

Course Syllabus: Fundamental Clinical Microbiology

BIOL 2144

General Information:

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| Course Meetings: | MWF (9:00 – 9:50 am) Bolin Hall 209 |
| Instructor: | James Masuoka, Ph.D. |
| Office: | Bolin Hall 324 |
| Telephone: | 397-4181 |
| E-mail: | james.masuoka@msutexas.edu |
| Office Hours: | MTW 11:00 am – 12:00 pm; R 9:00 am – 11:00 am (Other times by appointment) |

Course Description (from the catalog):

Introduction to the study of medically important bacteria, protozoa, viruses, helminths, and fungi. May not be applied to biology major.

Required Materials:

Microbiology: with Diseases by Body System by RW Bauman. 5th Edition. Pearson Benjamin Cummings, 2018. ISBN: 978-0-134-47720-6. **Note:** An e-text version of the textbook is included in the Mastering Microbiology links in the course D2L page through the Courseware Access and Affordability Program (see below).

Mastering Microbiology: Required digital materials for this course are part of the Courseware Access and Affordability Program at MSU Texas. Students are charged for required course materials on their student account with the Business Office. Any students who wish to opt-out of the Program and purchase the required course materials on their own must do so prior to 09/07/21. Opt-out instructions are sent to students' official my.msutexas.edu email address after the first day of class. Please contact the MSU Bookstore if you have any questions about the opt-out process.

Microbiology Laboratory Theory & Application: Brief Edition by M J Layoff & B E Pierce. 3rd Edition. Morton Publishing Company, 2016. ISBN: 978-1-61731-477-3

Course Objectives (Lecture):

- Compare and contrast the cellular structures of prokaryotic and eukaryotic cells
- Describe how specific cellular structures carry out processes such as motility, nutrient transport, energy production and reproduction
- Describe how microbial cell structures and processes can be the targets of antimicrobial agents, and explain how these relate to therapeutic decisions
- Explain the importance of aseptic technique in patient care
- Explain the impact of human activity on microbial evolution, and describe the mechanisms by which genetic information is modified and transferred between microorganisms
- Contrast the lifecycles of bacteria, eukaryotic microbes, and viruses
- Describe the environmental factors that affect microbial growth, and relate these factors to the environment of the human host and growth in laboratory culture

- Explain the various relationships that exist between microbes and the human host, and how both microbial and host factors influence development of disease
- Explain the factors important in microscopy and how each is optimized or controlled
- Relate microbial biology to means of identification, classification, and host defense mechanisms
- Describe how microbial genetic information flows and is shared
- Contrast the prokaryotic and eukaryotic pathways of carbohydrate catabolism

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)** This class, as well as your other classes, requires your engagement, and typical cell phone use serves to detract from that engagement. While in class, your phone should be on “silent” (NOTE: vibrate is NOT silent).
- **Other electronic devices: laptops, tablets and similar devices will no longer be permitted to be used 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 2144). 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 number 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 will not be 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 900 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 560. Fractional percentages will be rounded at the end of the semester.

Lecture constitutes approximately 60% of the BIOL 2144 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).

There is a component of the lecture score (100 points) related to the assigned reading. These assignments will be available through Mastering Microbiology accessed through the course D2L page. Assignments are available beginning the first day of class. Assignments will be due the day we begin discussion of that particular topic. Assignments may be completed after the due date for half credit.

The final lecture assessment is a “Meet the Microbiologist” biography (50 points) to be completed individually. Detailed instructions for this assignment will be provided separately.

Lab constitutes approximately 40% of the BIOL 2144 grade. Specifics for lab exercises, assignments and grading will be provided during the first laboratory session.

Participation in both lecture and lab is critical to success in this (or any other) class. Although focused on the laboratory portion, participation in lecture is also assessed. This includes attendance and participation in lecture discussion and completion of a pre-/post-semester

concept inventory survey (10 pts). For the latter, I will be sending a link to the survey during the first week of class and about two weeks before the final exam.

Note:

- 1) No regrades will be provided for exams (short answer or questions other than multiple choice entered onto a Scantron form) done in pencil.
- 2) Misspelled words (esp. organism names) and incorrect taxonomic nomenclature will result in ¼ point deductions for each instance.

Assignment Summary:

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|-------------------------|----------------------------|
| Midterm exams: | 270 points (3 x 90 points) |
| Mastering Microbiology: | 100 points |
| Final Exam: | 100 points |
| Meet the Microbiologist | 50 points |
| Laboratory: | 400 points |
| Total: | 1000 points |

Important Dates (Spring 2022):

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| Classes begin: | January 10 |
| Last day to add a course: | January 13 |
| Martin Luther King Jr. Day (no classes): | January 17 |
| Midterm Exam 1: | February 7 |
| Midterm Exam 2: | March 4 |
| Spring Break: | March 14 – 18 |
| Last day to drop with a W: | March 21 |
| Midterm Exam 3: | April 4 |
| Holiday Break (no classes): | April 14 - 15 |
| Classes end: | April 29 |
| Final Exam: | May 2 (Monday) (8:00 am – 10:00 am) |

