

## Biology 333: General Microbiology Sections 1 and 2

Spring 2021

### Course Syllabus

#### Course and Instructor Information

Lecture: Pre-recorded lectures will be posted to Canvas weekly. The format of the videos will be narrated PowerPoint slides and whiteboard diagrams. Some chapters will be covered in a single “lecture period” while others may take up to two lecture periods. Longer lecture videos will be spread across two “lecture periods.” When taught in-person, there are 100 minutes of lecture each week (two 50-minute lecture periods). You should anticipate having somewhere around **100 minutes of lecture video each week**, although some weeks may be a little more and some weeks may be a little less. The length of time spent watching lecture videos may be increased depending on how often you pause or rewind the videos. Supplemental resources (videos, web sites, etc.) usually will also be provided in Canvas. These are intended to provide additional explanation and added visualization of the processes discussed in class. I highly recommend watching the supplemental videos as a study aid.

Lab: Virtual labs will be used for all lab activities. Many of the virtual labs are produced by McGraw-Hill, and you will need to **purchase** an access code (\$37) from the University Bookstore to access the McGraw-Hill Connect lab activities. The McGraw-Hill Connect lab activities can be accessed through Canvas using the McGraw-Hill Connect link in the left menu of the Canvas course page, and instructions will be provided as part of the first week’s lab activities. Some lab activities are not affiliated with McGraw-Hill and cannot be linked through Canvas. Web links (URLs) will be provided for those exercises, including instructions for how to complete the exercises. Those links are provided in the lab schedule on the last page of the syllabus and will also be provided in Canvas. When taught in-person, there are 220 minutes of lecture each week (two 1 hour and 50-minute lab periods). You should anticipate having somewhere around **four hours each week** on lab introduction videos, reading lab PDFs (lab manual information), and performing lab activities, although some weeks may be a little more and some weeks may be a little less. The length of time spent watching lab videos and performing lab activities may be increased depending on how often you pause or rewind the videos or repeat lab activities.

Instructor: Dr. Matt Rogge

Office hours: T: 2:00-3:00 pm through Zoom

Office: CBB 345

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#### Course Description

This course is designed based on American Society for Microbiology’s “Recommended Curriculum Guidelines for Undergraduate Microbiology Education” (ASM, 2012). This ensures that all students in the course receive an education in topics consistent with microbiology curricula used nationwide. The Guidelines provide a framework of microbiological concepts that are central to a complete undergraduate microbiology education. These concepts include **evolution, cell structure and function, metabolic pathways, information flow and genetics, microbial systems, and the impacts of microorganisms**. Furthermore, development of scientific and reasoning skills and microbiological laboratory skills are recommended for an undergraduate microbiology course. These concepts and skills are aligned with those recommended for a general biology education. Although the course is not structured such that those topics are followed in sequence, the topics covered in the course are directly related to those overarching concepts.

#### What you should acquire from this class

*Students will understand that...*

- The microscopic world includes organisms from many taxonomic groups.
- Microbes are involved in complex environmental interactions that can be both beneficial and detrimental.

- The study of microbes requires careful observation and precise techniques.
- The study of microscopic organisms involves the analysis of physiological, morphological, and genetic traits.
- Cells, organelles, and all major metabolic pathways found in higher level species evolved from early prokaryotic cells.

## Learning outcomes

### Knowledge:

#### *Students will...*

- Distinguish features associated with prokaryotic and eukaryotic cells.
- Describe metabolic pathways used by microbes that allow them to live in diverse habitats, and how the metabolic activities contribute to a functional ecosystem.
- Recognize how microbial genetics affects physical traits of microbes and are used to classify and identify microbes.
- Recognize beneficial and detrimental interactions that microbes have with humans and other organisms in an environment.

### Skills:

#### *Students will...*

- Exhibit proper microbiological lab safety.
- Demonstrate the ability to use aseptic technique in the handling and culture of microbes.
- Execute commonly used laboratory practices for the culture and identification of microbes.
- Perform standard practices to analyze the growth of microbes and treatments, both physical and chemical, that inhibit microbial growth.
- Relate laboratory techniques with experimentation to better understand the biology of microorganisms and their impacts.

