

BIOS 312

Microbiology

Winter (Spring) Semester 2003

Lecture: TR 11:00 to 12:15 p.m. Wood Hall 1718
Laboratory: TR 9:00 to 10:50 a.m. Haenicke Hall 2022 Call No. 64026
TR 1:30 to 3:20 p.m. Haenicke Hall 2022 Call No. 48683
TR 4:00 to 5:50 p.m. Haenicke Hall 2022 Call No. 31157
TR 6:00 to 7:50 p.m. Haenicke Hall 2022 Call No. 52702

Instructor: Silvia Rossbach, Ph.D.
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Office hours: TWR 3:00 p.m. - 4:00 p.m. or by appointment

Laboratory Instructors: Brent Lehmkuhl, b1lehmku@wmich.edu, 387-2082
Al Barrese, Albert.Barrese@wmich.edu, 387-2661

Prep Room Supervisor: Vivian Locke, Vivian.Locke@wmich.edu, 387-5635

REQUIRED TEXTS:

- **Brock: Biology of Microorganisms.** Madigan, M. T., Martinko, J. M., Parker, J. 2003. 10th Edition. Publisher: Prentice Hall
- **Microbe Hunters.** DeKruif. Publisher: Harcourt
- **Microbiology: A Laboratory Manual.** Cappuccino. J.G., Sherman, N. 2001. 6th Edition. Publisher: Benjamin Cummings

Recommended Material:

- **Lab coat, Sharpie for labeling plates and tubes (e.g. black, fine point from Sanford), color pencils, glass slides for microscope use, cover slips**

Course Description: An introduction to the fundamental relationships among microbes with an emphasis on unifying principles. Laboratory work deals with techniques basic to bacteriology. Overall goal of this course is to acquaint the student with the fundamental role microorganisms play in common and extreme environments, to learn about the metabolic capabilities of microorganisms and to understand the complexity of microbe-host interactions.

Specific Objectives:

- understand the difference between prokaryotic and eukaryotic cells
- learn about the metabolic capabilities of microorganisms
- understand the role of microorganisms in the environment

- learn about Archaea and “tree of life”
- learn about microbe - host interactions

Prerequisites: BIOS 250 Genetics and a course in organic chemistry, or consent of instructor.

Estimated Study Times: around 4 – 5 hours/week

Evaluation:

3 Lecture exams a 50 points	150 points
4 Lecture quizzes a 12.5 points	50 points
Midterm Laboratory Exam	50 points
Final Laboratory Exam	50 points
2 Reports about unknowns a 25 points each	50 points
4 Lab quizzes a 12.5 points	50 points
<u>Comprehensive Final Exam</u>	<u>100 points</u>
Total	500 points

Grading Scale:

Grade	Points	Percentage
A	450-500	>90%
BA	425-449	>85-90%
B	395-424	>79-85%
CB	360-394	>72-79%
C	325-359	>65-72%
DC	300-324	>60-65%
D	275-299	>55-60%
E	< 275	< 55%

Make-up exams will be by special arrangement only and will require written documentation for excused absence. Only students with an excused absence are eligible for a make-up exam. **Regular lab attendance** is required to reach the course goals. 3 bonus points are available at the discretion of the lab instructor for "cleaning up after yourself each lab". 2 bonus points are available for a small presentation on a particular protozoan during laboratory time.

Academic Honesty: You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate Catalog (pp. 268-269) that pertain to academic integrity. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.

Interesting Web sites:

- <http://homepages.wmich.edu/~rossbach/>

Dr. Rossbach's course web sites (Ask for password for lectures)

- <http://www.asmusa.org/>

Home page of the American Society for Microbiology; free access to ASM journals older than 6 months (instruction for authors!), educational resources

- <http://www.microbe.org/>

Web site of the International Society for Microbial Ecology

- <http://commtechlab.msu.edu/sites/dlc-me/>

In the Microbe Zoo you can explore common and unusual habitats of microorganisms. Originally thought for K-12, but fun for everybody

- <http://www.cellsalive.com>

“Cells Alive!” shows neat video clips of dividing bacteria and other educational material.