Tentative Lecture Schedule

| Date | Week | Topic | Chapter (Pages*) | Mastering Due Dates |
|----------------|---|--|--|------------------------|
| Jan 10 – 14 | 1 | Intro, Mastering, Infectious Diseases, Microscopy | 4 (97 – 112) | 1,2 (1/14) |
| Jan 17 | 2 | Martin Luther King Jr. Day (No classes) | | |
| Jan 19 – 21 | 2 | Cell Structure & Function (Eukaryote) | 3 (58 – 59, 78 – 90) | 3 (1/24) |
| Jan 24 – 28 | 3 | Cell Structure & Function (Bacteria), Culturing | 3 (56 – 78) 6 (169 – 177) | 4 (1/24) 5 (1/28) |
| Jan 31 – Feb 4 | 4 | Microbial Growth, Metabolism | 6 (161 – 169, 177 – 186) 5 (125 – 143) | 6 (1/31) 7 (2/4) |
| Feb 7 - 11 | 5 | Midterm 1 (2/7) (Mon.) Metabolism | 5 (125 – 143) | |
| Feb 14 - 18 | 6 | Gene Expression; Mutations | 7 (193 – 211, 216 - 229) | 8 (2/14) |
| Feb 21 - 25 | 7 | Classification: General, Bacteria, Eukaryotes | 4 (112 – 119) 11 (322 – 345) 12 (351 – 370, 374 – 376) | 9 (2/21) 10 (2/25) |
| Feb 28 – Mar 4 | 8 | Classification: Eukaryotes Classification: Viruses Midterm 2 (3/4) (Fri.) | 12 (351 – 370, 374 – 376) 13 (382 – 405) | 11 (3/2) |
| Mar 7 – 11 | 9 | Viruses Innate Immunity | 13 (382 – 405) 15 (444 – 462) | 12 (3/9) |
| Mar 14 - 18 | 10 | Spring Break (No Classes) | | |
| Mar 21 – 25 | 11 | Adaptive Immunity; Vaccines | 16 (469 – 493) | 13 (3/21) |
| Mar 28 – Apr 1 | 12 | Pathogenesis | 14 (411 – 438) | 14 (3/28) |
| Apr 4 – 8 | 13 | Midterm 3 (4/4) (Mon.), Nervous System*; Systemic* | 20 (596 – 624)** 21 (630 – 663)** | 15 (4/6) 16 (4/8) |
| Apr 11 - 13 | 14 | Systemic*; Skin & Wounds* | 21 (630 – 663)** 19 (552 – 588)** | 17 (4/13) |
| Apr 15 | 14 | Holiday Break (No Classes) | | |
| Apr 18 – 22 | 15 | Skin & Wounds*; Respiratory*; GI Tract* | 19 (552 – 588)** 22 (672 – 703)** 23 (710 – 741)** | 18 (4/18) 19 (4/22) |
| Apr 25 – 29 | 16 | GI Tract*, GU Tract* | 23 (710 – 741)** 24 (748 – 770)** | 20 (4/27) |
| May 2 | Final Exam (Monday) 8:00 am – 10:00 am | | | |

*Page numbers refer to the print version of the textbook. For eBook sections, see table below

**Select diseases and infectious agents: see disease list

Chapter Sections: Specifications for eBook pages:

| Chapter | Topic | Sections |
|----------------|-----------------------------|---|
| 4 | Microscopy | Introduction, 4.1 – 4.3 |
| 3 | Cell Structure (Eukaryote) | Introduction, 3.1, 3.2, 3.10 – 3.12 |
| 3 | Cell Structure (Bacteria) | 3.3 – 3.6 |
| 6 | Culturing | Introduction, 6.2 |
| 6 | Microbial Growth | 6.1, 6.3 |
| 5 | Metabolism | Introduction, 5.1 – 5.3 |
| 7 | Gene Expression | Introduction, 7.1 – 7.3, 7.4 (Intro), 7.4.2 |
| 4 | Classification (General) | 4.4 |
| 11 | Classification (Bacteria) | Introduction, 11.1, 11.2, (11.4 – examples) |
| 12 | Classification (Eukaryotes) | Introduction, 12.1 – 12.3, 12.6 |
| 13 | Classification (Viruses) | Introduction, 13.1 – 13.3, 13.5 |
| 15 | Innate Immunity | Introduction, 15.1 – 15.3 |
| 16 | Adaptive Immunity | Introduction, 16.1 – 16.5 |
| 14 | Pathogenesis | Introduction, 14.1 – 14.8 |
| 20 | Diseases: Nervous System | Introduction, 20.1 – 20.5, 20.7* |
| 21 | Diseases: Systemic / CV | Introduction, 21.1 – 21.4* |
| 19 | Diseases: Skin & Wounds | Introduction, 19.1 – 19.6* |
| 22 | Diseases: Respiratory | Introduction, 22.1 – 22.6* |
| 23 | Diseases: Gastrointestinal | Introduction, 23.1 – 23.6* |
| 24 | Diseases: Genitourinary | Introduction, 24.1 – 24.7* |

* Select diseases and infectious agents: see disease list