U520-101-2020: Microbiology

Course Format: Online

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Course credits: 3

Prerequisites: The completion of college level General Biology and General Chemistry or the equivalents of those courses.

Course Description: U520-101 introduces concepts, skills and reasoning fundamental to the study of Microbiology. A key theme is cellular nature of life. The main principles that guide our study include evolution, cellular structure and function, metabolic pathway, information flow and genetics, microbial systems, and the impact of microbes. Some of our topics will address infectious disease and how our understanding of microbes allows us to battle this persistent threat.

Required Course Materials

- *Microbiology*, ©2017 Rice University. Download for free at https://openstax.org/details/books/microbiology)

Optional/Recommended Course Materials

- None

Hardware Requirements: You will need a webcam, speakers, and a microphone. You will complete your three exams through an online proctor, requiring all three components.

Course Learning Objectives

After completing this course, students will be able to

1. Describe evidence that supports the theory of evolution and how life on Earth evolved from microbes.
2. Describe the three domains of life. Discuss the cellular structures that are common to all forms of life and those structures that allow us to distinguish different groups of organisms, especially bacteria.
3. Describe metabolic pathways that are common to all cells. Discuss microbial metabolic pathways that allow some organisms influence biogeochemical cycles that involve carbon, oxygen and nitrogen.
4. Explain the differences in chromosome structure that is present in eukaryotic versus prokaryotic cells. Compare and contrast how genes are expressed in prokaryotic and eukaryotic cells.
5. Describe the different locations on our planet where microbes live. Explain the adaptations that allow species to thrive in extreme environments. Describe the importance of biofilm formation and structure.
6. Describe the human microbiome and how we depend on microbes for our health.
7. Discuss each of the six concepts identified above and describe how each biological property presents a limitation on microbial life that we can exploit in order to control microbes. You will be able to discuss different methods of control.

Course Overview

MODULE/ UNIT #	MODULE/UNIT TOPIC	EVALUATED ACTIVITIES
1	Respiratory infections	Chapter 22, Pages 959-1010 Homework 1 Quiz 13
2	Invisible world	Chapter 1, Pages 15-42 Homework 2 Quiz 2
3	The Cell	Chapter 3, Pages 89-148 Homework 3 Quiz 3
4	Prokaryotic	Chapter 4, Pages 149-196 Homework 4 Quiz 4
5	Eukaryotic	Chapter 5, Pages 197-242 Homework 5 Quiz 5
6	Acellular Pathogens	Chapter 6, Pages 243-284 Homework 6 Quiz 6 Essay 1
Exam 1		
7	Biochemistry	Chapter 7, Pages 285-316 Homework 7 Quiz 7
8	Metabolism	Chapter 8, Pages 317-360 Homework 8 Quiz 8
9	DNA	Chapter 10, Pages 405-444 Homework 9 Quiz 9
10	Genetics	Chapter 11, Pages 445-508 Homework 10 Quiz 10
11	Microbial growth	Chapter 9, Pages 361-404 Homework 11 Quiz 11
12	Control of microbes	Chapter 13, Pages 553-606 Homework 12 Quiz 12 Essay 18
Exam 2		
13	Antimicrobial	Chapter 14, Pages 607-660 Homework 13 Quiz 13
14	Pathogenicity	Chapter 15, Pages 661-702 Homework 14 Quiz 14

15	Epidemiology	Chapter 16, Pages 703-734 Homework 15 Quiz 15
16	Innate defenses	Chapter 17, Pages 735-776 Homework 16 Quiz 16
17	Immune System	Chapter 18, Pages 777-818 Homework 17 Quiz 17 Essay 17
Exam 3		

Activities

Lectures. The instructor will present material through narrated PowerPoint slides. These presentations are pre-recorded. You may submit questions via email prior to completing your quizzes. The lectures are designed to offer some guidance for homework, quizzes and exam. The lectures do NOT replace reading.

Reading. It is essential that you read the chapter assigned for each lesson. Many exam questions will be based on content that is in the book yet was not presented in lecture. This highlights the need to read the chapter and take good notes.

Evaluation Methods

Your final grade will be based on your performance on the following:

Homework. The Homework assignments are designed to accomplish two goals. First to have you take notes on the chapter. Second, to guide you through the thought process that is necessary in biology. Homework is very similar to taking notes. You will complete one homework assignment for each chapter that is covered. The learning objectives for the homework assignments are to ensure that students are reviewing the relevant content that is presented during the lectures and in the textbook.

Essays. You will write 3 essays in which you analyze information regarding the subject matter. A rubric and an example essay will be presented on Canvas so that you can better understand how I grade these essays. Each essay is worth 30 points.

Quizzes: A quiz for each lesson must be completed before moving on to the next lesson. Each quiz is worth 12 points. There are 17 quizzes and the lowest score will be dropped. Quizzes are timed. Students must turn on "Proctorio" proctoring software in order to take the quiz. Students are not allowed to use notes or other resources during the quiz. Evidence of cheating will result in the student receiving a score of "0" for that quiz. Further infractions can result in dismissal from the course.

Exams. There are three 75-minute **exams** given during lecture (150 points each). Exams are composed of multiple choice (55 minutes) questions and a short answer section (20 minutes).

Exam Method: This course requires all students to complete exams online with a proctoring service. Students receive one attempt on each exam. Students must turn on "Proctorio" proctoring software in order to take the exam. Students are not allowed to use notes or other resources during the quizzes or exams. Evidence of cheating

will result in the student receiving a score of "0" for that quiz. Further infractions can result in dismissal from the course.

Online exam proctoring policies can be found on our Web site:

- Proctoring information: https://il.wisconsin.edu/current-students/taking-exams/ (Links to an external site.)

If you have questions about examination procedures, contact Student Services at il@uwex.edu .

Grading Scale

The following grading scale is used to evaluate all course requirements and determine your final grade:

A = 93–100	AB = 88–92.9	B = 8387.9	BC = 7882.9
C = 70–77.9	D = 60–69.9	F = Below 60	

Pass/Fail Option

Students who enroll in an Independent Learning (IL) course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C and a final grade of U in place of a final grade equivalent to a D or F.