

# Microbiology 4000: Basic and Practical Microbiology

Autumn 2017

The Ohio State University

Lecture meets for 3 classroom hours per week, on Monday, Wednesday, and Friday. Attendance in lecture and lab is **required** for successful completion of the course. We currently use Canvas as a supplement to both the lecture and lab portions of the class. On **OSU Carmen/Canvas** you will find the comprehensive syllabus and lecture material. On **Cognella Canvas** you will find all lab material, such as lab PowerPoint presentations, videos of lab techniques, flash cards, games, PreLab quizzes and Module quizzes. You can find a link to Cognella Canvas on the OSU Canvas homepage. **Important FAQs** can be found on Carmen (link on the homepage).

## Materials needed for course

**Lecture Text:** “Nester’s Microbiology: A Human Perspective”, 8<sup>th</sup> ed. by Anderson et al., McGraw Hill Ed. (e-Textbook with online Connect Access).

Available at the OSU bookstores or can also be purchased directly by using the link in Carmen.

**Laboratory Manual:** A printed version of the lab manual “Basic and Practical Microbiology” as well as the Active Learning component are available for purchase at the University Readers Student Store <https://students.universityreaders.com/store/>. It is also available at the OSU bookstores.

## Instructor Information

**Course instructors:** Dr. Tammy Bullwinkle

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Office Hours: Wed 1-3 pm and Thurs 3:00-4:00 pm (until Oct. 18th) or by appointment

Dr. Maria (Mia) Neil

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Office: 318 Biological Sciences Building, 484 W 12<sup>th</sup> Ave

Office Hours: Wed 1-3 pm (starting Oct. 18th) or by appointment

**Lab Coordinator:** Dr. Mette Ibba

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Office: 374 Biological Sciences Building, 484 W 12<sup>th</sup> Ave

Office Hours: Email or call for appointment or just drop by.

