

**BIOLOGICAL SCIENCES 670 sec 002**  
**Undergraduate Senior Seminar - Spring 2023**  
**In Lapham 253 Wed 09:30 – 1020AM**

**COURSE OVERVIEW AND OBJECTIVES: The Biology of Epidemics and Pandemics**

It took nearly 200,000 years for human populations to reach 1 billion, but only 200 years to grow to the 7 billion we are today. This rapid increase in population has been due primarily to advances in agriculture, technology and most importantly to medicine. We will emphasize how medicine has played a major role in controlling the spread of many pathogens and discuss how our current understanding of population models and the biology of these pathogens is necessary to overcome the spread of these disease causing organisms.

While many of you in this course have an interest in medical applications, there may also students with a background in basic, evolutionary and conservation biology. Hence, we will discuss these epidemics and pandemics from a broader perspective and include humans as part of the natural ecosystem in which organisms live and are subject to the same biological principles that result in the spread or decline of populations.

It is expected that in this course you will:

1. know how to read the primary scientific literature to learn about topics you are unfamiliar with
2. know how to use publically available resources to search for peer reviewed information
3. develop confidence in your ability to read about, think about, discuss, and present scientific discoveries to a group of your peers.

After we discuss pandemics from a historical perspective, we will discuss how mathematical models can help us understand what causes diseases to spark, peak and decline. We will watch a few short videos that pinpoint the possibility of pathogens that may spread in the near future and whether we can predict these trends and also discuss the biology of specific pathogens.

Students will then present papers related to epidemics and pandemics related to history, the discovery of treatments, understanding trends in how such disease spreads in a population, current and future approaches in controlling the spread of such diseases both in terms of medicine as well as ecology and discuss what causes them in the first place. Papers presented should encompass both human examples such as covid-19 as well as in animals such as distemper in canids and rinderpest in ungulates.

While you have a choice of selecting a paper related to the topic of this seminar, I will have a series of papers that students can either choose or will be assigned to present in class. It is expected that the entire class will read the paper ahead of class to participate in meaningful discussion. It is also expected that the presenter will consult additional references to present the significance and background material, and to help explain methodology.

<b>INSTRUCTOR</b>	Dr. Selvakumar Ramakrishnan
<b>OFFICE</b>	N517 Lapham Hall
<b>EMAIL</b>	selvam@uwm.edu
<b>OFFICE HOURS</b>	Friday 11:00 – 12:00

**Class meets Wednesday from 09:30-10:20 pm in Lapham 253**

**CLASS ASSIGNMENTS:**

Please complete the reading assignment before each class (see below) and come prepared with one question to stimulate group discussion. Grades will be based on informed class participation and a presentation of a primary research paper.

WEEK	DATES	READING ASSIGNMENTS
1	Jan 25	Introduction
2	Feb 1	History of Major Pandemics - Discussion
3	Feb 8	Mathematical Models of Epidemics and Pandemics- Discussion
4	Feb 15	Designing the Covid-19 Vaccine- Discussion
5	Feb 22	Student Presentation
6	Mar 1	Student Presentation
7	Mar 8	Student Presentation
8	Mar 15	Student Presentation
9	Mar 22	Spring Break
10	Mar 29	Student Presentation
11	Apr 5	Student Presentation
12	Apr 12	Student Presentation
13	Apr 19	Student Presentation
14	May 26	Student Presentation
15	May 3	Student Presentation
16	May 10	Student Presentation

**Class Participation:** The success of this class depends on active participation by everyone. To maintain full points for participation you must: Read the paper and come up with a question, a problem, or an insight, or just something you found interesting about the article that will help stimulate discussion prior to class.

See below for written critique.

**Paper presentation:** When it is your turn to present, you should prepare a formal 20-35minute PowerPoint presentation. You should probably have about 15 slides that cover the following information:

1. Significance of the paper
2. Background
  - a. Description of the work leading up to this paper
  - b. Question that the authors were trying to address with their work
  - c. Overview of the approach they took
3. Results and conclusions
  - a. Major results and data that supports the conclusion
  - b. Applications and future approaches

**GRADING:**

Criteria	total points (100%)
Discussion participation	2x 15 = 30
Paper presentation	60
Attendance	10

**Participation** = In addition to active discussion in class, students should also write a brief critique which will consist of a few sentences about the interesting parts of the seminar (what did you learn). It should point out the strong points of the seminar as well as areas that could be improved. The critique will provide a 1-5 rating (5 being the highest rating) for the 2 areas outlined below. The critiques for each of the previous week presentation week is due prior to the start of each seminar, excepting the last seminar which is due on the same day of the class. There will be no credit for late critiques.

Grades	points
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D	60-69
FAIL	<60

**Attendance Policy:** Attendance is required and of extreme importance since class discussion is an essential part of the course. If you are not present, you cannot participate in the class discussion, therefore, an absence will result in a 3-point deduction in your participation grade. Absences to due illness should be accompanied by a doctor's notice. Accommodations for absences due to religious observances must be discussed with the instructor by the second week of class.

**Academic Conduct Policy:** The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. This course follows the guidelines and procedures detailed in the description of Student Academic Disciplinary Procedures found in Regents Policy Statements, UWS Chapter 14 and UWM Faculty Document #1686 and can be found online at: <http://uwm.edu/academicaffairs/facultystaff/policies/academic-misconduct/>

**Accommodations for Students with Disabilities:** If you need special accommodations to meet the requirements of this course, please contact the Student Accessibility Center (Mitchell Hall Room 112, 229-6287, <http://uwm.edu/arc/>) and inform the instructor after the first class meeting or at least two weeks before the first exam.

**Other University policies may be found at the following link:**

<http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf>