Course Description

This online course is designed to help you gain a broad understanding of microbiology. To achieve this, we will study the microbial world from several perspectives, including (i) biochemistry (atoms/molecules and cells), (ii) environmental microbiology, (iii) taxonomy, and (iv) medicine. The knowledge and understanding of the microbial world that you obtain in this course can be applied to other courses, your career, and your daily life.

Our course trajectory will look like this:

- Build a foundation
- Digging deeper
- Microbes and you
- Special topics

- chemical principles
- anatomy
- metabolism
- viewing microbes
- genetics
- growth requirements
- growth control
- important pathogens
- epidemiology
- pathogenic mechanisms
- immunity
- antimicrobial drugs & vaccines
- environmental microbiology

Fees

As part of your registration for this class you were required to pay an $80.00 lab fee. This fee is used to provide the course tutor and to furnish materials used by students in the weekly labs.

Course Objectives

My goal is not to turn you into a microbiologist in 16 weeks! Instead, I want to help you expand your knowledge of the field from whatever level you’re starting from. Having said that, by the end of the course you will be able to:

1. demonstrate factual knowledge (terminology, classifications, methods, and trends in microbiology);
2. explain fundamental principles (general mechanisms and theories in microbiology); and
3. demonstrate specific skills that are used by medical and lab professionals (microscopy, diagnostic tests, and aseptic technique).

Instructor

Instructor Name: Dr. Habashi
Contact information: Please use the Canvas inbox. Allow up to 24 hours to get a reply (and a little longer on weekends or holidays).

Office Hours: Rather than arbitrarily set office hours, please email me through the Canvas inbox to let me know when you’d like to meet.

- I have daytime and evening Zoom appointments available.

Course Schedule: Follow the course modules in order so that you won’t miss any assignments and you’ll be ready for each exam. The Canvas calendar shows when each exam opens and closes, when your assignments are due, and when I will hold exam reviews. Your lab instructor and tutor will contact you separately about their review schedules, either by email or Canvas Announcements.

- Covid-19 is affecting our lives in unexpected ways. Please contact me if you could use an extra accommodation due to the pandemic. I’ll work with you the best I can.

Lab Instructor: Dr. Wilson

- Please contact Dr. Wilson via the Canvas inbox. Office hours by request.

Course Tutor: Autumn Kelsch

- Contact via the Canvas inbox. Office hours by request. Weekly review schedule to be announced.

Course Resources


Optional: I strongly suggest that you have a microbiology textbook on hand to use as a reference.

A free option is to use Microbiology from Open Stax (https://openstax.org/details/books/microbiology) (you can download it or order a hard copy if you wish).

- PDF of Microbiology from Open Stax (https://usu.instructure.com/courses/639112/files/79317387/download?verifier=TUMizxHVslRMA5j8KzMPHzgRBLn4jdQUjXkTQ7T&wrap=1)

## Course Requirements

You will be expected to complete all readings, watch each lecture recording, and complete each assignment and quiz. Tutor/exam reviews, office hours, and practice quizzes are optional, but highly recommended. This is a challenging course with a lot of interesting material to cover; **1–2 hours of study per day outside of “lecture time” is recommended.** Read the syllabus carefully and discuss any questions with Dr. Habashi. Lab test and exam dates will not change, so please mark those on your calendar. By continuing in the course after reading the syllabus, you are indicating that you accept the terms of the syllabus.

## Evaluation Methods and Criteria

Grades will be based on the following assessments. All scores in the grade book (except the final exam) will be considered finalized at 5:00 PM on the last Friday before the final exam. No special projects will be offered to improve your grade, but there will be an opportunity to earn a few bonus points near the end of the semester by completing the course evaluation.

<table>
<thead>
<tr>
<th>Evaluation method</th>
<th># of points possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments and Quizzes</td>
<td>120</td>
</tr>
<tr>
<td>Lab Tests</td>
<td>100</td>
</tr>
<tr>
<td>Lecture Exams</td>
<td>300</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>720</strong></td>
</tr>
</tbody>
</table>

## Lab Assessments and Participation

Dr. Grant Wilson is your lab instructor. He is in charge of setting the due dates for each lab, correcting your lab assignments, and writing and grading the lab tests. So if you have questions about a lab, please email him directly through the Canvas inbox. If you don’t receive a quick reply, email Dr. Habashi. Each lab will have 10 points of credit associated with it. (Athletes and those with course/other University-sponsored conflicts should refer to the section of the syllabus regarding accommodations for their events.)