**MICROBIOLOGY 4000: Lecture Schedule, Autumn 2017**

*NOTE: THE FOLLOWING SCHEDULE IS SUBJECT TO CHANGE.*

Date	Topic	Chap	Connect HW	Instr
Aug. 23	Introduction to Course and Microbiology	1	Ch.3 opens 8/23 @ 6:00a	TB/MN/MI
Aug. 25	Intro to Micro/ Microscopy and Cell Structure	1,3		TB
Aug. 28	Cell Structure	3		TB
Aug. 30	Cell Structure	3	Ch. 4 opens 8/30 @ 6:00a	TB
Sep. 1	Prokaryotic Growth	4		TB
<b>Ch.3 DUE 9/3 (Sun) @ 11:59p</b>				
<b>Sept. 4</b>	<b>Labor Day: NO CLASS</b>			
Sept. 6	Prokaryotic Growth	4	Ch. 6 opens 9/6 @ 6:00a	TB
Sept. 8	Microbial Metabolism	6		TB
<b>Ch. 4 DUE 9/10 (Sun) @ 11:59p</b>				
Sept. 11	Microbial Metabolism	6		TB
Sept. 13	Microbial Metabolism	6		TB
Sept. 15	Microbial Metabolism	6		TB
<b>Ch. 6 DUE 9/17 (Sun) @ 11:59p</b>				
<b>Sept. 18</b>	<b>EXAM 1 Monday During Lecture Chapters 1, 3, 4, 6</b>			
Sept. 20	Bacterial Genetics: Prokaryotic Gene Exp.	7	Ch. 8 opens 9/20 @ @ 6:00a	TB
Sept. 22	Bacterial Genetics: Prokaryotic Gene Exp.	7,8		TB
Sept. 25	Bacterial Genetics: Mutations and Repair	8		TB
Sept. 27	Bacterial Genetics: Mutations and Repair/ HGT	8		TB
Sept. 29	Bacterial Genetics: HGT	8		TB
Oct. 2	Viruses, Viroids, and Prions	13	Ch. 13 opens 10/2 @ 6:00a	TB
Oct. 4	Viruses, Viroids, and Prions	13		TB
Oct. 6	Viruses, Viroids, and Prions	13		TB
<b>Ch. 8 DUE 10/8 (Sun) @ 11:59p</b>				
Oct. 9	Antimicrobial Drugs	20		TB
Oct. 11	Antimicrobial Drugs	20		TB
<b>Oct. 13</b>	<b>Fall Break: NO CLASS</b>			
<b>Ch. 13 DUE 10/15 (Sun) @ 11:59p</b>				
<b>Oct. 16</b>	<b>EXAM 2 Monday During Lecture Chapters 7, 8, 13, 20</b>			
Oct. 18	Innate Immunity	14	Ch. 14 opens 10/18 @ 6:00a	MN
Oct. 20	Innate Immunity	14		MN
Oct. 23	Innate Immunity	14		MN
Oct. 25	Adaptive Immunity	15	Ch. 15 opens 10/25 @ 6:00a	MN
Oct. 27	Adaptive Immunity	15		MN
<b>Ch. 14 DUE 10/28 (Sun) @ 11:59p</b>				
Oct. 30	Adaptive Immunity	15		MN
Nov. 1	Humoral and Cell-mediated Responses	15	Ch. 16 opens 11/1 @ 6:00a	MN
Nov. 3	Host-Microbe Interactions	16		MN
<b>Ch. 15 DUE 11/5 (Sun) @ 11:59p</b>				
Nov. 6	Host-Microbe Interactions	16		MN
Nov. 8	Epidemiology	19		MN
Nov. 10	<b>Veteran's Day Observed: NO CLASS</b>			
<b>Ch. 16 DUE 11/12 (Sun) @ 11:59p</b>				
<b>Nov. 13</b>	<b>EXAM 3 Monday During Lecture Chapters 14, 15, 16</b>			
Nov. 15	Epidemiology	19		MN
Nov. 17	Epidemiology/ Respiratory System Infections	19, 21		MN
Nov. 20	Respiratory System Infections	21		MN
<b>Nov. 22</b>	<b>Thanksgiving: NO CLASS</b>			
<b>Nov. 24</b>	<b>Thanksgiving: NO CLASS</b>			
Nov. 27	Respiratory/ Digestive System Infections	21, 24		MN
Nov. 29	Digestive System Infections	24		MN
Dec. 1	Digestive System Infections	24		MN
Dec. 4	Control of Growth	5		MN
Dec. 6	Control of Growth	5		MN
<b>Dec. 14</b>	<b>FINAL EXAM (Not Cumulative) Chapters 19, 21, 24, 5</b>		<b>THURS @ 10:00 AM (11:30 AM lecture) THURS @ 4:00 PM (4:10 PM Lecture)</b>	

Lab	Date	<p style="text-align: center;"><b>Microbiology 4000 Laboratory Schedule</b>  <b>Prelab Quizzes   Module Quizzes   Assignments</b></p>
1	T - August 22 W - August 23 R - August 24	<p><b>Online Pre-Lab 1 Quiz (DUE IMMEDIATELY)</b></p> <p>Exercise 1-1: Lab safety rules and regulations – M1 (Module 1)            Exercise 1-2: Where do the parts belong on the microscope – M1            Exercise 1-3: Using the microscope – M1            Exercise 1-4: Getting familiar with microbes and their sizes – M1            Exercise 1-5: Motility and pond water microbes – M1            Exercise 1-6: Fungi and molds – M1</p> <p><b>Online Module 1 Quiz (Due before class meets next)</b></p> <p><b>Online Pre-Lab 2 Quiz (Due before class meets next)</b></p>
2	T - August 29 W - August 30 R - August 31	<p>Exercise 2-1: Streaking bacteria organisms to obtain single isolated colonies – Day1/M2            Exercise 2-2: Streaking bacterial organisms to examine nutritional needs – Day1/M2            Exercise 2-3: Streaking microorganisms to examine temperature requirements – Day1/M2            Exercise 2-4: Isolating and characterizing of bacterial species from a mixed culture– Day1/M2            Exercise 2-5: Dilution and enumeration using spread plate technique- Day1/M2            Exercise 2-6: Simple stain – crystal violet - M2            Exercise 2-7: Differential stain – Gram stain - M2</p> <p>Practice use of Micropipettes</p> <p><b>Online Pre-Lab 3 Quiz (Due before class meets next)</b></p>
3	T - September 5 W - September 6 R – September 7	<p>Exercise 2-1: Streaking microorganisms to obtain single isolated colonies - Day2/M2            Exercise 2-2: Streaking bacterial organisms to examine nutritional need – Day2/M2            Exercise 2-3: Streaking microorganisms to examine temperature requirements – Day2/M2            Exercise 2-4: Isolating and characterizing of bacterial species from a mixed culture– Day2/M2            Exercise 2-5: Dilution and enumeration using spread plate technique- Day2/M2            Exercise 2-8: Acid-fast stain - M2 DEMO            Exercise 2-9: Capsule stain - M2            Exercise 2-10: Observation of endospores - M2            Exercise 2-11: The endospore stain - M2 DEMO            Exercise 2-12: The Flagella stain - M2 DEMO</p> <p><b>Competency Test 1: Microscope (In class)</b></p> <p><b>Online Pre-Lab 4 Quiz (Due before class meets next)</b></p>

