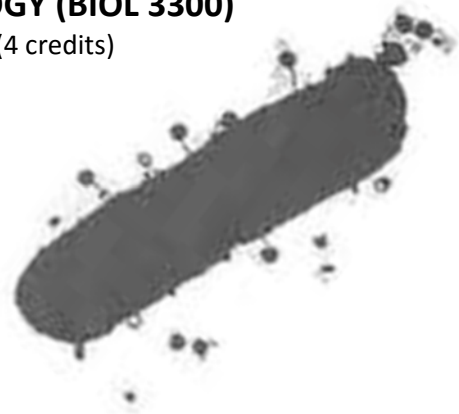


## SYLLABUS for GENERAL MICROBIOLOGY (BIOL 3300)

Vernal only / T & Th / 1:00 – 4:15 pm (4 credits)

### INSTRUCTOR CONTACT INFORMATION

Lianna Etchberger, Ph.D.  
USU Uintah Basin Regional Campus, B221E  
(435) 722-1783  
[lianna.etchberger@usu.edu](mailto:lianna.etchberger@usu.edu)



### INSTRUCTOR'S OFFICE HOURS                      Wednesdays & Thursdays, 12:00 – 1:00 pm

I am available any time I'm in my office, or we can meet by appointment in person or virtually via Interactive Video Conference (IVC) in Canvas. The best way to contact me is by **email**, or **voicemail** message. I will respond as soon as possible.

### MEETING TIMES- VERNAL ONLY                      Tuesdays and Thursdays, 1:00 – 4:15, B122

Most days, lecture session will be from 1:00 to 2:30 and labs from 2:45 to 4:15. Some labs will require more time so the transition time may vary. Expect to spend a combined average of 3.5 to 4 hours per week in lab.

### COURSE LAB FEE

Registration for this course requires payment of a \$100 lab fee. Because of reduced funding from the Utah state legislature, lab fees have become necessary to maintain a high quality learning experience and to ensure that you are exposed to state-of-the-art microbiological techniques. The fee is used to buy lab supplies for this course.

### REQUIRED MATERIALS

- **Text book (print OR electronic version):**
  - Microbiology, by Wessner et al. (2013, John Wiley & Sons) with three options listed in decreasing price:
    - Hard bound, ISBN-13: 978-0-471-69434-2 (includes access code for WileyPLUS)
    - Loose-leaf, ISBN 978-1-118-12924-1
    - eText comes with WileyPLUS purchase: <https://www.wileyplus.com/WileyCDA/Section/Microbiology.id-813848.html>
  - **Custom Lab Manual** (Selected exercises from Benson's Microbiological Applications, 2016, McGraw-Hill Create) ISBN 9781308863689- can be purchased directly from publisher at

### COURSE DESCRIPTION

General Microbiology explores the biology, ecology, and diversity of microorganisms. Emphasis placed on bacteria, viruses, fungi, and protists, and their roles in the environment. Microbial evolution and microbial diversity are unifying themes for general concepts concerning the morphology, metabolism, and reproduction of microbes. We will discuss how evolution has impacted the diversity of microorganisms and viruses, and the interactions and impacts that microbes have on each other, on humans and the on the environment. Laboratory experiences will provide you with practical skills including science processing, brightfield microscope use, aseptic technique, and laboratory safety. The course will prepare you for further study in microbiology and research, and to become citizens who are better able to make informed decisions about the environment and your health. To receive University Studies Breadth Life Sciences (BLS) credit, students must complete both BIOL 1610 and BIOL 3300. The BIOL 1610 and BIOL 3300 option for BLS credit is available only to students majoring in Biological Engineering or Environmental Engineering.