## Lab Tests

- There will be two lab tests, worth 50 points each, given on the dates listed in the weekly schedule.
- After each lab test is graded and the scores are posted, you will have 3 days to contest your score. Please submit all questions to **Dr. Wilson** via Canvas. After that, no score adjustments will be considered.
Lecture Exams

There will be 4 lecture exams, each composed of ~50 questions and worth 100 points each, given on the dates listed in the weekly schedule. You will take each exam using Proctorio. **The lowest of your four exam scores will be dropped (this does not include lab tests or any part of the final).** You will be responsible for ensuring that you are able to test using Proctorio, so please let me know if you haven’t used it before. Picture ID will be required for each exam. A scientific calculator and white board will be provided through Proctorio for each test. **I will do my best to work with you if an emergency arises; please email me prior to or during the test period if you would like to be considered for a make-up exam.**

- On the Quizzes page, you will find practice quizzes for each chapter. The questions are written in the same format as exam questions, and you may see a small number of them appear on your test, so make them a regular part of your studying. You will know what questions you missed on each quiz when you submit your answers, but the correct answers will not appear. You’ll need to try those questions again. **If you get stuck, ask for help.** The questions range in difficulty from simple recall to application.

Exam questions will be formulated based on the assigned readings, lectures, handouts, videos, articles, and other materials distributed by email or posted on Canvas. **Each lecture exam will be open for a three-day period.**

- By continuing in the course, you are indicating that you agree to adhere to all University policies regarding academic integrity.
- Once the scores for an exam have been posted, you will have 3 business days to contest your score. **Please submit all questions via the Canvas inbox to Dr. Habashi.** After that period is up, no score adjustments will be considered.
- You are invited to meet with Dr. Habashi by Zoom up to the last Wednesday before the final exam opens to review your exams. The course tutor can also show you your exams.

Final Exam

A comprehensive final exam worth 200 points will be given from **Monday, 5/3/21 to Tuesday, 5/4/21.** You will take the final using Proctorio. Reviews and review materials will be made available on Canvas and through the course tutor. **There is no make-up for the final, except in exceptional circumstances. The exam may not be taken early, except with prior approval from Dr. Habashi (please note: vacations are not exceptional circumstances).**

Grade Scheme

The following grading standards will be used in this class:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 % to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0 % to 90.0%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0 % to 87.0%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0 % to 83.0%</td>
</tr>
<tr>
<td>Grade</td>
<td>Range</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0 % to 80.0%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0 % to 77.0%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0 % to 73.0%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0 % to 70.0%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0 % to 67.0%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0 % to 60.0%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 59.0 % to 0.0%</td>
</tr>
</tbody>
</table>

**Course Schedule/Outline**

This weekly schedule is based on how quickly we would move through the material in a face-to-face course. If you would like to be considered for extensions on any due dates, please contact me through the Canvas inbox.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/19</td>
<td>Introduction to the course with Dr. Habashi (<em>live streaming</em> via Zoom on Canvas; 6:00-7 PM)</td>
</tr>
<tr>
<td>1</td>
<td>1/19</td>
<td><strong>Lecture</strong>: The Microbial World and You</td>
</tr>
<tr>
<td>1</td>
<td>1/21</td>
<td><strong>Lecture</strong>: Chemical Principles</td>
</tr>
<tr>
<td>1</td>
<td>1/20</td>
<td>Lab introduction with Dr. Wilson (<em>live streaming</em> via Zoom on Canvas; 5-6 PM)</td>
</tr>
<tr>
<td>1</td>
<td>1/26</td>
<td><strong>Lecture</strong>: Observing Microorganisms Through a Microscope</td>
</tr>
<tr>
<td>2</td>
<td>1/28</td>
<td><strong>Lecture</strong>: Functional Anatomy of Prokaryotic and Eukaryotic Cells</td>
</tr>
<tr>
<td>2</td>
<td>1/30</td>
<td><strong>Lab 1</strong>:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· Getting started; Laboratory Safety; Introduction – Microbiology – Rules for Success</td>
</tr>
<tr>
<td>3</td>
<td>2/2</td>
<td><strong>Lecture</strong>: Microbial Metabolism</td>
</tr>
<tr>
<td>3</td>
<td>2/4</td>
<td><strong>Lecture</strong>: Microbial Metabolism</td>
</tr>
<tr>
<td>3</td>
<td>2/6</td>
<td><strong>EXAM 1 (Ch. 1-4): Available 2/4 through 2/6 by Proctorio</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Lab 2</strong>:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· Microorganisms, Aseptic Technique, and Cultures</td>
</tr>
</tbody>
</table>
2/9 Lecture: Microbial Growth