4	<p>T - September 12 W - September 13 R – September 14</p>	<p>Exercise 2-4: Isolating and characterizing of bacterial species from a mixed culture – Day3/M2 Exercise 2-5: Dilution and enumeration using spread plate technique - Day3/M2</p> <p>Exercise 3-1: Sampling the environment - Day1/M3 Exercise 3-2: Biofilm formation using pond water sample - Day1/M3 Exercise 3-3: Isolation of a biofilm-forming bacterium from soil - Day1/M3</p> <p>Exercise 4-1: Carbohydrate utilization in bacteria – Day1/M4</p> <p><b>Online Module 2 Quiz (Due before class meets next)</b></p> <p><b>Competency Test 1: Microscope (continued) (In class)</b> <b>Competency Test 2: Inoculation (In class)</b></p> <p><b>Online Pre-Lab 5 Quiz (Due before class meets next)</b></p>
5	<p>T - September 19 W - September 20 R – September 21</p>	<p>Exercise 3-1: Sampling the environment - Day 2/M3 Exercise 3-2: Biofilm formation using pond water sample – Day2/M3 Exercise 3-3: Isolation of a biofilm-forming bacterium from soil – Day2/M3</p> <p>Exercise 4-1: Carbohydrate utilization in bacteria - Day2/M4 Exercise 4-2: Protein utilization in bacteria – Day1/M4 Exercise 4-3: Catalase and oxidase activities – Day1/M4 Exercise 4-4: Aerobic and anaerobic growth – Day1/M4</p> <p><b>Competency Test 3: 3-phase streak plate (In-class)</b> <b>Lab manual check – R&amp;Q pages will be collected from Module 1 and 2</b></p> <p><b>Online Pre-Lab 6 Quiz (Due before class meets next)</b></p>
6	<p>T - September 26 W - September 27 R – September 28</p>	<p>Exercise 3-3: Isolation of a biofilm-forming bacterium from soil – Day3/M3</p> <p>Exercise 4-2: Protein Utilization in Bacteria – Day2/M4 Exercise 4-3: Catalase and oxidase activities – Day2/M4 Exercise 4-4: Aerobic and anaerobic growth – Day2/M4 Exercise 4-5: Anaerobic respiration and Nitrate reduction – Day1/M4</p> <p>Exercise 5-1: Identification of unknown bacteria in the clinic - Day1/M5 <b>Exercise 5-2: Identification of unknown bacteria in the laboratory - Day1/M5</b></p> <p><b>Online Pre-Lab 7 Quiz (Due before class meets next)</b></p>
7	<p>T - October 3 W - October 4 R – October 5</p>	<p>Exercise 3-3: Isolation of a biofilm-forming bacterium from soil – Day4/M3</p> <p>Exercise 4-5: Anaerobic respiration and Nitrate reduction – Day2/M4 Exercise 4-6: Selective, differential and selective-differential media - Day1/M4</p> <p><b>Exercise 5–2: Identification of unknown bacteria in the laboratory - Day2/M5</b></p> <p>Exercise 6-1: Growth Curve – M6 Exercise 6-2: Effect of pH on bacterial growth - Day1/M6 Exercise 6-3: Effects of osmosis pressure on bacterial growth - Day1/M6 Potato slices Demo - M6</p> <p><b>Online Module 3.1 Quiz (Due before class meets next)</b></p> <p><b>Online Pre-Lab 8 Quiz (Due before class meets next)</b></p>