### Dispositions:

#### *Students will...*

- Identify the advantages and disadvantages of microbes to health and well-being of humans and other organisms.
- Recognize the ubiquitous occurrence of microbes in the environment and the necessary functions they perform in an ecosystem.
- Realize the effects of overuse and misuse antimicrobial agents and the potential negative impacts.

## The Online Lab Experience

An online microbiology course is not ideal, but no part of this COVID-19 pandemic is ideal. In-person labs were decided against because only 6-8 students would be allowed in the lab at a time, which would result in each student having only one hour of lab **per week** instead of the regular four hours of lab **per week** during a normal semester. Furthermore, some students may not feel comfortable attending a lab no matter what precautions are in place, and some may need to quarantine for extended times due to themselves or a family member contracting COVID-19. Finally, there is a chance of a COVID-19 outbreak on campus or in the Portage County community that may force all courses online at some point in the semester. Thus, in order to ensure that each student gets an equivalent experience and is evaluated (graded) equally, the decision to use online virtual lab activities was made. The virtual activities replicate many of the activities we use for in-person labs; however, the “hands-on” experience cannot be replicated, and that is an obvious disadvantage to virtual labs. A major advantage to the labs, however, is that you can perform each lab multiple times and see how results change when a technique is performed incorrectly. In-person labs only allow a “once and done” approach. While I recognize the lack of a “hands-on” approach is not optimal, I have been impressed by the detail contained in the virtual labs and their ability to replicate (as best as possible) the actual laboratory experience.

Feel free to give me feedback on your experience with the virtual labs, as I am considering them as an option for future microbiology courses as well as summer online courses.

### **Prerequisites**

This course has prerequisites of an **introductory biology course**, a **principles of genetics** course, and a **general chemistry** course. This class will build on many of the topics covered in those courses, and I expect that you come in **prepared** to build onto those ideas rather than having to cover that material again. You will be provided with chapters and sections in the textbook that should be used to **refresh** your memory of those concepts. Those review sections **are not** covered during lecture.

### **Required materials**

Textbook: Willey, et al. 2020. Prescott's Microbiology, 11<sup>th</sup> Edition. McGraw-Hill, New York, New York. Available from text rental.

Lab activity access: McGraw-Hill Connect subscription must be purchased from the UWSP Bookstore. The cost is \$37. Graded lab activities cannot be completed without this subscription.

### **Attendance**

The entire course can be done asynchronously, meaning there are no specific times or activities for which a student must be present.

Students are expected to complete all lecture and lab activities in preparation for quizzes, exams, and other graded activities by their due date and time. The lab activities and graded exercises have a window of time in which they are available so that student schedules can be accommodated. Because of this flexibility, due dates and times for assignments **will not** be extended without a legitimate and documented reason.

Makeups for missed assignments will only be allowed in the event of illness or emergency, which **requires documentation**. The professor reserves the right to change the format of any makeup assignments, including exams. If you are aware ahead of time of a conflict with a scheduled exam, a **conversation** (email or Zoom) with the instructor is required **at least a week in advance** of the activity to discuss the situation and reasons for missing the activity. **A makeup assignment is not guaranteed to be allowed.**

If you become ill or have another legitimate excuse for not completing a course activity, let me know as soon as you can.

### **Grading**

It is expected that every student performs each lab and graded activity **independently**. None of the activities are to be completed in groups of any size.

**TOTAL CLASS POINTS: 720**

### Course interaction

Students are required to participate in discussion activities throughout the semester. These discussions can be completed either in synchronous Zoom sessions or asynchronous Canvas forum discussions. Participation grades will be broken up into 2-week increments: Weeks 1/2, Weeks 3/4, Weeks 5/6, Weeks 7/8, Weeks 10/11, Weeks 12/13, and Weeks 14/15. There are no required participation activities for Week 16, which is the last week of classes.

