General Microbiology
BIOL 310
Spring 2023
Course Syllabus
TR 10:50-12:05 RITA 154

Professor: Matthew E. Rhodes, Ph.D
Email: rhodesme@cofc.edu
Office: 119 RITA
Office Hours: T 1:00-2:30, W 11:00-12:00 and by appointment
I will do my best to respond to all e-mails within one business day.
Feel free to come by outside office hours. If my door is open come on in. If it is closed feel free to knock.

Required Texts and Materials:
Lecture: Prescott’s Microbiology, 12th Edition
Joanne M. Willey, Linda M. Sherwood, Christopher J. Woolverton,
Copyright year: 2022
McGraw Hill Publishing
Bound, binder, ebook

Connect: Prescott’s Microbiology, 12th Edition
McGraw Hill Publishing provides a smart learn ebook and access to connect. Assignments posted through connect will be mandatory and will compile a percentage of student’s grade for the course.
For help with registration or technical assistance contact 1-800-331-5094 or visit www.mhhe.com/support
See last page for details on how to get Connect

Online registration instructions:
Either go through the link on OAKS.

Or

Go to the following web address and click the “register now” button.
https://connect.mheducation.com/class/m-rhodes-spring_2023

Teaching/Class Philosophy:
Let’s start by what this class is. This class is a general intro to microbiology. We will attempt to cover a broad variety of topics that fall under the realm of microbiology. However, seeing as it is impossible to cover all relevant topics we will be forced to pick and choose. We will spend comparatively little time on topics that should be covered in other classes (Ex- Eukaryotes) and more of our time on Bacteria and Archaea. We will be paying particular attention to differences between the three domains. Viruses
fall somewhere in the middle, but given the current state of the world we may be spending more time on viruses than usual. We will spend one class period devoted entirely to SARS-CoV-2. The textbook is not perfect. No textbook is perfect, but it is the best that I can find. We will be omitting chapters and sections of the textbook and in turn replacing them with supplemental readings (see below). These readings are intended to represent relatively recent and fascinating developments in microbiology. But what I find interesting and what you find interesting may be different. If there is a topic you want to explore and have a suggested reading, please pass it along. If I am not able to include it this semester, I may use it in the future. Some of the readings this year were passed along by previous students. And yes these readings will be on the test. In a similar vein, if there are topics related to SARS-CoV-2 that you would like to be discussed, please pass them along as well.

Now a brief note on what this class is not. Some of you may be disappointed to hear that it is not a medical microbiology course. It is not an applied microbiology course. It is not an environmental microbiology course. We will not be focusing on any one aspect of microbiology. However, with the recent revelations of the importance of the human microbiome the distinctions between medical microbiology and environmental microbiology are starting to break down. To be a good doctor, nurse, dentist, etc. it is important to appreciate the human body and organs in their entirety. For too long in modern medicine microbes have been treated solely as the enemy and we are only now realizing the disservice this might have done to our health.

**General Course Information:**

This course begins by examining the history of microbiology, the shapes, sizes, and structure of microorganisms so you become familiar with the world of microbiology. We will then look at microbial growth and how the growth of microbes can be controlled, followed by the means by which microbes obtain energy (physiology), and the flow of information within a microbial cell. Following this understanding of how the microbial cell functions, we will examine the viruses and how these interact with both microbial and animal cells. We end the semester with an introduction to the interactions between microbes and humans, the response of our immune system, and we will examine certain microorganisms and their role in disease.

**Student Learning Outcomes:** The goal of this course is to demonstrate how microbes have shaped the world and continue to shape the world. Starting all the way back at the origin of life we will investigate the impact that microbial life has had on the evolution of life eventually ending with the effects of microbial life on the human body. To better appreciate how this occurs we will need to understand microbial physiology, metabolisms, and genetics. Upon completion of this course the student should be able to:

1. Discuss the historical development of the field of microbiology.
2. Identify the components of the microbial world with special references to the bacteria.
3. Compare the sizes, shapes, and physical makeup of the bacteria, archaea and viruses.
4. Discuss different theories surrounding the origin of life.
5. Evaluate the role of microorganisms in disease and the prevention and treatment of infectious disease.
6. Describe the varied nutritional types of bacteria at the elementary level.
7. Clarify the fundamentals of the molecular genetics of bacteria.
8. Discuss the principles of molecular biology including DNA structure, DNA replication, transcription, and translation as they pertain to microorganisms.
9. Explain the regulation of gene expression including enzyme activity, induction, repression, DNA binding proteins, and attenuation.
10. Clarify the molecular basis of mutation, genetic recombination, transformation, transduction and conjugation.
11. Evaluate the role that microbes play in regulating human health.
12. Understand how microbes interact with their environments.
13. And others...