	T - October 10 W - October 11 R – October 12	No labs
8	T - October 17 W - October 18 R – October 19	<p>Exercise 3-3: Isolation of a biofilm-forming bacterium from soil – Day5/M3</p> <p>Exercise 4-6: Selective, differential and selective-differential media - Day2/M4</p> <p><b>Exercise 5–2: Identification of unknown bacteria in the laboratory - Day3/M5</b></p> <p>Exercise 6-2: Effect of pH on bacterial growth - Day2/M6</p> <p>Exercise 6-3: Effects of osmosis pressure on bacterial growth - Day2/M6</p> <p>Exercise 6-4: Effect of high temperature on viability of bacteria – Day1/M6</p> <p>Exercise 6-5: Effect of UV radiation on bacterial viability – Day1/M6</p> <p><b>Online Module 4 Quiz (Due before class meets next)</b></p> <p><b>Online Pre-Lab 9 Quiz (Due before class meets next)</b></p>
9	T - October 24 W - October 25 R – October 26	<p>Exercise 3-4: Examination of microbes in milk and juice- Day1/M3</p> <p>Exercise 3-5: Examination of microbes in meat and cheese- Day1/M3</p> <p>Exercise 3-6: The symbiotic relationship of bacteria in yogurt production – Day1/M3</p> <p><b>Exercise 5–2: Identification of unknown bacteria in the laboratory - Day4/M5</b></p> <p>Exercise 6-4: Effect of high temperature on viability of bacteria – Day2/M6</p> <p>Exercise 6-5: Effect of UV radiation on bacterial viability Day2/M6</p> <p>Exercise 6-6: The effectiveness of hand washing – Day1/M6</p> <p>Case study I - Handout</p> <p><b>Lab manual check – R&amp;Q pages will be collected from Module 3.1 and 4</b></p> <p><b>Online Module 5 Quiz (Due before class meets next)</b></p> <p><b>Online Pre-Lab 10 Quiz (Due before class meets next)</b></p>
10	T - October 31 W - November 1 R - November 2	<p>Exercise 3-4: Examination of microbes in milk and juice - Day2/M3</p> <p>Exercise 3-5: Examination of microbes in meat and cheese - Day2/M3</p> <p>Exercise 3-6: The symbiotic relationship of bacteria in yogurt production – Day2/M3</p> <p><b>Exercise 5–2: Identification of unknown bacteria in the laboratory - Day5/M5</b></p> <p>Exercise 6-6: The effectiveness of hand washing – Day2/M6</p> <p>Exercise 6-7: Effects of mouthwashes and rinses on bacterial growth – Day1/M6</p> <p>Exercise 6-8: Effects of antiseptics and disinfectants on bacterial growth – Day1/M6</p> <p>Exercise 6-9: The effect of antibiotics on bacteria – Day1/M6</p> <p>Exercise 6-10: The action of natural antibiotics – Day1/M6</p> <p><b>Case Study I –Day 1</b></p> <p><b>Online Module 3.2 Quiz (Due before class meets next)</b></p> <p><b>Online Pre-Lab 11 Quiz (Due before class meets next)</b></p>

11	T – November 7 W - November 8 R - November 9	<p><b>Exercise 5–2: Identification of unknown bacteria in the laboratory - Day6/M5</b></p> <p>Exercise 6-7: Effects of mouth washes and rinses on bacterial growth – Day2/M6  Exercise 6-8: Effects of antiseptics and disinfectants on bacterial growth – Day2/M6  Exercise 6-9: The effect of antibiotics on bacteria – Day2/M6  Exercise 6-10: The action of natural antibiotics – Day2/M6</p> <p>Exercise 7-1: Mutualism – M7  Exercise 7-2: Parasitism – Day1/M7  Exercise 7-3: Phagocytosis and virulence factors – M7  Exercise 7-4: Antigen-antibody interactions – M7</p> <p>Normal Microbiota of the Nose and Mouth - Handout</p> <p><b>Case Study I – Day 2</b></p> <p><b>Case study II (read through Case Study II before Lab 12)</b></p> <p><b>Online Module 6 Quiz (Due before class meets next)</b></p> <p><b>Online Pre-Lab 12 Quiz (Due before class meets next)</b></p>
12	T – November 14 W - November 15 R - November 16	<p><b>Exercise 5–2: Identification of unknown bacteria in the laboratory - Assignment due</b></p> <p>Exercise 6-9: The effect of antibiotics on bacteria – Day3/M6</p> <p>Exercise 7-2: Parasitism – Day2/M7  Exercise 7-5: <b>Case study II</b>, Epidemiology and Elisa – M7</p> <p><b>Online Module 7 Quiz (Due before class meets next)</b></p>
13	T – November 28 W - November 29 R - November 30	<p><b>In-Class Lab Exam</b></p>