- **Biweekly** Zoom sessions will be held on Thursday afternoon (2:00-3:00 pm) in Weeks 2, 4, 6, 8, 11, 13, and 15. The sessions will last about one hour and are student-driven, meaning that new material will not be presented during those sessions. These are intended for students to ask for clarification of the material covered in lab or lecture during that 2-week block, discuss relationships of that material to real-world events, or to have other relevant discussions. Students can earn up to 10 points for participation in each Zoom session. Each attending student must ask **at least one** unique question (5 points) and must be in

attendance for the entire session (5 points) to receive full credit. **To receive credit for attending the entire session, your webcam must remain on for the entire session.** Students are not required to answer questions from other students during a Zoom session.

- **Weekly** Canvas forum discussions will be set up. Students can receive up to 5 points **per week** through participation in the discussion forums. To receive these points, a student must author a forum post that asks a question about a topic covered in lab or lecture during that week (2.5 points). Students must also attempt to answer another student's question about the material (2.5 points) in that week to receive the full point value for the week. A maximum of 5 points can be earned per week. To get the full 10 points for a 2-week block, the student must ask and answer a question in both of the weekly forum discussions for that 2-week block. While most forum questions will be answered by students (hopefully!), all questions will be answered by the instructor after a 48-hour window has passed (in other words, I will let the question sit for at least 48 hours before responding). If any student has a question that needs to be answered sooner, that questions should be asked in an email, during an office hour, or during a Zoom session. **Questions and answers must be posted by the Monday of the following week** (for example, to get points for the Week 3 forum discussion, a question and an answer to another student's question must be posted in the Week 3 forum by the Monday of Week 4).
- To earn the full 10 points in any given 2-week block (for example, Week 1/2, Week 3/4, Week 5/6, etc.), you must complete the requirements for *either* the Zoom discussion *or* the forum discussions for that 2-week block.
  - If a student asks a question in both the Week 1 and Week 2 forums but does not answer another student's forum question in those forums, the student earns only 5 points for that 2-week period (5 of 10 points earned – 50%).
  - If that same student attends the Week 2 Zoom session but does not participate (does not ask a question). The 5 points for attending the Zoom session **will not** be added to the 5 points from the forum discussion questions. Although there are 5 points for Zoom participation and 5 points for each question asked in the discussion forums, the student only partially **completed** the activities and will only receive partial credit. If the student attends the Zoom session **and** asks a question, however, then that student will receive the full 10 points for that block (the Zoom discussion requirements are fulfilled).
  - Students can only receive the full 10 points in a 2-week block by **completing** one of the options for course interaction: 1) asking and answering questions in the forums for both weeks; or 2) attending and participating in the Zoom session in the second week of the 2-week block.
- It is not required that a student complete the same activity for every 2-week block. A student may earn the full 10 points for Weeks 1/2 by completing the forum discussion option and earn the full 10 points for weeks 3/4 by completing the Zoom discussion option. As long as the student completes one of the interaction activities during each 2-week block, the full 10 points will be awarded.
- The purpose of this requirement is to keep each student engaged throughout the semester. As such, a maximum of 10 points can be earned during any two-week interval. For example, completion of the Week 1 and Week 2 forum discussion is worth 10 points, but if a student also completes the Week 2 Zoom session (10 points), the student will receive a maximum of 10 points, not 20 points total (but GOOD JOB on being engaged!). Thus, when planning out how you want to participate in this requirement, you should view it in two-week intervals starting in Week 1.

Attendance at all (or as many as possible) Zoom sessions and participation in the Canvas forum discussions is encouraged. Engagement in discussion about the material is an important way to become more familiar with and better understand the material, in addition to recognizing how it applies to real-world situations.

**Course Interaction Total Point Value: 70 points**

#### Lab Activity Completion

Students are expected to read the **PDF documents** and watch the **introductory videos** associated with each lab activity (available in Canvas each week) in addition to completing the virtual lab activity. The documents and

videos are provided to give students the context (reasoning) for using the techniques to study microbes, to provide background on how/why the techniques work, and to supplement the information provided during the virtual lab activities. Lab activities will be utilized from various resources. The McGraw-Hill Connect Virtual Labs have integrated lab activities and quiz questions, and I can view the progress/completion of those activities for each student. The lab activities from other sources, however, do not have integrated quizzes or assignments to complete, and I will use Canvas quizzes to ask questions about those activities and their results. Completion of each lab activity and any associated exercises is worth 3 points per lab (6 points per week). To receive credit for completion of the lab, a student must **receive 80% or greater on the lab activities and associated post-lab quizzes**. Activities can be repeated until the minimum score is achieved. Failure to achieve 80% or greater for each activity by the end of the week (Friday at 11:59 pm) will result in students not receiving full credit for that lab. Completion and understanding of these labs, the techniques used in them, and the analysis of data generated in the exercises is necessary to be prepared for lab quizzes (see below).