**Grade Composition:**

**Lecture (Total 75%):**
- Exams: (3x 100) 300pts or 50% (16.7% each)
- Final Exam 150 pts or 25%
- In-Class/At home Assignments 80pts or 13.3%
- Connect (online) Assignments 40pts or 6.7%
- Participation/Attendance 30pts or 5%

**Lab (25%)**

**Exams**
Three in-class (1.25-hour) exams will be given on scheduled dates. The exams will consist of a variety of fill-in-the-blank, drawings, or short answer questions, with minimal or no multiple choice questions. The exam material will primarily focus on the material covered since the preceding exam, but applicative questions of cumulative material may appear.
Make-up exams are purely at the discretion of the professor and are reserved for extreme circumstances only. There is no obligation of the professor to provide make-up exam opportunities. Contact your professor as soon as possible if you think you will or if you have missed an exam. No make-ups will be administered after a 48-hour period. See other attendance policies.

**Final Exam**
A single final exam will be comprehensive and will count for roughly 25% of the lecture grade. The final exam grade can NOT be dropped and make-up exam opportunities will be allowed only for extremely unusual circumstances.

**Connect Assignments**
For each chapter of Prescott’s microbiology a connect assignment will be posted. Each assignment should be completed through **connect by 10:30AM prior** to the lecture during which that chapter will be discussed. This is to assure that you have read the material and are prepared for class. Personally, I wish this had been around when I was a student. There will be a 10 point scale on connect assignments so a 90% will be considered a perfect score.
Reading assignments will not cover the entire book chapter. You are encouraged to read the entire chapters but exam material will not be taken from material that is not covered in lecture.

**Supplemental Readings:** A variety of supplemental readings will be posted on OAKs for roughly 1/3 to 2/3 of classes. These readings will vary in length and complexity. They range from newspaper articles to primary literature to podcasts. They will be pivotal for in class assignments, discussion boards, homeworks, and content from the readings will appear on exams. The goal of the supplemental readings (SRs) is to expose you to recent and/or particularly fascinating (in my opinion) discoveries and controversies in microbiology. Should something pique your interest and you would like to delve into it further please reach out.
In Class Assignments/Homeworks
Throughout the semester there will be semi-regular in class assignments/homeworks based on classwork and supplemental readings. Sometimes you will be working in small groups and sometimes individually. Sometime these will be turned in at the end of the class period, sometimes they will be started in class and finished at home, and sometimes solely at home. They will be graded rather leniently. With demonstrated effort, I expect pretty much everybody to get 10’s/9’s on these assignments. I apologize in advance but there are simply too many students for detailed comments on each turned in assignment. Your lowest 1 ICA/HW will be dropped from your grade. Late assignments will be graded for 50% credit up to two weeks after the due date.

Participation/Attendance
Your participation/attendance grade will consist of discussion board posts on supplemental readings, intermittent poll everywhere questions, and occasional attendance tracking. Asking questions in class, answering questions in class, and overall contributions to the classroom environment can serve to boost your Participation/Attendance grade especially if it is lacking in other ways.
Missed in class assignments, poll everywhere questions, and late assignments in general will only be accepted for excused absences. Accommodations for missed exams will only be provided for rare extenuating circumstances.
This is an in person class and that will remain the focus. If you are ill or have another legitimate reason you can request access to a live zoom streaming of the class. You will not be marked absent if attending via zoom and can submit any assignments. However, again the learning experience will be optimized for those present and you can only attend via zoom with prior arrangement.
You may have up to 2 unexcused absences. With the coronavirus still running rampant, every effort will be made to accommodate excused absences, however an excess of excused absences may necessitate an incomplete.

Lab Grade
A quarter of your grade will be based on the lab component of the course. A more detailed explanation of the lab portion of the class will be provided in individual lab sections.

Extra-Credit
Extra-credit opportunities are of the sole discretion of the professor; there is no obligation of the professor to provide extra-credit opportunities. IF an extra-credit opportunity is provided it will be provided to the entire student body of all of the professor’s sections of the class. There will be NO personal extra-credit assignments. These potential extra-credit assignments will be announced in class and are not presented in the syllabus’ grade computation.

Syllabus/Schedule Modifications
This syllabus/schedule most likely will change due to hurricanes etc. as the semester progresses depending on the learning environment. I will do my best to adhere to the syllabus as written, but changes will be at my discretion and I will announce any changes both during class and through OAKS. Make sure you stay up to date on any modifications. You should also notice a flex day built-in to the schedule. I anticipate that we will move slightly slower through material than on the syllabus and I will adjust the schedule accordingly. I will make every effort to keep exams on the scheduled dates.