## Microbiology 4000 Learning Outcomes

*Successful students will be able to...*

1. Describe the basic morphology of bacteria, their growth requirements, and how they adapt and reproduce. <sup>1,2</sup>
2. Explain how environmental factors affect the culturing of microbes in a laboratory setting. <sup>1,2</sup>
3. Understand the diversity of metabolism that exists in bacteria and describe the unique metabolic ways used only in the prokaryotic world. <sup>1</sup>
4. Describe bacterial genetics with the emphasis on two main processes responsible for the diversity in the bacterial world: mutations and bacterial gene transfer. <sup>1</sup>
5. Describe the basic morphology of viruses, how they reproduce and cause diseases. <sup>1</sup>
6. Apply appropriate aseptic techniques when completing any exercise in lab. <sup>2</sup>
7. Correctly carry out basic microbiology laboratory techniques including: Gram staining, production of pure cultures, production of dilution series and enumeration of microbes, inoculation of various culture media, the filter disk method of testing bacterial susceptibility to various agents, and use of the ELISA test. <sup>2</sup>
8. Correctly and safely use any equipment needed to carry out exercises in lab. <sup>2</sup>
9. Demonstrate how to identify unknown bacteria using tests, media, and techniques introduced in lab. <sup>2</sup>
10. Explain how unknown bacteria are identified through submission of a lab report that includes a flow chart and interpretation of results. <sup>2</sup>
11. Describe Biofilm, and explain how it is formed.
12. Explain how microbes are involved both constructively and destructively in foods. <sup>1,2</sup>
13. Explain microbial symbiosis based on observations made in lab. <sup>2</sup>
14. Describe some of the normal microbiota of the nose, mouth, and skin. <sup>1</sup>
15. Understand infection and disease control. Understand the preventative techniques necessary to limit the spread of bacteria and viruses. <sup>1</sup>
16. Describe and explain various ways to control the growth of microbes. <sup>1,2</sup>
17. Describe how to track the spread of a simulated disease, and how to determine the index case. <sup>1,2</sup>
18. Describe the system of Natural or non-specific immunity. <sup>1</sup>
19. Describe Adaptive immunity; understand how it is acquired and how it protects us. <sup>1</sup>
20. Describe how microbes overcome the host body's immune mechanisms and how they are transmitted. <sup>1</sup>
21. Explain several aspects of immunity based on observations made in lab. Including: phagocytosis, precipitin, agglutination, and complement fixation. <sup>1,2</sup>
22. Describe the etiological agent, pathogenesis, symptoms and treatment of microbial diseases of the Respiratory system and the Digestive system. <sup>1</sup>

<sup>1</sup>Lecture goal

<sup>2</sup>Lab goal

## Guidelines for Final Grade

**Points Available:** The entire course is based on a 400 point system. 240 of the points are from lecture and 160 points are from lab assessments.

Lecture Exam 1	50 points
Lecture Exam 2	50 points
Lecture Exam 3	50 points
Lecture Exam 4 (Final, non-comprehensive)	50 points
Lecture Homework (Connect) – 8 @ 5pts ea.	40 points
PreLab Quizzes	45 points (1 and 4 pts per quiz)
7 Lab Module Quizzes	42 points (6 pts per quiz)
Unknown Summary (ID of unknown bacteria)	10 points
Assignments	4 points (2 pts each assignment)
3 Lab Competency Tests	9 points (3 pts per competency test)
Final Lab Exam	50 points
<b>TOTAL</b>	<b>400 points</b>

\*Please see Attendance Policy on p. 10 of this syllabus

**Grading Scale** (Note: This is a guideline and may be subject to change)

<u>Final total points</u>	<u>Grade</u>	<u>Final total points</u>	<u>Grade</u>
372-400	A	308-319	C+
360-371	A-	292-307	C
348-359	B+	280-291	C-
332-347	B	268-279	D+
320-331	B-	240-267	D

The table below gives additional information concerning the point categories above. Please read the information carefully and ask if you have questions.