**Lab Activity Total Point Value: 90 points**

#### Lab quizzes

There will be five lab quizzes worth a total of 180 points. Each of the first four quizzes is worth **30 points**, and the final quiz is worth **60 points**. The final quiz will be cumulative and include questions related to important microbiological lab techniques and calculations used throughout the semester. Labs from which the cumulative material is drawn are indicated by an asterisk in the lab schedule below (not all lab activities will be represented on the final quiz). Quizzes will cover information and techniques demonstrated and used during virtual lab activities or presented in the lab PDFs and lab introductory videos, as well as real-world application of the methods used in the exercises. The format of the quizzes will be any combination of multiple choice, short answer, matching, labeling, and fill in the blank. Lab quizzes **will rarely cover specific results** from lab activities (do not spend time studying/memorizing specific results – focus on how the results were measured, how they were interpreted, and why the results occurred the way they did). Most quiz question/problems will be related to the **application** of the techniques covered, e.g., how cultures are interpreted or why media or culture conditions support or inhibit the growth. In other words, focus on **why** the tests are done, **how** they work, and **what** they demonstrate. Techniques used to analyze results (calculations, graphing, etc.) may also be covered by lab quizzes. Lecture material will **not** be covered on lab quizzes. Lab quizzes will be provided through Canvas and will be open from Monday at 12:00 am to Wednesday at 11:59 pm during the week of the quiz. Once you begin the quiz, you will have **45 minutes** to complete each the first four quizzes and **75 min** to complete the final quiz). **You have one attempt on each lab quiz**. Failure to complete the quiz by 11:59pm on the due date will result in zero points, and **no makeups are allowed**.

**Lab Quizzes Total Point Value: 180 points**

#### Lecture quizzes

There will be four lecture quizzes worth a total of 80 points (20 points each). The first quiz will cover the information from the first couple weeks of class, and the remaining quizzes will cover the new material since the previous exam. These quizzes only cover lecture material, and the format will be any combination of multiple choice, true/false, matching, labeling, and fill in the blank. Lecture quizzes will be provided through Canvas and will be available to take for four days. Once you begin the quiz, you have **30 minutes** to complete the quiz. You may take the quiz as many times as you like during the four-day window, and your final score will be the **average of all attempts**.

**Lecture Quizzes Total Point Value: 80 points**

#### Lecture Exams

There will be four exams. The first three exams are 60 points each and cover the material since the previous exam. The final is worth 120 points, with 60 points covering the chapters covered since the third exam and 60 points covering **cumulative** material from the whole semester. The lecture exams will only cover material that was discussed in lecture. The format of the exams will be any combination of multiple choice, short answer, matching, labeling, and fill in the blank. Exams will be given in Canvas. The exam will be available at 12:00 am on the date of the exam and will be available until 11:59 pm on that same date. **You have one attempt to**

**complete each exam.** You have **75 minutes** to complete the semester exams and **150 minutes** to complete the final. Failure to complete the exam by 11:59 pm on the scheduled date will result in zero points, and **no makeups are allowed.**

**Lecture Exams Total Point Value: 300 points**

### **Canvas Quiz and Exam Settings**

Because of the online nature of this course, I have limited ability to monitor academic integrity to ensure quizzes and exam are being taken by each student independently. Furthermore, my assumption is that students will use notes, the book, the internet, etc. while taking the quizzes and exams. As such, the quizzes and exams will be structured in a way that limits the usefulness of resources other than a student's personal knowledge of the material. In other words, you will have to know and understand the material, not rely on your notes and internet skills to answer the questions for you. This means each student must thoroughly study (and restudy) the material and ask questions about the material **BEFORE** exams and quizzes to ensure success on the exams and quizzes. In other words, do not assume that you will be able to look up the answer to most questions to get a good grade. Also note that **copying and pasting** information from internet sources is **PLAGIARISM** and will not be tolerated. The following Canvas settings will be used:

