

**Pandemics: Biological Basis and Societal Impact.**

This course will provide the biological foundations to understand pandemic diseases and will review biological and societal impacts of pandemics through human history. The course is designed for non-majors with no prior background in biological science or chemistry.

**Instructor:** Dr. Gordon Rule

**Office:** NA

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**Course Goals:**

- Provide an understanding of biological process such that student can understand the biological basis of bacterial and viral diseases.
- Generate a basic understanding of the human immune response to pathogens.
- Develop skills to identify, understand, and critique popular and peer-reviewed scientific literature.
- Develop a fundamental understanding of public policy as it pertains to the management of infectious diseases.
- Develop written and oral technical communication skills.

**Learning Outcomes:**

- Students will be able to discuss the outcome of infectious diseases in terms of biological processes.
- Students will be able to explain the immune response to diseases and why the process may fail.
- Students will be able to discuss the merits of different vaccination strategies.
- Students will be able to identify and critically read articles in the popular press related to infectious diseases.
- Students will be able to critique public policy with regard to infectious diseases from a scientific perspective.
- Students will be able to develop and present scientific information to the lay-person in an organized and convincing manner.

**Course Materials:** There is no textbook for the course. Students will be provided access to online resources and articles for background reading.

**Evaluation of Students:**

1. Quizzes will be given on a weekly basis. The quizzes are designed to help the student maintain an active learning strategy and to identify gaps in their understanding. The quiz scores will be averaged after dropping the lowest two quiz score.
2. Homework assignments will be given throughout the course, usually on a weekly basis, and will generally be due within one week. The lowest two homework scores will be dropped. Homeworks are intended to enhance student understanding of concepts and provide an entry points for self-learning. They will consist of a mixture of quantitative problems, conceptual questions, use of bioinformatic tools, and reviews of published articles.
3. Three examinations will be given, two in-class and one during finals week. The third exam will be comprehensive by nature. Exams will consist of quantitative problems, short answer, multiple choice, fill in the blank and will largely test concepts that were assigned in problem sets and discussed in class.
4. Presentation on a topics related to pandemics (individual or groups). Each presentation will consist of:
  - i) Biological basis of the disease
  - ii) Treatment, including policy.
  - iii) Effect of pandemic on society
5. Final grades will be determined by weighting 50% of the lowest in-class exam grade, dropping the two lowest homework score, the lowest two quiz score, and using the grading scale below.

Quizzes (Lowest two dropped)	5 %
Homework (Lowest two dropped)	15 %
3 Tests (25+15+10), weighted to favor higher grade.	60 %
In-class Presentations	20 %

**Tentative Grading Scale:** A>90, B>80, C>65, D>55, R lower than 55.

**Late Policy:** Extensions may be granted for assignments, provided they are requested before the due date. If an extension is not granted, there will be a 5% grade penalty/day.

**Exam re-grades/ Grading issues:** I am committed to grading as fairly as possible. If you think a mistake was made in grading your exam, you can submit your exam and a **written** explanation of why you think you deserve more points than you were given and your exam will be re-graded. Re-grades must be submitted no more than one week after homeworks have been returned or in two weeks for exams. **Please check your grades on Canvas for accuracy and completeness throughout the semester!**

### 03-xxx Tentative Course Schedule – Summer 2020

Lecture	Date	Instructor	Topic
1	(M)June 29	Faculty	Overview of cellular biology, atomic structure
2	(T) June 30	Faculty	Organic compounds, amino acids
3	(W) July 1	Faculty	Protein structure and function
4	(R) July 2	Faculty	Spotlight on antibodies   Carbohydrates
	(F) July 3	Faculty	No Classes (Ind. day)
5	(M)July 6	Faculty	Nucleic acids   DNA Polymerases   DNA replication
6	(T) July 7	Faculty	Central dogma
7	(W) July 8	Faculty	Prokaryotic and Eukaryotic Genetics
8	(R) July 9	Faculty	Gene Regulation
	(F) July 10		Exam I (Lectures 1-6)
9	(M)July 13	Faculty	Biotechnology   Spotlight on diagnostic testing
10	(T) July 14	Faculty	Lipids and membranes
11	(W) July 15	Faculty	Vesicular transport and cytoskeleton
12	(R) July 16	Faculty	Immunology I - Innate response to pathogens
13	(F) July 17	Faculty	Immunology II - Acquired response to pathogens
14	(M)July 20	Faculty	Immunology III - Vaccines   Spotlight on Dengue fever
15	(T) July 21	Faculty	Overview of Pandemics
16	(W) July 22	Faculty	HIV
17	(R) July 23	Student	Black death
	(F) July 24		Exam II (Lecture 7-14)
18	(M)June 27	Student	Smallpox & Polio
19	(T) June 28	Student	Influenzas
20	(W) June 29	Student	Cholera & Typhus
21	(R) June 30	Student	Tuberculosis & Leprosy
22	(F) June 31	Student	Malaria
23	(M)Aug 3	Student	Hemorrhagic fevers (Ebola, Marburg, Lassa)
24	(T)Aug 4	Student	Yellow fever & Zika
25	(W)Aug 5	Student	Covid-19 & other coronaviruses
26	(R)Aug 6	Student	Emerging pandemics, viral and bacterial
27	(F)Aug 7		Course Review/make-up day
			Exam III (During final exam period)

**Academic Integrity:**

Cheating, Plagiarism, and Unauthorized assistance will not be tolerated. Please read the University Policy on Academic Integrity for more details: <http://www.cmu.edu/policies/student-and-student-life/academic-integrity.html>. Any unauthorized access to course material (including solution keys from previous years) is also in violation of the academic integrity policy.

*With respect to problem sets, we encourage you to have an initial discussion of the questions with your classmates to deepen your understanding of the material. However, we strongly advise you to write the problem set solutions by yourself, without your study-group members present. You should also not share your solutions with any other students.*

**Recording/ Video Policy:** Zoom sessions will be recorded and posted on Box. Student presentations will also be recorded for study purposes.

**An Invitation to Students with Learning Disabilities:** Carnegie Mellon University is committed to providing reasonable accommodations for all persons with disabilities. To access accommodation services, you are expected to initiate the request through the Office of Health & Wellness or CaPS-Q. In order to receive services/accommodations, verification of a disability is required as recommended in writing by a doctor, licensed psychologist or psycho-educational specialist. The Office of Health & Wellness, CaPS-Q and the Office of Disability Resources in Pittsburgh will review the information you provide. All information will be considered confidential and only released to appropriate persons on a need to know basis.

Once the accommodations have been approved, you will have access to your Summary of Accommodations Memorandum describing the approved accommodation(s). You are responsible for sharing the Memorandum with your professors at the beginning of each semester.

For more information on policies and procedures, please visit

<https://scotty.qatar.cmu.edu/qword/student-affairs/office-of-health-and-wellness/assistance-for-individuals-with-disabilities/>

***Please take care of yourself:*** Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep, and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. Asking for support sooner rather than later is usually beneficial. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. ***Please feel comfortable approaching the instructor in requesting extensions for problem sets and to adjust exam schedules depending on demands in your other courses or other issues in your life.***

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call [412-268-2922](tel:412-268-2922) and visit their website at <http://www.cmu.edu/counseling/>. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

*If you or someone you know is feeling suicidal or in danger of self-harm, call someone immediately, day or night:*

CaPS: [412-268-2922](tel:412-268-2922)

Re:solve Crisis Network: [888-796-8226](tel:888-796-8226)

*If the situation is life threatening, call the police*

On campus: CMU Police: [412-268-2323](tel:412-268-2323)

Off campus: 911