Classmates: (for study groups or if you missed a lecture)

Name

Phone

BIOS 312 Winter 2003

Lecture Schedule (tentative)

Date	Lecture	Chapter	Subject
1/7	1	1, 2	Introduction to Microbiology, History of Microbiology
1/9	2	4	Cell Structure and Function I
1/14	3	4	Cell Structure and Function II
1/16	4	5	Quiz 1 , Nutrition and Metabolism I
1/21	5	5	Nutrition and Metabolism II
1/23	6	6	Microbial Growth; Review
1/28			Lecture Test 1
1/30	7	20	Microbial Growth Control I
2/4	8	20, 7	Microbial Growth Control II, Microbial Genetics I
2/6	9	8	Microbial Genetics II
2/11	10	10	Quiz 2 , Microbial Genetics III
2/13	11	9	Viruses I
2/18	12	9, 16	Viruses II; Review
2/20			Lecture Test 2
2/25	13	11	Microbial Evolution and Systematics
2/27	14	12	Microbial Diversity: Bacteria
3/4			Spring Break
3/6			Spring Break
3/11	15	13	Microbial Diversity: Archaea
3/13	16	17	Metabolic Diversity

3/18	17	21	Quiz 3 , Human – Microbe Interactions
3/20	18	22	Immunology I
3/25	19	23	Immunology II; Review
3/27			Lecture Test 3
4/1	20	26	Microbial Pathogens I
4/3	21	27	Microbial Pathogens II
4/8	22	28, 29	Microbial Pathogens III
4/10	23	19	Quiz 4 , Microbial Ecology I
4/15	24	19	Microbial Ecology II
4/17	25		Review
4/21	Monday		Final Examination: 8:00 – 10:00 a.m.

BIOS 312 Winter 2003

Laboratory Schedule (subject to change!)

	Date	Experiment	Subject
T	1/7	xiii–xvi, handout	Lab safety, basic lab technique, pouring plates
R	1/9	4, 5, 6, handout	Microscope, calibration, wet mount, hanging drop technique
T	1/14	2, 3, 7, 8	Streak plate, cultural characteristics, smears, simple stains
R	1/16	9, 10, 32, 69	Negative stain, Gram stain, start of unknown #1
T	1/21	11, 12A	Acid-fast stain, endospore stain, work on unknowns (WOU)
R	1/23	12B, handout	Capsule stain, flagella stain, WOU
T	1/28	15, 16, 17, 18	Temperature, pH, oxygen relationships, anaerobic growth, WOU
R	1/30	29, 30	Catalase and oxidase tests, WOU
T	2/4	14, 21	Differential and selective media, exoenzymes, WOU
R	2/6	22, 23, 24, 25	Fermentation, TSI, IMViC, hydrogen sulfide, WOU
T	2/11	26, 27, 28, 31	Urease, litmus milk, nitrate reduction test, utilization of amino acids, WOU
R	2/13	13, 19, 20	Turbidity measurements, serial dilutions, growth curve, WOU
T	2/18	38	Bacteriophage plaque assay, WOU
R	2/20		Review, unknown #1 report due
T	2/25		Midterm Exam
R	2/27	35, 36, 37, 69	Fungi, yeasts, LPCB, start unknown #2
T	3/4		Spring Break
R	3/6		Spring Break

T	3/11	40, 41, 42, 43, 45	Moist heat, osmotic pressure, radiation, antibiotics, disinfectants, WOU
R	3/13	Handout, 49	Production of yogurt, ginger ale, vinegar and sauerkraut, WOU
T	3/18	47, 50A	Food and water analysis, WOU, flow chart unknown #2 due
R	3/20	50B, handout	Water analysis, ribosomal database project, WOU
T	3/25	50C	Water analysis, WOU
R	3/27	57, 58	Conjugation, isolation of antibiotic resistant mutant, WOU
T	4/1	59	Ames Test, WOU
R	4/3	60, 61, 62, 63	Mouth, throat, skin, <i>Staphylococcus</i> , <i>Streptococcus</i> , WOU
T	4/8	65, 67	Rapid identification methods, urine analysis, WOU
R	4/10	33, 34	Parasites, student presentations, WOU
T	4/15		Review, student presentations, unknown #2 report due
R	4/17		Laboratory Final

Note: Extra laboratory time will be available for work on identification of unknown microorganisms; open laboratory times will be announced!