- **Randomized questions:** Lab quizzes and lecture exam questions will be generated from a random set of questions, and individual students will not have the same questions as other students (the difficulty of different questions will be comparable). Possible answers for multiple choice, matching, etc. will also be given in a randomized order.
- **Time limits:** Lab quizzes, lecture quizzes, and lecture exams will have **strict time limits** for completion. Relying too heavily on looking up answers will take extra time and jeopardize your ability to complete all questions on these exercises. If you have a documented reason for needing more time on graded exercises, you can request extended testing times through the UWSP Disability and Assistive Technology Center (DATC; <https://www.uwsp.edu/datc/Pages/default.aspx>). Makeup assignments, extra credit, or bonus points **will not** be given if you run out of time on a quiz or exam.
- **One question at a time:** Lab quizzes, lecture quizzes, and lecture exams will be set up “one question at a time,” but you will be allowed to go back to previous questions if needed. Realize, however, that moving back and forth through the exam takes extra time.
- **Due dates/times:** Quizzes and exams are open for a period of time and have a definitive due date. If you have 75 minutes to complete an exam but start the exam 30 minutes before the time it is due, you will not have the full 75 minutes to complete the exam; you will only have 30 minutes. Once the submission time is reached, Canvas will automatically submit your quiz/exam even if you have not completed it, and you will not have an opportunity to retake that quiz/exam or earn back any points missed. Thus, make sure you start the quiz/exam early enough to give yourself time to complete it before it is due.

If you feel these restrictions on lab and lecture quizzes/exams will negatively impact your success in this course, be sure to fully complete the lab activity and course interaction components on time. Completion of those activities and receiving those points will help to balance any quiz or exam grades that are below your expectations. Furthermore, diligence in completing the lecture quizzes (you have four days to complete them and as many opportunities to take them as you would like) will also help to offset lab quiz and lecture exam grades that are below your expectations.

### **Late Assignments**

Participation assignments are due at 11:59 pm (before midnight) on the due date. Submitting anything after midnight will be assessed a 10% deduction with an additional 10% deducted for each additional day late. Access to McGraw-Hill Connect activities and quizzes closes each week on Friday at 11:59 pm, so there will be no opportunity to complete those activities late without reopening the assignments. Quizzes and exams will be automatically submitted at 11:59 pm on the due date, so there will not be an opportunity to turn those assignments in late.

## Final Grade Calculations

Grades will be calculated by dividing the total points received by the total points possible and multiplied by 100 (a simple percentage). The following scale will be used to assign a final letter grade based on your percentage.

93 to 100%	A	80 to 82%	B-	67 to 69%	D+
90 to 92%	A-	77 to 79%	C+	60 to 66%	D
87 to 89%	B+	73 to 76%	C	<60%	F
83 to 86%	B	70 to 72%	C-		

Grades are assigned based on how well you perform on the graded exercises. I do not “adjust” a grade because you need it to get into med school, graduate school, or stay in your current program of study. **Note that some programs will not accept a C- as a passing grade.** If you want an A in the course, you will need to exhibit **excellence** in every aspect of the course, including both lab and lecture activities. Average performance will result in an average grade (usually C to B-). Achieving only *minimum* expectations is **not** exhibiting excellence and will result in an average grade.

**ROUNDING:** Percentages with a decimal value of 0.50 or higher will be rounded **up** to the next whole percentage (e.g., 89.50% → 90%). Percentages with a decimal value less than 0.50 will be rounded **down** to the next whole percentage (e.g., 89.499% → 89%). **NO EXCEPTIONS.**

## Future Letters of Recommendation and References

In the future, you may need a former professor to write a letter of recommendation or be a reference for your employment application, application for graduate school, awards and scholarships, or other future endeavors. If you decide that you want to ask me to be a reference for you, you need to consider what you have provided for me to write or talk about. Were you an average, above average, or excellent student? Were you engaged in class and excited about the material? Do I only know you based on a grade you received, or am I familiar with you outside of class and your goals for your life and career? Have you separated yourself from other students I have had in terms of interest, motivation, or academic success? **In other words, what am I going to be able to say about you to convince someone else that you are better than other applicants?** Furthermore, have you exhibited any negative characteristics that I might mention in my letter? The information I give reflects my *entire* impression of you based on what I have observed, and I will not give false or misleading information. Serving as a reference in no way guarantees that the reference will be a *positive* one. You need to consider these things for *any* person you hope to be a reference.

