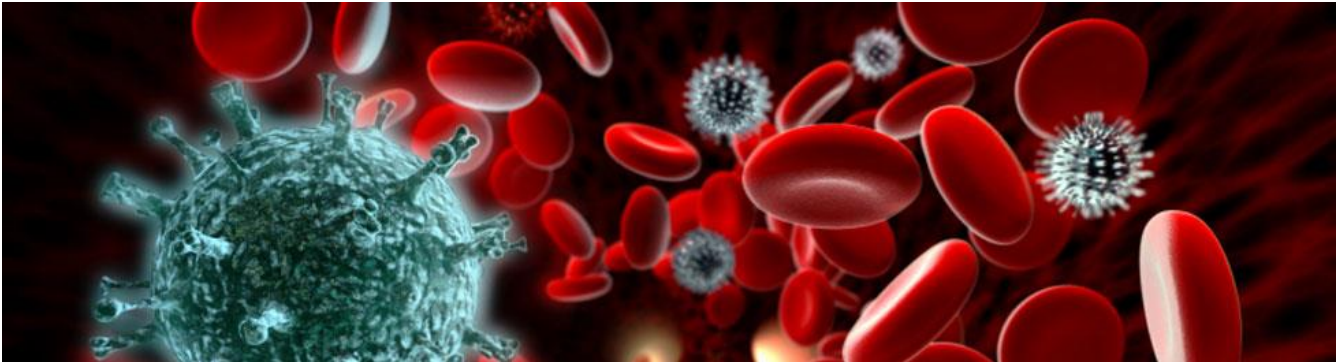


# Infectious Disease Biology (BIOL304-601)

## Syllabus - Spring 2023



**Instructor:** Dr. Nataliya Balashova, M.S., Ph.D.  
**Email:** natbal@upenn.edu  
**Lectures:** Thursdays from 7.00 to 10.00 PM virtually via Zoom  
**Office hours:** By appointment via Zoom

### Prerequisites

Students should be familiar with the basic concepts of biological chemistry, cell structure and function, energy use and metabolism, molecular biology and genetics, evolution, taxonomy and classification. UPENN course requirements: BIOL211-Molecular Biology and Genetics, BIOL275-Microbiology, BIOL213-Essentials of Physiology.

### Course Description

This course is an introduction to human infectious agents, the diseases they cause as well as infectious disease epidemiology. Topics will focus on classification and characteristics of infectious agents (Section 1); the mechanisms of microbial pathogenesis, infectious disease transmission and host defense against infections (Section 2); the approaches to diagnosing and controlling infectious diseases (Section 3); and current understanding of pathophysiology of various human organ system infections (Section 4). This course stresses the general education goals, in particular communication, information literacy, and critical thinking.

### *Course objectives:*

Following completion of this course students should be able to:

- Understand the complexity and diversity of pathogenic microorganisms and understand different strategies that pathogens employ to cause disease;
- Understand the mechanisms of the host response to pathogens and different ways pathogens evade the immune response;
- Understand methods of diagnosing and prevention of infection;
- Understand the theoretical basis of pathogen transmission and patterns of disease occurrence;

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- Apply knowledge learned in this course to critically evaluate literature in the field of microbial pathogenesis.

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#### Recommended books

Cowan MK and Smith H. Microbiology. A Systems Approach. 2018. 5<sup>th</sup> Edition. McGraw-Hill Education. New York, NY. ISBN-13: 9781259706615.

Krasner RI and Shors T. The microbial challenge: Science, Disease and Public Health. 2013. 3<sup>rd</sup> edition. Jones & Bartlett Publishers. Sudbury, MA. ISBN-13: 978-1449673758.

#### Course Activities

Course activities include lecture, video materials, discussion, presentations, and home assignments.

***The course requires synchronous attendance of 70% of classes (at least 9 classes) with your camera on! Quizzes on the materials of the previous lecture will be given in the beginning of each class.***

#### Methods of evaluation

##### *Exams*

There are 2 exams in the course. The midterm and final exams will be given on 3/4 and 5/13. Each exam will last for up to 120 min (7.00 to 9.00 pm) and be worth 80-100 points. The exams will include multiple choice questions and may include some paper or pathogen review as a second part. Exams will be based on both materials presented in class lectures (posted on the Canvas course site) and assigned readings. The midterm exam will cover basic materials of lectures. The final exam will be comprehensive, covering specific pathogens material from the entire course. No use of electronic devices (laptops, cell phones, and others) will be allowed during an exam. Missed exams cannot be made up unless the absence is excused and verified by the instructor. Only one exam per semester is allowed to be made up. All make up exams will be scheduled on a particular day at the end of the semester by the instructor and may include formats different from the regularly scheduled exam.

##### *Quizzes/essay*

There will be 10-12 quizzes and one classroom essay. Each quiz/essay will count 5-10 points. The essay will be on video material. Ten min of regular class time will be provided to complete each quiz and about 30 min will be required to complete an essay. No use of electronic devices (laptops, cell phones, and others) will be allowed during a quiz/essay.