2/11 Lecture: Control of Microbial Growth

2/13 Lab 3:
- Bacteria Morphology and Staining Techniques

2/16 Lecture: Microbial Genetics

2/18 Lecture: Microbial Genetics

2/20 Lab 4:
- Enumeration, Dilution, and Plate Counts

2/23 Lecture: Bacteria

2/25 Lecture: Fungi and Algae

**EXAM 2 (Ch. 5-8): Available 2/25 through 2/27 by Proctorio**

2/27 Lab 5:
- Environmental Influences on Microbial Growth – Salinity Testing

3/2 Lecture: Protozoans and Multicellular Parasites

3/4 Lecture: Protozoans and Multicellular Parasites

3/6 **Lab Test 1** (covers labs 1-5; 60 min; available 3/5 through 3/6 by Proctorio)

3/9 Lecture: Viruses, Viroids, and Prions

3/11 Lecture: Viruses, Viroids, and Prions

**EXAM 3 (Ch. 10-12): Available 3/11 through 3/13 by Proctorio**

3/13 Lab 6:
- Virus activity
- Microorganisms as Vectors of Disease

3/16 Lecture: Principles of Disease and Epidemiology
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/18</td>
<td>Lecture: Microbial Mechanisms of Pathogenicity</td>
</tr>
<tr>
<td>3/20</td>
<td>Lab 7: Handwashing and Normal Flora</td>
</tr>
<tr>
<td>3/23</td>
<td>Lecture: Nonspecific Defenses (Innate Immunity of the Host)</td>
</tr>
<tr>
<td>3/25</td>
<td>Lecture: Nonspecific Defenses (Innate Immunity of the Host)</td>
</tr>
<tr>
<td>3/27</td>
<td>Lab 8: Food Safety, Virology video and worksheet on Canvas (1 h)</td>
</tr>
<tr>
<td>3/30</td>
<td>Lecture: Specific Defenses (Adaptive Immunity)</td>
</tr>
<tr>
<td>4/1</td>
<td>Lecture: Specific Defenses (Adaptive Immunity)</td>
</tr>
<tr>
<td>4/3</td>
<td>Lab 9: Ebola video and video worksheet on Canvas (1 h), Statistics in Epidemiology</td>
</tr>
<tr>
<td>4/6</td>
<td>Lecture: Antimicrobial Drugs</td>
</tr>
<tr>
<td>4/8</td>
<td>Lecture: Antimicrobial Drugs</td>
</tr>
<tr>
<td>4/10</td>
<td>Lab 10: Kirby-Bauer Diffusion for Antibiotic Effectiveness, ‘Hunting the Nightmare Bacteria’ video and worksheet on Canvas (60 min)</td>
</tr>
<tr>
<td>4/17</td>
<td>-Myth Busters paper due (Canvas upload)</td>
</tr>
<tr>
<td>4/20</td>
<td>Lecture: Environmental Microbiology</td>
</tr>
<tr>
<td>4/22</td>
<td>Lecture: Environmental Microbiology</td>
</tr>
<tr>
<td>4/24</td>
<td><strong>Lab Test 2</strong> (covers labs 6-10; 60 min; available 4/23 through 4/24 by Proctorio)</td>
</tr>
</tbody>
</table>
Review with Dr. Habashi (live streaming via Zoom on Canvas; 6:15-7:15 PM)

-Prepare for the final! 😊

- No Lab

**COMPREHENSIVE FINAL EXAM** (including our old material plus Chs. 16, 17, 20, and 2)

Available 5/3 through 5/4

### Attendance and Excused Absences Policy

There are no required course meetings. All lectures and reviews will be made available as recordings on Canvas. You will, however, be expected to take your lecture and lab tests during the time periods given in the Canvas calendar.

### Library Services

All USU students attending classes in Logan, at our Statewide Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at libguides.usu.edu/rc. (http://libguides.usu.edu/rc)

### Classroom Civility

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read Student Code Article V Section V-3 (https://studentconduct.usu.edu/studentcode/article5) for more information.