If you do ask me to be a reference or write a letter, I require the request to be in writing and an in-person meeting scheduled to discuss the position(s) for which you are applying. Before I give a recommendation, I require a current CV and/or transcript, copies of or links to forms I need to fill out, and all necessary contact information (names, addresses, phone numbers) required for me to submit the recommendation. Finally, I require these materials be delivered a minimum of **two weeks** before a recommendation is due. More time is greatly appreciated. If any of these criteria are not met, I will not have time, nor will I be well enough informed to write a letter.

## Graduate credit

Students taking the course for graduate credit will be assigned additional work and should discuss this work with the instructor as soon as possible.

## Academic Expectations

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, we have developed a set of expectations for all students and instructors. This set of expectations is known as the *Rights and Responsibilities* document, and it is intended to help establish a positive living and learning environment at UWSP.

Academic integrity is central to the mission of higher education in general and UWSP in particular. Academic dishonesty (cheating, plagiarism, etc.) is taken very seriously. **Don't do it!** For more information, see the UWSP "Student Academic Standards and Disciplinary Procedures" section of the *Rights and Responsibilities* document, Chapter 14.

### Access for all Students

The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities.

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me **AT THE BEGINNING OF THE COURSE**. I am happy to help in any way that I can, but you need to be registered. For more information, please visit the Disability and Assistive Technology Center, located on the 6th floor of the Learning Resource Center.

### How to be successful in this class

- **Complete** all activities, pay attention, and be an **active** learner.
- Develop good note-taking skills. Do not try to write down everything that is said or that appears on the PowerPoint slides. Sort through the information and make note of the **important ideas and concepts** being discussed. Reading and processing the information is the first step in learning the information.
- Learn to take notes with abbreviations so that you can spend enough time listening in addition to writing. Leave space in your notes so that you can go back and fill in more details later.
- Be **engaged** in the class. Write information in *your own words*. Ask questions when you are unable to explain something completely.
- Do not study *for exams*. Studying that way promotes memorization, not understanding. Instead, **study for learning and understanding**, and do it often. You need to develop critical thinking skills to succeed in a science-based course and career. No boss is going to walk into your workspace and ask you to define a list of terms. They will expect you to **understand and apply** the information, not define it.
- Training your mind (studying and learning) is like training your body (sports, musical instruments, gaming, etc). The more you practice, the better you get. Practice (study) **early and often**.
- Begin studying for exams **at least two weeks** before the exam.
- Begin studying your notes in terms of "**big picture**" ideas. Find the bigger concepts and make sure you have a basic understanding of those ideas. Once those bigger concepts are understood, add additional details relating to those ideas. By doing this, you construct "compartments" in your mind to store the details rather than simply trying to absorb all the details and hoping that they arrange themselves into a coherent idea. Ultimately, the difference between an A, B, or C is the **level of detail** that you know, but you should begin by focusing on the bigger picture.
- Study frequently. **Repetition** is the key to learning any topic. Studying for 40 hours over the span of two weeks will be much more beneficial than studying for 40 hours the weekend before the exam. Learn to study **efficiently**.
- Do not try to memorize definitions. You will need to know what words mean to understand and answer questions, but I will never ask you to define a word.
- When you do not understand something, **LOOK IN THE TEXTBOOK!** The book can give more detailed explanations and images that may help you better understand the material. Alternatively, use the internet and watch the supplemental videos provided in Canvas. You have a wealth of information at your fingertips, use it!
- When your notes do not make sense and the book does not help, schedule an appointment with me. I am here to help you learn. I do not expect you to be a microbiologist *before* taking the class. I understand that much of this material is new to you and everyone else, and one or two lectures on a topic is not enough for you to fully grasp the concepts. Do not be too stubborn or independent to ask for help or you will risk falling behind.
- After you have studied and know some or most of the material, interact with other students in the class and actively **discuss** the information. **Explain mechanisms, theories, concepts**, etc. to other students. The other



students can help you fill in areas where you are deficient. You will find that explaining these things to someone else is one of the best ways to ensure you **know** and **understand** the information. Then have another student explain a different idea or concept and help them identify areas in which they are deficient.