Topics introduced in this course include:

- Brief history of microbiology
- Phylogeny and diversity of microbes including viruses
- Microbial growth requirements and control of microbial growth
- Microbial genetics and mechs of genetic variation
- Introduction to microbial genomics and bioinformatics
- Bacterial and Archaeal metabolism and ecology
- Microbial ecology and symbiosis
- Pathogenicity and host response

**COURSE EVALUATION**

USU uses the Individual Development and Education Assessment (IDEA) Student Ratings system that “looks at instruction in terms of its endgame. Rather than emphasizing teaching style or personality, the IDEA system focuses on student learning and the methods used to facilitate it.” ([www.theideacenter.org](http://www.theideacenter.org)) The IDEA learning objectives emphasized in this course are aligned with more specific course goals in the table below.

**COURSE OBJECTIVES**

After successful completion of this course, students should be able to:

IDEA Center Learning Objectives	Course Learning Objectives
<p><b>Objective 1.</b> Gain factual knowledge (terminology, classifications, methods, trends)</p>	<ul style="list-style-type: none"> <li>• Use appropriate terminology to distinguish microbe species (cellular and viral) and to describe microbial processes and interactions</li> </ul>
<p><b>Objective 2.</b> Learn fundamental principles, generalizations, or theories</p>	<ul style="list-style-type: none"> <li>• Identify important criteria for describing microbial diversity</li> <li>• Explain the impact that microbes and their environment have on each other in terms of microbial diversity</li> </ul>
<p><b>Objective 3.</b> Learn to apply course material (to improve thinking, problem solving and decisions)</p>	<ul style="list-style-type: none"> <li>• Apply concepts from the reading assignments (outside of class) to solve problems, analyze data, and think like a microbiologist.</li> <li>• Apply concepts of classification and systematics to identify an unknown microbial species</li> <li>• Integrate the evolutionary theory, genetics, and metabolism to explain microbial diversity in a given environment</li> <li>• Develop competency in using standard microbiology equipment (microscope, pipettes, incubators, etc.)</li> <li>• Develop standard microbiology skills (aseptic technique, lab safety, estimating the number of microbes in a sample, etc.)</li> </ul>

**COURSE STRUCTURE**

I view my role as your instructor not to tell you what is in the textbook (you can read), but to help you learn complex concepts that you may not glean directly from the readings. I have designed this course to maximize our time together to help you construct your knowledge of microbiology. Lectures include activities intended to develop your thinking and learning skills. The laboratory research project is meant to reinforce course content and to apply the scientific method. I will help you structure your learning. Learning is your responsibility.

**Lab Activities.** After a series of guided exercises to develop microbiology lab skills, we will perform an inquiry-based independent research project. The project will help strengthen your science processing skills such as keeping a notebook, designing experiments, analyzing data, and sharing your results in writing. There will be NO MAKE-UP LABS *per se*, so make every effort to attend. There will be times that you may

want to check on your isolates, so you can schedule times to visit the lab outside of class if you wish. Your learning in the lab will be assessed by your ability to answer questions, keep accurate records (lab notebook), write up a scientific report, and demonstrate good lab etiquette and safety.

**Lecture Activities.** You are expected to have read the assigned textbook material PRIOR to coming to class. Additional pre-class readings may be assigned (see Canvas Course for postings/links). Pre-reading will enable us to practice integrating information in class through discussion and activities designed to help you apply course information, develop writing skills, and work effectively in a group. Pre-reading will be assessed through graded online pre-lecture quizzes on Canvas. Additional online graded post-lecture quizzes will be assigned.

**Pre-lecture Reading Quizzes-** There will be one pre-lecture reading quiz for each chapter. I will drop the lowest two scores at the end of the semester.

**Canvas- Course Management System.** Use Canvas to access to your grades, announcements, discussions, and course material. This course management system is very intuitive and powerful with a universal calendar and several options for notifications through popular social media including text, email and Facebook. Be sure to set your notification preferences to receive announcements.

**Other Assignments.** You may be assigned points for additional projects or assignments to be completed inside or outside of class.

**Exams.** Exams will be taken in class. Exams will be cumulative and test your ability to recall factual information, make connections between concepts, and apply concepts to new situation or perturbation of a system. The questions will be in multiple-choice, fill-in-the-blank, and short answer formats. The final is comprehensive with questions from new material, and modified questions from previous exams.

**GRADING**

Course grading scale will be no stricter than:

	<u>% Course grade</u>
<u>Lecture-related activities (70%)</u>	
Pre-lecture reading quizzes & assignments	8
Other activities and assignments	8
Exams in class x 3	36
Comprehensive Final Exam	18
<u>Lab-related activities (30%)</u>	
Lab etiquette & safety	5
Lab Quizzes (taken with exams 1-3)	5
Lab Manual Report sheets	5
Bacterial Transformation: Report	5
Research Project: Report	10
Total:	100

Total Points Possible	Final Grade
93-100%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
60-66%	D
Below 60%	F

**COURSE POLICIES**

**Instructor’s Responsibilities**

I will help you learn by engaging you in the material and challenging you to think like a biologist. You can expect me to attend all lectures, read the assigned material, and prepare examinations and quizzes that are fair and representative of the reading assignments, lecture activities, and lab activities as they relate to the

learning objectives provided. I will also be available by email, telephone, or in my office during the day to answer specific questions and provide any needed assistance toward the course learning objectives.

### **Student's Responsibilities**

You are expected to attend each lecture and laboratory, participate in activities, take comprehensive notes, and read the relevant material in the text. You should focus your efforts on achieving the learning objectives by doing the appropriate problems in the text and online, reviewing concepts, practicing problem solving, and keeping a detailed lab notebook. In the event that there is any difficulty in keeping up with the pace of the course, it is YOUR responsibility to contact me for advice or assistance. If you cannot take an exam during the scheduled period, you must make other arrangements with me **at least 48 hours before the exam** is given. If you cannot attend a class, you are still responsible for all content. (I *strongly* suggest exchanging contact information with your **microbiology-buddy** right now!)

### **Late submission of assignments**

Without prior arrangement at least 24 hours in advance, I will deduct 10% of the assignment value for each day an assignment is late. For example, if you turn in an assignment two days late, I will deduct 20% prior to grading.

**Attendance.** Attendance is important to be successful in this course. Be aware that you are fully responsible for all announcements made and material covered in class. I will make every effort to announce updates in Canvas announcements, but you are ultimately responsible for what goes on during class. I suggest that you exchange contact information with your classmates now so that you can contact them for support should you need to miss a class.

**Use of mobile devices and laptops in class.** We may occasionally use laptops in class. However, as research shows, unexpected noises and movement automatically divert and capture people's attention, which means that you are negatively affecting everyone's learning experience if your cell phone goes off, images move on your laptop screen, etc. For this reason, I expect you to turn off your mobile devices (even vibrate can be distracting). If you choose to use a laptop, please mute it and sit behind other students. If you must answer your silenced mobile device in the case of an emergency, please leave the room before speaking. The bottom line: DO NOT DISTURB OTHERS IN THE CLASS.

## **UNIVERSITY POLICIES**

The entire **USU Student Policy Manual** can be read online at <http://catalog.usu.edu/content.php?catoid=12&navoid=3587>

I highlight some of the most relevant policies below.

### **Students with Disabilities**

Please address any special needs or special accommodations with me at the beginning of the semester or as soon as you become aware of your needs. The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program." If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille. For more information go to <http://www.usu.edu/drc/>

### **Withdrawal and Incomplete Grade**

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. If an incomplete grade is to be given, an Incomplete Grade Documentation Form must be filed by the instructor in the department or college office. Students may not be given an incomplete grade due to poor performance or in order to retain financial aid. An incomplete grade may be granted only if the student has completed the majority of the course and is passing the class at the time. <http://catalog.usu.edu/content.php?catoid=12&navoid=3805>

### **Classroom Incivility**

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.