**Table Concerning Point Categories** (continued on the next page)

**Lecture Exam Policy:** All exams are as scheduled and are during regularly scheduled lecture or final exam times. Students are to take exams in the course section they are enrolled in.

**In order to be eligible for an exam makeup, students must:**

- 1) Have a **VALID** excuse (illness, death, **unavoidable** academic or sports conflict, etc.). Excusable absences are ultimately decided by the Instructor.
- 2) Email either Dr. Bullwinkle or Dr. Neil **BEFORE** the regularly scheduled exam (at least **1 week** prior in situations where student is aware of a conflict).
- 3) Provide written, original documentation for your absence (email attachments are NOT accepted).
- 4) Complete the makeup exam within **5 DAYS** of the regularly scheduled exam.

**All makeups will be administered by the OSU Testing Center.** Once approved for a makeup:

- 1) Contact the Testing Center and arrange an appointment: <http://registrar.osu.edu/testing/index.asp>
- 2) Forward the appointment confirmation email for approval by the Instructor. Making an appointment does not guarantee eligibility for exam credit, you need to be approved (see above). It is the student's responsibility to inform the Instructor of their appointment in a timely fashion.



3) Your exam will be at the Testing Center for your appointment. Bring your ID. It is student's responsibility to show up on time.

**NOTE:** The format of make-up exams may be different (short answer) than the regular exams.

**Lecture Homework Assignments:** We will use Adaptive Learning Resource called Connect/ LearnSmart (from McGraw Hill) in this course for assessment purposes and to encourage student preparedness. This smart technology uses continuously adapting learning path individualized for each student. You will need an Access Code (that comes with electronic textbook) in order to gain access to Connect/LearnSmart technology.

You will be assigned LearnSmart questions based on **8 chapters** throughout the semester, which you need to **COMPLETE** in order to get the full credit of 40 points (5 points/chapter), however partial credit will be given (ex. 50% complete = 2.5 pts). The open and close/due dates are listed in the lecture schedule (p. 2) and on Carmen. The extent of questions asked for each chapter is not fixed since it will vary depending on the depth and complexity of the topics being covered. Each assignment will remain open over a period of approximately **7-10 days** and must be completed **BEFORE** the deadline. It can be accessed multiple times during the open period and also after the submission/due date, if you'd like to review the questions just before the exam. You will not get credit for completion of the assignment after the due date. **NO EXCEPTIONS. NO MAKEUPS.**

Technical difficulties can be directed to McGraw Hill: 1-800-331-5094 (be sure to get a case number)

**PreLab Quizzes and Module Quizzes:** PreLab quizzes have to be completed each week in order to prepare for lab. Each quiz contains 8-12 questions; You can take a PreLab quiz **twice** before the due date. Module quizzes have to be completed after finishing all exercises within each individual module. You can take each of the Module quizzes only **once**. There will be giving no make-up quizzes and only under certain conditions, and with proper documentation, will a make-up PreLab/Module quizzes be given.

**Lab Competency Tests:** Learning basic microbiology laboratory techniques is an important part of your lab experience. During the semester you will be tested on three of these techniques: Use of the compound light microscope, aseptic technique, and three-phase streak plate. You will have plenty of opportunities to practice these techniques during lab. Please be sure to ask your lab TA to observe you as you practice and to critique your technique.

**Lab Assignment 1 and 2:** These assignments concern the post-exercise questions found in your lab manual. Twice during the semester your answers will be randomly collected from 2 – 4 exercises by your TAs and graded.

**Assignment 3 - Identification of Unknown Bacteria:** This assignment concerns the identification of two unknown bacterial species. The lab manual and Cognella Canvas will contain detailed information about the format to be use for this assignment.

**Final Lab Exam:** The examination will include questions about the techniques and touch on several different exercises from throughout the semester. More information concerning specific topics covered in the exam will be given in the lab period prior to the final lab exam and guidelines will be posted a few weeks prior to the exam. The exam consists of 50 multiple choice questions about lab exercise techniques and their interpretation.

**Lab Safety:** Although that the majority of microbes we will be working with in lab under normal conditions are harmless, it is important that you let us know if you are immunocompromised in any way, or if you are pregnant. You may want to contact your Primary Care Physician before lab starts too. We can give you a list of microbes that we will be working with that you can show to your physician. It is essential that everyone follow our safety procedures and guidelines at all times.

