BIOL3314-201 General Microbiology

Spring 2024 | MWF 10:00-10:50am | Bolin 213

Instructor Information

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Office Hours: MW 4:00 – 5:00 pm, TR 10:00 am – 12:00 pm | other times by appointment

General Information

Description

This course is an introduction to the biology of microorganisms including viruses, bacteria, archaea, protozoa, and fungi. Cell structure and function, metabolism, information flow and genetics, evolutionary relationships, and microbial ecology will be covered. A conceptual and experimental background sufficient to enable students to successfully pursue more advanced courses in related fields is provided.

Core Concepts

The learning outcomes for this course are derived from the six core concepts and 27 fundamental statements identified by the curriculum proposed by the American Society for Microbiology[1]. The five core concepts covered by this general microbiology course are: Cell Structure and Function; Metabolic Pathways; Information Flow and Genetics; Evolution; and Microbial Systems. After completing this course, students will be able to describe how different microbial groups survive and thrive in the varied ecosystems presented to them by nature.

Purpose of the Syllabus

The purpose of the syllabus is to inform you of course expectations, policies, and content. Ignorance of course policies because you did not read your syllabus will not be an acceptable excuse for not adhering to these policies. Because the syllabus is also available online, you cannot lose it. By accepting this syllabus and remaining enrolled in the course, you affirm that you understand the contents of this syllabus and that you will adhere to its requirements.

Expectations and Goals

It is expected that you will try your best to understand the material; complete all quizzes, exams, and assignments; ask for help when you need it; and seek to understand why you are in this class (what purpose does it serve to you, your major, and your future?).

Prerequisite(s)

BIOL 1214 and CHEM 1241/1243, each course with a grade of C or better.

[1] ASM Curriculum Guidelines, Part I (Concepts and Statements).

Required Materials

1. **TEXTBOOK:**
   ***Prescott's Microbiology*, 12th Edition** by Willey, Sandman and Wood. McGraw Hill. ISBN: 978-1-264-77733-4. I will be lecturing out of the 12th edition as it is the most recent. However, any recent edition will likely be sufficient. I will not be using any homework or other assignments/tools through the publisher's online resources.
2. **ACCESS TO D2L:** Journal articles, assignments, and other materials including laboratory materials will be posted on D2L, so you need access to it. Any issues with accessing D2L if you are enrolled in the course should be addressed to the IT department.
3. **LABSTER ACCESS:** All lab exercises this semester will be carried out virtually using simulations provided by Labster. An access code must be purchased from the MSU Bookstore. Simulations are accessed in D2L in your lab section page. Starting the first simulation with start the access process, during which you will need to enter your code. This process needs to be done only once.

Classroom Expectations and Policies:

- Students are expected to be prepared for lecture and lab by: 1) reading the text, lab manual and handouts prior to coming to class; 2) having paper and pen at hand
- Students are expected to arrive a few minutes early in order to mentally prepare. If late arrival is unavoidable, the student should enter the class in a manner that creates as little disruption as possible.
- Points will be deducted from assignments turned in late.
- Student Conduct: Please refer to the MSU Student Handbook: (https:// msutexas.edu/student-life/_assets/files/handbook.pdf) for university policies related to student responsibilities, rights and activities. For example, see page 73 for valid grounds for an instructor drop (excessive absence, indifferent attitude, disruptive conduct, failure to meet class assignments), page 13 for the university's code of student conduct and page 55 for definitions of academic dishonesty that may be subject to disciplinary action (cheating, plagiarism, and collusion). In this class, academic dishonesty on an assignment or exam will minimally result in a score of 0 for that assignment or exam. Depending on the magnitude or frequency of these types of infractions, more severe sanctions – including being dropped from the course – will be imposed.
- **CELL PHONES (and other electronic devices): (READ THIS TWICE, PLEASE)** NO cell phones are permitted to be out in this class. This class, as well as your other classes, requires your engagement, and cell phones serve to detract from that engagement. Additionally, your phone should be not only put away, but on "silent" (NOTE: vibrate is NOT silent). If your phone is out and/or in sight, you will be asked to put it away.
- **Similarly: use of laptops, tablets and other devices will not be permitted during lecture.** The ability to take good notes is a skill that university students must be able to master. Further, classroom studies have shown that taking notes by hand increases engagement in the material. Simply transcribing the lecture word-for-word is not helpful.
- Students with disabilities: It is the responsibility of the student to first contact Disability Support Services and then the instructor to determine what accommodations might be made for a disability. It will be the responsibility of the student to make arrangements to acquire notes. Any requests for accommodations must be made 2 weeks prior to the first exam.
- The professor considers this classroom to be a place where you will be treated with respect as a human being - regardless of gender, race, ethnicity, national origin, religious affiliation, sexual orientation, political beliefs, age, or ability. Additionally, diversity of thought is appreciated and encouraged, provided you can agree to disagree. Furthermore, guns or other weapons create a coercive environment that is neither safe nor conducive to learning. Therefore weapons of any

kind will not be permitted in my classroom. This includes guns, concealed or otherwise, regardless of licensure. Any student bringing a weapon to class or to lab will be immediately dropped from the course. It is the professor's expectation that ALL students consider the classroom a safe environment.

- The instructor reserves the right to amend these rules as needed throughout the term.

E-mail Policy:

I will respond to e-mail during regular school hours (8:30 am – 5:00 pm M-F). I will make every effort to respond to e-mail sent during the week within 24 hours. Those sent over the weekend will be attended to on Monday. Always include a subject line in your e-mail messages. It would be particularly helpful to include in the subject line the course number & section (*i.e.* BIOL 3314). Questions regarding simple matters of class schedule or those that can otherwise be answered from information in this syllabus will be given low priority.

Attendance Policy:

Students are expected to attend all meetings of the classes in which they are enrolled. Although in general students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade where class attendance and class participation are deemed essential by the faculty member. In those classes where attendance is considered as part of the grade, the instructor should so inform students of the specifics in writing at the beginning of the semester in a syllabus or separate attendance policy statement. An instructor who has an attendance policy must keep records on a daily basis. The instructor must give the student a verbal or written warning prior to being dropped from the class. Instructor's records will stand as evidence of absences. A student with excessive absences may be dropped from a course by the instructor. Any individual faculty member or college has the authority to establish an attendance policy, providing the policy is in accordance with the General University Policies. [MSU Student Handbook, p. 61]

Absences will be excused for:

a. **Death of an immediate family member.** An immediate family member is considered to be a grandparent, parent, sibling, spouse, in-law, aunt, uncle, or child.
b. **Summons to appear in court or jury duty.** A copy of the summons is required.
c. **Call to military service.** A copy of your orders to report is required.
d. **University sponsored event.** Members of athletic teams, college bowl participants, etc. will be excused with proper notification.
e. **Debilitating illness or disability.** Illnesses will be addressed on an individual basis. If a student is affected by an illness that is not debilitating, (*i.e.* flu, virus infection) which may result in the student missing one or more consecutive class sessions, that student will be marked as unexcused for the amount of days missed **unless a doctor's note is provided**.

ROUTINE APPOINTMENTS, medical or otherwise, AND VACATION TRAVEL ARE NOT ACCEPTABLE reasons for excused absences.

If you feel ill (esp. with signs and symptoms of COVID-19): Stay Home and Isolate yourself. Inform your instructor of your circumstances.

It is the responsibility of the student to obtain notes or other information covered in class during an absence.

Exam Policies:

- No make-up exams will be given in this course. If you must miss class during a midterm exam period, and it is an excusable absence (see above), then the cumulative portion of the final exam will be used to determine the missed midterm score. You must notify the instructor of problems **prior to** the start of the exam, and provide the appropriate documentation as soon as possible. Only one midterm exam will be substituted for in this manner.
- Exams are not moved for congested midterm or finals schedules.

Grading:

All exams and assignments count toward your final grade in the course and so it is important to do the best that you can on everything you turn in. If you find yourself having difficulties, please come to me for help early in the semester so that you give yourself time to improve.

Attendance is not a direct component of your course score. However, continual tardiness – and the subsequent class disruption due to coming in late – will be taken into account and may have an effect on your final points awarded. As stated above, cell phone use distracts from attention in class. Therefore, students who persist in using their mobile devices during class, except for designated classroom activities, will be marked as absent.

This course is not graded on a traditional curve. The course is worth 800 points. Grade categories and equivalent percentages are as indicated: A (90-100%); B (80-89%); C (70-79%); D (60-69%); F (59% and below). Passing requires 60% of the points (unadjusted) for the course, or 480. Fractional percentages will be rounded at the end of the semester.

Lecture constitutes approximately 57% of the BIOL 3314 grade. There will be three midterm exams, each worth 90 points. The final exam will be worth 180 points. Each exam, including the final, will focus on what was covered since the previous exam. However, each exam will also be cumulative in that each section of the course builds on what came before. The final will also be more typically cumulative in that it will cover the entire semester, focusing on material that needs to be reviewed (*i.e.* the majority of the class got it wrong the first time around).

Each semester, the University sponsors the Undergraduate Research and Creative Activity Forum. In this Forum, students present their research findings or creative works. For this assignment, students will critically evaluate (50 points) three (3) poster presentations or three (3) oral presentations (or combination thereof). This will provide experience in both how to present results and how to critically evaluate data presented by others.

Lab constitutes approximately 40% of the BIOL 3314 grade. This semester, all laboratory work will be virtual. This is a result of Bolin Hall renovations and the loss of lab space. Laboratory work will be done using simulations through Labster (375 points). These simulations will also be used to reinforce concepts covered in lecture. Access to Labster and use of the simulations will be explained in the first week of class.

Note:

1) No regrades will be provided for exams done in pencil.

