SPRING 2019

Week	Lectures	Assignments
1 01/07	Syllabus and Introduction Epidemiology	Discussion board introductions
2 01/14	Introduction to Evolutionary Principles Evolution of Virulence Human Evolution	
3 01/21	Innate Immunity Adaptive Immunity	
4 01/28	Vaccination Plagues of Antiquity	
5 02/04	Bubonic Plague	Discussion 1
6 02/11	AIDS	Discussion 2
7 02/18	Typhus	Discussion 3
8 02/25	Malaria	Discussion 4
9 03/04	Cholera	Discussion 5
10 03/11	No Lectures (Complete Midterm)	Midterm Exam Available 03/4 Due 03/17 5 p.m. CST
11 03/18	No Class: Spring Break	
12 03/25	Small Pox	Discussion 6
13 04/01	Antibiotic Resistance Syphilis	Discussion 7
14 04/08	Tuberculosis	Discussion 8
15 04/15	Leprosy	Discussion 9
16 04/22	Plagues on Order	Discussion 10
17 04/29	No Lectures	Final Exam Available 04/15 Due 04/29 5 p.m. CST