## ATTENDANCE POLICY

### Lecture attendance

Attendance in lecture is required for successful completion of the course. Exams are based on material covered during lecture. You are responsible for any class discussions, handouts, additional assignments, announcements, and schedule changes.

**Attendance in the laboratory is mandatory.** It is necessary for course completion to attend the labs. Due to the nature of this course, **make-up labs are not a possibility.** Missing one or more labs without a valid written excuse (e.g. doctor's note), will result in losing course points (4 pts per lab absence), which likely will influence your overall grade. For an excused absence from lab, please bring a valid written excuse within one week of the missed lab. You also lose points for being over 10 minutes late to lab (0.2 pts). If you are over 40 minutes late to lab it will count as a missed lab. If you have more than 4 unexcused or excused absences you may not be allowed to complete the lab course. Please, contact the lab coordinator and TA to see if you will be allowed to complete the course. Please, note that if your absences are due to a documented illness or other valid excused reasons, you may be eligible for an incomplete grade. (NOTE: Written records of your reason must be submitted.)

## QUESTIONS CONCERNING GRADING OF COURSE MATERIALS

If you have any questions or concerns regarding grading of any of the lecture exams offered in this course, you must submit them in writing to the lecture instructor within one week from the date the grade for the exam is posted on Carmen. You must address all the concerns regarding the final exam before the final grade is posted on Carmen. Once the final grade is posted, no questions from the final will be addressed.

Any questions that you have regarding grading of lab materials must be submitted in writing to your lab TA or the lab coordinator within a week of the date the graded material (quiz, etc.) was returned to you.

### Disability Statement

Any student who feels s/he may need an accommodation based on the impact of a disability should contact Dr. Neil/Bullwinkle (for lecture accommodations) or Dr. Mette Ibba (for lab accommodations) privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 098 Baker Hall to coordinate reasonable accommodations for students with documented disabilities.

### Academic Misconduct Statement

- Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."
- The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct, so we recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.
- If we suspect that a student has committed academic misconduct in this course, we are obligated by University Rules to report our suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic

misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

**Examples of academic misconduct most applicable to Microbiology 4000:**

- Knowingly providing or receiving answers or information during or about a quiz or exam
- Possessing or using unauthorized items or material during a quiz or exam
- Copying any portion of an assignment from another student of Micro 4000 (current or past)
- Copying any portion of an assignment from a published source or web site
- Falsifying your identity or asking another student to falsify their identity
- Changing graded material or scores
- Falsifying documentation or lying about an excuse to miss an exam or lab
- Asking instructors to change your grade as a personal favor

Ignorance of the Universities Code of Student Conduct is not an excuse for academic misconduct. For more information see: <http://studentlife.osu.edu/csc/>. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact Dr. Bullwinkle, Dr. Neil, or Dr. Ibba.

**General Education Course Information**

Microbiology 4000 is a General Education Course (GE) in Natural Science and as such, is part of the Colleges of Arts and Sciences (ASC) General Education Program.

**Goals of ASC Natural Sciences Courses:**

Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

**Learning Objectives of ASC Natural Sciences Courses:**

1. Students understand the basic facts, principles, theories, and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students provide examples of the inter-dependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Microbiology 4000 meets the GE Natural Science Learning Objectives in multiple ways. The course includes an overview of the basic biology, structure, and function of microorganisms with a concentration on bacteria and viruses. Principles and theories related to microbial growth, metabolism, genetics, and the human immune system are included. Students study modern scientific methods of culturing and identifying microbes in the laboratory part of the course. The lecture part of the course also explains how scientific methods are used in the field of microbiology and how these methods have been used historically in key discoveries such as pasteurization, vaccination and antibiotic therapy. Both lecture and lab provide opportunities for students to learn and experience how technological advances in microscopy, genetic engineering, and biochemical techniques have contributed to understandings of scientific principles of microbiology and vice versa. In lecture, current events from news media and recent scientific publications are used to help students appreciate the positive and negative roles of microorganisms in fields such as health and disease, the environment, industry, and food sciences. By the end of the course, students will have developed an understanding of how microorganisms are involved in nearly every aspect of their everyday life.