### University Policies & Procedures

#### COVID-19 Classroom Protocols

In order to continue to provide a high standard of instruction at USU, and to limit the spread of COVID-19 during the pandemic, students are asked to follow certain classroom protocols. These protocols are in place not only for your safety but also the safety of the rest of the campus community. You will be asked to clean your desk area at the start of each class, sit in designated seats, wear face coverings, and follow dismission instructions. There may be individual medical circumstances that prevent some students from using face coverings. These circumstances will be rare, but if they do exist, we ask that everyone be respectful. It is imperative that we each do our part so that on-campus instruction can continue.

#### Academic Freedom and Professional Responsibilities
Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 (http://www.usu.edu/hr/files/uploads/Policies/403.pdf) further defines academic freedom and professional responsibilities.

**Academic Integrity – "The Honor System"**

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

**Academic Dishonesty**

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating:** using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually;”
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.

- **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.

- **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: ARTICLE VI. University Regulations Regarding Academic Integrity (https://studentconduct.usu.edu/studentcode/article6)

**Sexual Harassment/Title IX**

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 (http://www.usu.edu/policies/339) address sexual harassment in the workplace and academic setting.
The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU's Office of Equity (https://equity.usu.edu/) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305 (http://www.usu.edu/policies/305/)), and has designated the Office of Equity Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

 Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term ‘extenuating’ circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

 Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) (http://www.usu.edu/drc/) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu (mailto:drc@usu.edu)). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Students who are at a higher risk for complications from COVID-19 or who contract COVID-19 may also be eligible for accommodations.

 Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: https://studentaffairs.usu.edu (https://studentaffairs.usu.edu/), (435) 797-1712, studentservices@usu.edu (mailto:studentservices@usu.edu), TSC 220
- Student Legal Services: https://ususa.usu.edu/student-association/student-advocacy/legal-services (https://ususa.usu.edu/student-association/student-advocacy/legal-services), (435) 797-2912, TSC 326,
- Access and Diversity: http://accesscenter.usu.edu (http://accesscenter.usu.edu/), (435) 797-1728, access@usu.edu (mailto:access@usu.edu); TSC 315
- Multicultural Programs: http://accesscenter.usu.edu/multiculture (http://accesscenter.usu.edu/multiculture), (435) 797-1728, TSC 315
- LGBTQA Programs: http://accesscenter.usu.edu/lgbtqa (http://accesscenter.usu.edu/lgbtqa/), (435) 797-1728, TSC 3145
- Provost's Office Diversity Resources: https://www.usu.edu/provost/diversity (https://www.usu.edu/provost/diversity/), (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State
University: https://studentconduct.usu.edu/studentcode (https://studentconduct.usu.edu/studentcode/)

 Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII (https://studentconduct.usu.edu/studentcode/article7).
Full details for USU Academic Policies and Procedures can be found at:

- Student Conduct (http://www.usu.edu/studentconduct)
- Student Code (https://studentconduct.usu.edu/studentcode/)
- Academic Integrity (https://studentconduct.usu.edu/studentcode/article6)
- USU Selected Academic Policies and Procedures (http://www.usu.edu/provost/faculty-life/syllabus.cfm)

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.

Mental Health

Mental health is critically important for the success of USU students. As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Utah State University provides free services for students to assist them with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available on campus at Counseling and Psychological Services (CAPS) (https://counseling.usu.edu).

Students are also encouraged to download the “SafeUT App” (https://healthcare.utah.edu/uni/programs/safe-ut-smartphone-app) to their smartphones. The SafeUT application is a 24/7 statewide crisis text and tip service that provides real-time crisis intervention to students through texting and a confidential tip program that can help anyone with emotional crises, bullying, relationship problems, mental health, or suicide related issues.

Course Communications

Email is an official form of communication at USU. Any communication to you about this course will be sent to the email address you have listed in Canvas as your preferred address. You are responsible for any information conveyed to you at that email address.

- To ensure that Canvas is using the email account you prefer, do the following:
  - Log in to Canvas and click on the link "Profile" at the top right of the page.
  - Click on "Notifications" at the left side of the screen.
  - Verify your email address.
  - You may also opt to receive course notifications via text on your cell phone. Click the downward arrowhead to the right of "Email me at" on the "Notifications Preferences" page to bring up the option "Text my Cell at."

It is your responsibility to check your Canvas account at least once a day so that you do not miss announcements or emails to the class. All questions regarding academic progress or grades must be sent via the Canvas inbox.

To log in to Canvas, go to: canvas.usu.edu (no “www”). Your username is your Banner username (your “A” number) and your password is your BANNER password. BIOL 2060 should appear under the heading "Courses."

- For help with Canvas, contact the IT service desk: 435-797-HELP (4357) or 1-877-878-8325.