- The level of detail that you will be required to know is the **level of detail that I cover in lectures**. The book has much more detailed information, which may help you better understand the material I cover, but I will not ask about the details I do not cover.
- **Pay attention to the details**. That does not mean to study and know every single detail covered, but when you are answering questions, use **appropriate** terms. Describe things **accurately**. The more **clearly** and **accurately** you describe things and answer questions, the more confident I am that you know and understand the material. In other words, you will get **better grades** by having better **attention to detail**.
- When answering short-answer questions on exams, be sure you answer them **clearly** and **completely**. You should not expect me to interpret vague answers in your favor (because I will not). Your ability to explain something clearly is related to your knowledge of the subject. If your answers are not clear or direct, my interpretation is that you do not understand that topic very well.
- If I ask you to **explain** or **describe** something, the answer should not be a one or two-word answer. A good explanation will incorporate answers to the following questions:
  - “**What** is happening?”
  - “**Why** is it happening?”
  - “**How** it is happening?”
- Watch the following YouTube videos. The first is 1hr lecture by a psychology professor discussing how to study. The second is a 6 minute summary of the first video.
  - <https://www.youtube.com/watch?v=IIU-zDU6aQ0>
  - <https://www.youtube.com/watch?v=23Xqu0jXlfs>

## TENTATIVE LECTURE SCHEDULE

Week	Date	Topic	Chapter(s)
1	Jan 25-29	Introduction to Microbiology Introduction to Microbiology	1 1
2	Feb 1-5	Cellular Structure of Bacteria Cellular Structure of Bacteria/Archaea	3 3/4
3	Feb 8-12	<b>Lecture Quiz 1</b> (Chapters 1-4) Virus and Prion Structure and Replication Virus and Prion Structure and Replication	6 6
4	Feb 15-19	Bacterial Nutrition and Growth <b>EXAM 1</b> (Chapters 1-6) on Feb 18	7
5	Feb 22-26	Antimicrobial Therapy and Resistance Antimicrobial Therapy and Resistance	9 9
6	Mar 1-5	<b>Lecture Quiz 2</b> (Chapters 7-9) Available Mar 1-4 Bacterial Catabolism Bacterial Catabolism	11 11
7	Mar 8-12	Bacterial Anabolism Bacterial Genetics	12 13
8	Mar 15-19	<b>EXAM 2</b> (Chapters 7-12) on Mar 16 Bacterial Genetics: Regulation of Expression	14
9	Mar 22-26	<b>SPRING BREAK – NO NEW MATERIAL</b>	
10	Mar 29-Apr 2	Bacterial Genetics: Regulation of Expression Bacterial Genetics: Mechanisms of Genetic Variation	14 16
11	Apr 5-9	<b>Lecture Quiz 3</b> (Chapters 13-14) Available Apr 5-8 Bacterial Genetics: Mechanisms of Genetic Variation Microbial Taxonomy and Evolution	16 18
12	Apr 12-16	Bacterial Diversity and Evolution Viral Diversity	19 26
13	Apr 19-23	<b>EXAM 3</b> (Chapters 13-19) Apr 20 Viral Diversity	26
14	Apr 26-30	Microbial Interactions Microbial Ecology	27 Portions of 28, 29, 30, 31
15	May 3-7	<b>Lecture Quiz 4</b> (Chapters 26-27) Available May 3-6 Microbial Ecology The Human-Microbe Ecosystem	Portions of 28, 29, 30, 31 34
16	May 10-14	The Human-Microbe Ecosystem Infection and Pathogenicity	34 35
17	May 17-21	<b>FINAL EXAM</b>	