Letter Grade Schedule

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Numerical Range (%)</th>
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### Tentative Lecture and Exam Schedule

<table>
<thead>
<tr>
<th>Lecture #</th>
<th>Date</th>
<th>Topic</th>
<th>Assigned readings (read before class!)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>01/12</td>
<td>Course Policies/Procedures. Origin of life</td>
<td></td>
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<tr>
<td>2</td>
<td>01/17</td>
<td>The history of microbiology and Microscopy</td>
<td>Chapters 1.1-1.3 and Chapter 2</td>
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<tr>
<td>3</td>
<td>01/19</td>
<td>Review of Biochemistry and Bacterial Cell Culture</td>
<td>Appendix 1 and Chapter 3: 3.1-3.4</td>
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<tr>
<td>4</td>
<td>01/24</td>
<td>Bacterial Cell Structure Cont.</td>
<td>Chapter 3: 3.5-3.9</td>
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<tr>
<td>5</td>
<td>01/26</td>
<td>Archaeal Cell Structure</td>
<td>Chapter 4</td>
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<tr>
<td>6</td>
<td>01/31</td>
<td>Eukaryotic Cell Structure</td>
<td>Chapter 5</td>
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<tr>
<td>7</td>
<td>02/02</td>
<td>Catch Up Day 1</td>
<td></td>
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<tr>
<td>8</td>
<td>02/07</td>
<td>Taxonomy</td>
<td>Chapter 26</td>
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<tr>
<td>9</td>
<td>02/09</td>
<td>Exam 1</td>
<td></td>
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<tr>
<td>10</td>
<td>02/14</td>
<td>Microbial Growth</td>
<td>Chapter 7.1 – 7.8</td>
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<tr>
<td>11</td>
<td>02/16</td>
<td>Metabolism</td>
<td>Chapter 10</td>
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<tr>
<td>12</td>
<td>02/21</td>
<td>Catabolism</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>13</td>
<td>02/23</td>
<td>Viruses</td>
<td>Chapter 6, Chapter 27.1 (Skim the rest of chapter 27)</td>
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<tr>
<td>14</td>
<td>02/28</td>
<td>Bacterial Genome Replication</td>
<td>Chapter 13</td>
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<tr>
<td>15</td>
<td>03/02</td>
<td>Regulation of Bacterial Cellular Processes</td>
<td>Chapter 14</td>
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<tr>
<td>16</td>
<td>03/14</td>
<td>Biogeochemical Cycling</td>
<td>Chapter 28</td>
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<tr>
<td>17</td>
<td>03/16</td>
<td>Exam 2</td>
<td></td>
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<tr>
<td>18</td>
<td>03/21</td>
<td>Control of Microorganisms in the Environment</td>
<td>Chapter 8</td>
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<tr>
<td>19</td>
<td>03/23</td>
<td>Antimicrobial Chemotherapy</td>
<td>Chapter 9</td>
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<tr>
<td>20</td>
<td>03/28</td>
<td>Mechanisms of Genetic Variation</td>
<td>Chapter 16</td>
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<tr>
<td>21</td>
<td>03/30</td>
<td>Microbial Interactions</td>
<td>Chapter 27</td>
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<tr>
<td>22</td>
<td>04/04</td>
<td>Pathogenicity and Infection</td>
<td>Chapter 34</td>
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<tr>
<td>23</td>
<td>04/06</td>
<td>Catch Up Day</td>
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<tr>
<td>24</td>
<td>04/11</td>
<td>The Human Microbiome</td>
<td>Chapter 33</td>
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<td>25</td>
<td>04/13</td>
<td>Exam 3</td>
<td></td>
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<tr>
<td>26</td>
<td>04/18</td>
<td>Immunity</td>
<td>Selected Sections in 31-32</td>
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<tr>
<td>27</td>
<td>04/20</td>
<td>Human Diseases</td>
<td>Selected Sections in 37-39</td>
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<tr>
<td>28</td>
<td>04/25</td>
<td>COVID Lecture</td>
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<tr>
<td></td>
<td>TBD</td>
<td>Final Exam</td>
<td>Cumulative</td>
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PREREQUISITES
For this course prerequisites are BIOL 111, 111L, 112, 112L and 211 and One Year of Chemistry. "One Year of Chemistry" means you must have already completed, with passing grades, CHEM 101-101L-102-102L or CHEM 111-111L-112-112L, or the equivalent. For transfer students, the course must have transferred to the CoFC as equivalent to the above. Biology also requires MATH 250 Statistics as a prerequisite to all of its upper-level classes.

This course will cover a lot of material and move relatively quickly. It is expected that you are well versed with all material covered in prerequisite classes. This is especially true for students who might have taken the prerequisites a while ago or who have gotten waivers to enroll without the prerequisites. It is your responsibility to ensure that you are up to speed on the necessary background material. If you need any assistance with topics that you are unfamiliar with, I would be happy to provide you with resources.