##### *Homework Assignments*

4-6 homework assignments will be offered. 15 points can be obtained for each of these assignments (overall 60 points). These assignments must be completed outside of the class and submitted by email

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at the time of midterm exam (set 1) and final exam (set 2). Homework assignments submitted late without valid excuse or resubmitted will not be accepted.

#### ***Presentations***

Presentations are optional and allow gaining 30 extra points. Presentations topics list to choose from will be provided. The assignments will require scientific review and preparation of power point presentation. Students who selected to present should give a talk on the selected topic during lecture time on the assigned day. Presentation should take 10 min to outline the topic. 15 points max can be obtained if topic is not presented to the class and only electronically submitted.

#### ***Regrading option***

Regrading is an option for exams and quizzes only. A typed request within a period of one week after official submission of the grade will be accepted by the instructor only if the request contains specific, supporting evidence to clearly demonstrate that the answer provided on the respective exam or quiz is indeed correct; and the respective exam or quiz was taken in ink and no whiteout was used.

#### **Grading Policy**

Grades are based on two examinations (midterm and final), quizzes (in-class), as well as classroom presentation, homework, and home essay. The method of grading is outlined below:

2 exams	60% of your grade
11 quizzes	15% of your grade
1 essay, 6 homework, 1 presentation	25% of your grade

Grades will be assigned according to the following tentative scale (%):

A+	386.5-400 pts (96.7-100%)	C	293.5-306 (73.4-76.6%)
A	373.5-386 (93.4-96.6%)	C-	280-293 (70-73.3%)
A-	360-373 (90-93.3%)	D+	266.5-279.5 (66.7-69.9%)
B+	346.5-359.5 (86.7-89.9%)	D	253.5-266 (63.4-66.6%)
B	333.5-346 (83.4-86.6%)	D-	240-253 (60-63.3%)
B-	320-333 (80-83.3%)		
C+	306.5-319.5 (76.7-79.9%)	F	below 240 (less than 60%)

#### **Strategies for success**

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A great deal of material will be covered in this course. Thus, it is important to keep up with the work on the regular basis. Students should use both online materials and text-book, as assigned, to prepare for quizzes/exams since some required materials may not be found online. If you encounter any difficulties, you may contact the instructor for help with the material via email or schedule an appointment. You may also wish to contact the Learning Resource Center at <https://www.vpul.upenn.edu/lrc/> for tutoring or help with studying and test-taking skills.

#### **Code of Academic Integrity**

The University of Pennsylvania Code of Academic Integrity will be strictly enforced. Any violation will result in failure in the course (consult <https://catalog.upenn.edu/pennbook/code-of-academic-integrity/> for more information).

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### Course schedule

Date	Topic	Chapter readings
<b>Section 1 Infectious Agents</b>		
	Lecture 1. History of Microbiology. Microorganisms and Human Health	*CS: 1 **KS: 1, 2, 3
	Lecture 2. Prokaryotic Cells. Medical Bacteriology <b>Quiz 1. Homework Assignment 1</b>	CS: 4 KS: 4, 9
	Lecture 3. Eukaryotic cells. Medical mycology and parasitology <b>Quiz 2. Homework Assignment 2</b>	CS: 5 KS: 11
	Lecture 4. Viruses. Medical virology and Other non-cellular infectious agents <b>Quiz 3. Essay</b>	CS: 6 KS: 5, 10
	Lecture 5. Host defense mechanisms <b>Quiz 4. Homework Assignment 3</b>	CS: 14-15 KS: 7, 12
	Lecture 6. Mechanisms of Microbial Pathogenesis <b>Quiz 5. Homework Assignment 4</b>	CS: 13.1-13.2 KS: 7, 12
	<b>Midterm exam (120 min)</b>	
	Spring break	
	Lecture 7. Infection and Disease, Epidemiology <b>Quiz 6. Homework Assignment 5</b>	CS: 13.3 KS: 1, 7, 8, 13, 14, 15
	Lecture 8. Diagnostic Microbiology and Immunology <b>Quiz 7. Homework Assignment 6</b>	CS: 12 KS: 4, 5, 16
	Lecture 9. Physical and Chemical Control of Microbes <b>Quiz 8. Homework Assignment 7</b>	CS: 12 KS: 7, 13
<b>Section 4 Pathophysiology of Infectious Diseases</b>		
	Lecture 10. Infectious of the Skin and Nervous system <b>Quiz 9.</b>	CS-19,20 KS: 9-11
	Lecture 11. Infectious of the Cardiovascular and Lymphatic system <b>Quiz 10.</b>	CS-20 KS: 9-11
	Lecture 12. Infectious of the Respiratory and Digestive systems <b>Quiz 11.</b>	CS-22 KS: 9-11
	Lecture 13. Infectious of the Urinary and Reproductive systems <b>Quiz 12.</b>	CS-23 KS: 9-11
	<b>Final exam (120 min)</b>	

\*CS - Cowan and Smith. Microbiology. A Systems Approach.

\*\*KS - Krasner and Shors. The microbial challenge: Science, Disease and Public Health.

**Please note that course schedule outlined here is tentative**