2) Misspelled words (esp. organism names) and incorrect taxonomic nomenclature will result in ¼ point deductions for each instance.

Assignment Summary:

Midterm exams:	270 points (3 x 90 points)
Final Exam:	180 points
Forum evaluations	50
Laboratory:	375 points
Total:	875 points

Important Dates (Spring 2024):

Classes begin:	January 16
Midterm Exam 1:	**February 12**
Midterm Exam 2:	**March 8**
Spring Break:	March 11 – March 15
Last day to drop with a "W":	March 25 (4:00 pm)
Holiday Break (no classes):	March 28 – 29
Midterm Exam 3:	**April 12**
Spring Research Forum	**April 18**
Classes end:	May 5
Final Exam:	**May 8 (Wednesday) (10:30 am – 12:30 pm)**

Class topic schedule appears on the next page.

(Tentative) Lecture Schedule

Week	Date	Topic (Chapter)	Pages
1	Jan 15	**No Class – MLK Jr. Day**	
1	Jan 17 – 19	Introduction Microscopy (Ch 2)	23 – 43
2	Jan 22 – 26	Microscopy (Ch 2) Structure: Bacteria (Ch 3)	23 – 43 44 – 79
3	Jan 29 – Feb 2	Structure: Bacteria (Ch 3) Structure: Archaea (Ch 4) Structure: Eukaryotes (Ch 5)	44 – 79 80 – 90 91 – 108
4	Feb 5 – 9	Structure: Eukaryotes (Ch 5) Structure: Viruses (Ch 6) Metabolism – Principles (Ch 10)	91 – 108 109 – 126
5	Feb 12 – 16	**Midterm Exam 1 [Ch 2-6] (M)** Catabolism (Ch 11)	
6	Feb 19 – 23	Catabolism (Ch 11) Anabolism (Ch 12)	
7	Feb 26 – Mar 1	Motility (Ch 3, 4, 5) Growth (Ch 7)	44 – 79 80 – 90 91 – 108 127 – 161
8	Mar 4 – 8	Growth (Ch 7) Reproduction **Midterm Exam 2 [Ch 7, 10, 11, 12, +] (F)**	127 – 161
9	Mar 11 – 15	**No Class – Spring Break**	
10	Mar 18 – 20	Reproduction	
10	Mar 22	**TBD: TX-ASM Meeting**	
11	Mar 25 – 27	Gene Expression (Ch 13, 15)	277 – 309 336 – 352
11	Mar 29	**No Class – Holiday Break**	
12	Apr 1 – 5	Gene Expression (Ch 13, 15) Variation (Ch 16)	336 – 352 353 – 376
13	Apr 8 – 12	Variation (Ch 16) Habitats/Ecosystems (Ch 29, 30) **Midterm Exam 3 [Ch 13, 15, 16, +] (F)**	353 – 376 599 – 616 617 – 635
14	Apr 15 – 19	Habitats/Ecosystems (Ch 29, 30) Cycles (Ch 28)	599 – 616 617 – 635 584 – 598
15	Apr 22 – 26	Cycles (Ch 28) Interactions (Ch 27)	584 – 598 571 – 583
16	Apr 29 – May 3	Interactions (Ch 27), TBD	571 – 583
	May 8	**Final Exam (10:30 am – 12:30 pm)** **Midterm 3 + Comprehensive**	

Tentative Schedule of Laboratory Simulations

Week	Date (week of)	Simulations
1	Jan 15	**No Lab – MLK Jr. Day**
2	Jan 22	Laboratory Safety Aseptic Technique Microscopy
3	Jan 29	Gram Stain: Stains & Counterstains The Gram Stain Pipetting: Selecting & Using Pipetting: Master the Technique
4	Feb 5	Bacterial Cell Structure Cell Membrane & Transport: Types of Transporters Cell Membrane & Transport: Modifying the Cell Membrane
5	Feb 12	Using the Gram Stain to Help Diagnose Meningitis Cell Respiration: Glycolysis Cell Respiration: The Krebs Cycle Cell Respiration: The Electron Transport Chain
6	Feb 19	Spectrophotometers Spectrophotometry: the Beer-Lambert Law SDS-PAGE
7	Feb 26	Western Blot Counting Cells Bacterial Growth Curves Bacterial Shape & Movement
8	Mar 4	ELISA Bacterial Quantification by Culture
9	Mar 11	**No labs – Spring Break**
10	Mar 18	Bacterial Isolation
11	Mar 25	DNA: Structure & Function Protein Synthesis
12	Apr 1	Identification of an Unknown Bacteria Genetic Transfer in Bacteria
13	Apr 8	Gel Electrophoresis Polymerase Chain Reaction Next Generation Sequencing
14	Apr 15	Control of Microbial Growth Pasteurization **Attend Celebration of Scholarship (Thursday)**
15	Apr 22	Biosafety
16	Apr 29	**No labs – Prepare for lecture final exam**