ATTENDANCE
As of now the expectation is that this will be fully in person. If you are feeling ill or are meant to be quarantined, **do not attend class!!!**

An excessive number of unexcused absences from lecture (excessive = more than 2 in lecture) or from lab (one = excessive in lab) constitutes grounds for dismissal from class. If you will be absent on official college business (e.g. athletic events, professional conference), please provide documentation in advance. Excessive excused absences especially in lab will necessitate withdrawal from the class or in rare cases, an incomplete. I of course recognize that circumstances this semester may be difficult and whether you can stay in the class is dependent on whether I deem it possible for you to make up the missed work. Depending on class circumstances resources for excused absences may include (1) zoom attendance with permission of the instructor (2) Recorded powerpoints (3) Powerpoint slides (4) Notes from a peer. Please make every effort to be on time. Electronic devices such as cell phones and smart pads may only be used for educational purposes.

**IF you have a DISABILITY** The Center for Disability Services/SNAP is committed to assisting qualified students with disabilities achieve their academic goals by providing reasonable academic accommodations under appropriate circumstances. If you have a disability and anticipate the need for an accommodation in order to participate in this class, please connect with the Center for Disability Services/SNAP. They will assist you in getting the resources you may need to participate fully in this class. You can contact the Center for Disability Services/SNAP office at 843.953.1431 or at snap@cofc.edu. You can find additional information and request academic accommodations at the Center for Disability Services/SNAP website.

The **deadline for WITHDRAWAL** from the course with a grade of "W" is **Friday, March 24th, 2023**. In accordance with College regulations, withdrawal from the course after that date will be permitted only under dire and unpredictable circumstances, such as sudden serious illness and is largely out of my hands (see "Withdrawal from Courses" in the Undergraduate Catalog).

All students are expected to be very familiar with and to adhere to **THE HONOR SYSTEM OF THE COLLEGE OF CHARLESTON**. In this class, removal of a test or copies of test questions from the classroom is a violation of the Honor Code. Anyone who shares contents of tests from prior semesters with someone in the class or anyone who uses this material for study for a test is also in violation of the Honor Code. Material from other sources must be properly attributed. Work **claimed as your own** (e.g. for mini-projects, posters, unknown report) **must** be your own work. Plagiarism is unacceptable.
Tests & other assignments will usually be reviewed in class. Tests must be returned & will be kept on file by
the instructor. If you are absent, it is your responsibility to examine your test during office hours or to
arrange an appointment. There will be blocks of scheduled times for you to review your old tests prior to
the final exam.

I. College of Charleston Honor Code and Academic Integrity

As members of the College of Charleston community, we affirm, embrace and hold ourselves accountable to
the core values of integrity, academic excellence, liberal arts education, respect for the individual student,
diversity, equity and inclusion, student centeredness, innovation and public mission. Congruent with these
core values, the College of Charleston expects that every student and community member has a responsibility
to uphold the standards of the honor code, as outlined in the Student Handbook. In pursuit of academic
learning, you are expected to reference the work of other scholars, and complete your own academic work,
while utilizing appropriate resources for assistance. Any acts of suspected academic dishonesty will be
reported to the Office of the Dean of Students and addressed through the conduct process. Your adherence to
these practices and expectations plays a vital role in fostering a campus culture that balances trust and the
pursuit of knowledge while producing a strong foundation of academic excellence at the College of Charleston.
Any questions regarding these expectations can be clarified by your instructor.

Advice From Previous Students Who Have Taken This Course:

- Study, come to class, take notes and ASK QUESTIONS
- Print off the slides and study material and you will be fine
- Stay on top of the notes/lectures. Don’t get behind. A LOT of info.
- Come to class. The powerpoints are great for refreshing but aren’t good enough.
- Pay attention to slides and the amount of time spent on one topic, its likely important.
- Focus on Slides!
- Study every night
- Don’t take 17 credit hours like me. Be sure you have plenty of time to devote.
- Be ready to learn and have fun
- Need to study a lot
- Review each lecture slide in depth and use the book only as a resource to supplement. Reading
  relevant figures/legends was helpful.
- Read chapters before class and stay on your game!
- Study your ass off!
- Take good notes of the slides even though they are online. Listen to repeated subject matter.
- Read and reread not just on the exam week.
- Make sure to add notes from class to powerpoints.
- Concentrate on big ideas
- You get out of the class what you put into it
- To continually review notes
- NEVER miss lecture!
• Keep up on studying notes and pay attention to all tables
• Don’t skip class. Print off the slides before class to bring in
• Go to class!! Focus on powerpoints.