Faculty members of Utah State University have the responsibility and authority to determine, maintain, and enforce an atmosphere in their classrooms that is conducive to teaching and learning, in accordance with University policy and practice. Read more at <http://catalog.usu.edu/content.php?catoid=12&navoid=3171>

### **Academic Honesty and Integrity – The “Honor Pledge”**

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students. 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."

Violations of the Academic Integrity Standard (academic violations) include, but are not limited to:

1. **Cheating:** (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually"; (2) depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity; (6) submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or (7) engaging in any form of research fraud.
2. **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.
3. **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.

Read more about Academic Honesty and Integrity at <http://catalog.usu.edu/content.php?catoid=12&navoid=3140>

### **GRIEVANCE PROCESS (STUDENT CODE)**

Students who feel they have been unfairly treated [in matters other than (i) discipline or (ii) admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: [Article VII Grievances](#)

# General Microbiology (BIOL 3300) Course Schedule

L. Etchberger, Fall 2016

Lecture: **Microbiology** by Wessner et al. (2013), John Wiley & Sons

Lab: A Collection of Exercises from **Benson's Microbiological Applications** by Brown (2016), McGraw Hill

Wk	Date	Ch <sup>^</sup>	Lecture Topic (Tentative)	Lab Exercise Started
1	T Aug 30		Orientation and Intro	
	R Sep 1	1	The Microbial World	Lab Safety
			<b>PART I: THE MICROBES</b>	
2	T Sep 6	2	Bacteria (Appendix C)	1-Brightfield Microscopy
	R Sep 8	3	Eukaryal Microbes (Appendix D)	5- Microscopic Measurements
3	T Sep 13	4	Archaea (Appendix E)	18,6- Motility, Euks: Ponds
	R Sep 15		EXAM 1	19- Media Preparation (RO)
4	T Sep 20 <sup>□</sup>	5	Viruses (Appendix F)	7- Ubiquity of Bacteria
	R Sep 22	6	Cultivation	9- Aseptic Technique
			<b>PART II: MICROBIAL GENETICS</b>	
5	T Sep 27	7	DNA Replication and Gene Exprn	11, 12- Smear, Simple Staining
	R Sep 29	8	Viral Replication Strategies	15- Gram Staining
6	T Oct 4	9	Bacterial Genetic Analysis	10- Pure Culture Techniques
	R Oct 6		EXAM 2	"
7	T Oct 11	11	Regulation of Gene Expression	21- Enumerating Microbes
	R Oct 13	10	Microbial Genomics	"
8	T Oct 18	12	Microbial Biotechnology	"
	<del>R Oct 20</del>		<i>USU Fall Break- Attend Friday Classes on Thursday</i>	
			<b>PART III: MICROBIAL PHYSIOL &amp; ECOLOGY</b>	
9	T Oct 25	13	Metabolism	Bacterial transformation: pGLO
	R Oct 27		"	"
10	T Nov 1		EXAM 3	"
	R Nov 3	14	Biogeochemical Cycles	Research Project (TBA) - Design
11	T Nov 8	15	Microbial Ecosystems	"
	R Nov 10		"	Research Project – Gather Data
12	T Nov 15	17	Microbial Symbionts	"
	R Nov 17		"	"
13	<del>T Nov 22</del>		No Class	---
	<del>R Nov 24</del>		<i>USU Thanksgiving Holiday</i>	
			<b>PART IV: MICROBES &amp; DISEASE</b>	
14	T Nov 29	18	Intro to Infectious Disease	Research Project – Analyze Data
	R Dec 1	24.1-3	Antimicrobial Drugs & Resistance	
15	T Dec 6	24.5	Vaccinations Discussion	Report due
	R Dec 8		REVIEW	---
	T Dec 13		<i>Exam 4 + Final Comprehensive Exam</i>	

<sup>^</sup> Be sure to skim the textbook chapters AND have completed the online Reading Quiz BEFORE coming to class.

<sup>□</sup> M Sept 19, 5:00pm is the last day to drop without notation on transcript.