### TENTATIVE LAB SCHEDULE

Week	Date	Topic	Source
1	Jan 25-29	Virtual Labs Tutorial	McGraw-Hill Connect
		Laboratory Safety and Handwashing*	McGraw-Hill Connect
2	Feb 1-5	The Scientific Method	McGraw-Hill Connect
		Metric Measurements	McGraw-Hill Connect
3	Feb 8-12	Aseptic Technique*	McGraw-Hill Connect
		Microscopy	McGraw-Hill Connect
4	Feb 15-19	<b>Lab Quiz 1 for Weeks 1-3 due Feb 17</b>	
		Introduction to Staining*	McGraw-Hill Connect
		Additional Stains*	McGraw-Hill Connect
5	Feb 22-26	Enzyme Labs	McGraw-Hill Connect
		Cellular Respiration and Fermentation	McGraw-Hill Connect
6	Mar 1-5	Microbial Growth*	McGraw-Hill Connect
		Microbial Growth*	McGraw-Hill Connect
7	Mar 8-12	<b>Lab Quiz 2 for Weeks 4-6 due Mar 10</b>	
		Control of Microbial Growth*	McGraw-Hill Connect
		Antibiotic Resistance	McGraw-Hill Connect
8	Mar 15-19	Isolation Methods*	McGraw-Hill Connect
		Isolation Methods*	McGraw-Hill Connect
9	Mar 22-26	<b>SPRING BREAK – NO LABS</b>	
10	Mar 29-Apr 2	Food Microbiology Testing and Water Activity Lab ( <a href="https://virtuallabs.nmsu.edu/stain.php">https://virtuallabs.nmsu.edu/stain.php</a> , <a href="https://virtuallabs.nmsu.edu/equip.php">https://virtuallabs.nmsu.edu/equip.php</a> , Culture Media* ( <a href="http://learn.chm.msu.edu/vibl/content/differential/index.html">http://learn.chm.msu.edu/vibl/content/differential/index.html</a> ))*	New Mexico State University  Michigan State University
11	Apr 5-9	<b>Lab Quiz 3 for Weeks 7-10 due Apr 7</b>	
		Unknown Bacterium Identification – Gram-Positive Cocci*	McGraw-Hill Connect
		Unknown Bacterium Identification – Gram Negative Bacilli*	McGraw-Hill Connect
12	Apr 12-16	PhET Lac Interactive ( <a href="https://phet.colorado.edu/en/simulation/legacy/gene-machine-lac-operon">https://phet.colorado.edu/en/simulation/legacy/gene-machine-lac-operon</a> )	UC-Boulder
		Virus Explorer ( <a href="https://media.hhmi.org/biointeractive/click/virus-explorer/">https://media.hhmi.org/biointeractive/click/virus-explorer/</a> )	HHMI Biointeractive
13	Apr 19-23	DNA Analysis*	McGraw-Hill Connect
		Bacterial Genetics part 1*	McGraw-Hill Connect
14	Apr 26-30	<b>Lab Quiz 4 for Weeks 11-13 due Apr 28</b>	
		Bacterial Genetics part 2	McGraw-Hill Connect
		Bacterial Genetic Identification Lab ( <a href="https://www.biointeractive.org/classroom-resources/bacterial-identification-virtual-lab">https://www.biointeractive.org/classroom-resources/bacterial-identification-virtual-lab</a> )	HHMI Biointeractive
15	May 3-7	Winogradsky Column ( <a href="https://www.biointeractive.org/classroom-resources/winogradsky-column-microbial-ecology-bottle">https://www.biointeractive.org/classroom-resources/winogradsky-column-microbial-ecology-bottle</a> )	HHMI Biointeractive
		Solve the Outbreak ( <a href="https://www.cdc.gov/mobile/applications/sto/web-app.html">https://www.cdc.gov/mobile/applications/sto/web-app.html</a> ) Introduction	CDC
16	May 10-14	Solve the Outbreak ( <a href="https://www.cdc.gov/mobile/applications/sto/web-app.html">https://www.cdc.gov/mobile/applications/sto/web-app.html</a> ) continued	CDC
		<b>Lab Quiz 5 for Weeks 14-16 and Cumulative Information due May 12</b>	

Labs with an asterisk (\*) indicate labs that contain material that may be included on the **cumulative portion of the final lab quiz**.