

## **Brazosport College Microbiology (BIOL 2120)**

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### **COURSE DESCRIPTION**

Through a combination of lecture, laboratory activities and presentations, this course provides students the opportunity to learn about bacteria, fungi, protozoa, viruses, and parasites and their activities. The course will emphasize microbe-human interactions such as disease and the immune response and how to control microbial growth and the spread of infection.

### **PREREQUISITES**

BIOL 1306 Introduction to Biology I, BIOL 1106 Introduction to Biology Laboratory I, BIOL2301 Anatomy and Physiology, and BIOL 2101 Anatomy and Physiology Laboratory.

### **LAB REQUIREMENTS**

Concurrent enrollment or previously taken BIOL 2320 Microbiology Lecture.

### **COURSE OBJECTIVES**

To be scientifically literate in microbiology, students need to understand five overarching biological concepts: **evolution**; **structure and function**; **pathways and transformations of energy and matter**; **information flow, exchange, and storage**; **biological systems**; and **the impact of microbes**. Two key skills also must be acquired that has a lasting impact outside the classroom, **scientific thinking** and **microbiology laboratory skills**.

### **STUDENT LEARNING OUTCOMES**

A student learning outcome is “a specific statement that describes the knowledge, skills/abilities, or attitudes that students are expected to learn upon successful completion of a course or activity” (Wood, WB. 2009. Annu Rev. Cell Dev. Biol 25: 93-112).

- Students are required to read a college-level textbook, scientific articles and additional exercise handouts. Tests will include questions based on information in the texts, lectures and handouts.
- Students will develop writing skills through their responses to essay questions on examinations, research paper, ethics problems and other writing assignments.
- Students are required to give an in class presentation on a topic in microbiology of their choice using appropriate visual tools.
- Lecture requires students to think about processes invisible to the human eye. Students are assessed on these skills by skills testing and select questions on written exams.

- Students learn key concepts of disease-host interactions, drug development, vaccinations, and the body's defense systems. Students learn the basis for drug development and reasons for drug resistance.
- Students acquire an understanding of the issues related to drug treatments, disease, and genetic breakthroughs in treating diseases. Students learn cloning, genetic engineering, production of carcinogens, and screening for different diseases.
- Students learn drug treatments, disease, and genetic breakthroughs. Students discuss different ethical issues, such as cloning. Learning more about the implications of genetic testing and drug development will help the establishment of personal values for ethical behavior.
- Students will integrate knowledge from chemistry, biochemistry and basic cell biology as applied to Microbiology. Students will use basic concepts of chemistry, biochemistry and cell biology to answer test questions on molecular structure and function of microorganisms.

## **TEXTBOOK OR COURSE MATERIAL INFORMATION**

Microbiology Laboratory Theory & Application, Brief, 2<sup>nd</sup> Edition ISBN: 9780895829474  
By: Michael J. Leboffe

A student of this institution is not under any obligation to purchase a textbook from the college bookstore. The same textbook is/may also be available from an independent retailer, including an online retailer

## **STUDENTS WITH DISABILITIES**

Brazosport College is committed to providing equal education opportunities to every student. Brazosport College offers services for individuals with special needs and capabilities including counseling, tutoring, equipment, and software to assist students with special needs. Please contact the Special Populations Counselor, 979.230.3236, for further information.

## **STUDENT CODE OF CONDUCT & ACADEMIC INTEGRITY**

### **CODE OF CONDUCT**

Enrollment in this course and Brazosport College is a privilege and not a right. Students who enter the classroom agree to abide by Brazosport College's Student Code of Conduct, which can be found in the Student Guide and Calendar.

Disruption of the class will not be allowed. It is expected that students will be focused on the course objects and topics and not outside events or topics that are not related to the course. Students are expected to be respectful to classmates, their instructor, their supplemental instructor, and themselves. Students that fail to do this will be asked to leave the class meeting and may be withdrawn from the course.

Students are expected to attend all course meetings and failure to do so may result in a reduction in the course achievement score or failure in the course. See section Course Requirements & Achievement Score in this syllabus for more information.

## **ACADEMIC INTEGRITY**

Brazosport College assumes that students eligible to perform on the college level are familiar with the ordinary rules governing proper conduct including academic honesty. **The principle of academic honesty is that all work presented by you is yours alone.** Academic dishonesty including, but not limited to, cheating, plagiarism, and collusion shall be treated appropriately.

Academic dishonesty violates both the policies of this course and the Student Code of Conduct. In this class, any occurrence of academic dishonesty will be referred to the Dean of Student Services for prompt adjudication, and will, at a minimum, result in the grade of an F in this course. Sanctions may be imposed beyond your grade in this course by the Dean of Student Services.

Scholastic dishonesty shall include, but not be limited to, cheating, plagiarism and collusion.

**PLAGIARISM:** Plagiarism is taking the work created by another person or entity and submitting it as your own for academic credit or other personal gain.

**SELF-PLAGIARISM:** Self-Plagiarism is presenting your own previously presented or submitted work as if it were new.

**CHEATING:** Cheating is to use information in a variety of dishonest manners in order to obtain personal benefit to that particular student for academic or other personal gain.

**COLLUSION:** Collusion is the act of committing academic fraud with one or more persons. Collusion shall be defined as the unauthorized collaboration with another person in preparing assignments for fulfillment of course requirements and/or knowingly allowing students to commit academic integrity.

To avoid academic dishonesty violations students should:

1. Before beginning any assignment, check with the faculty member to make sure you fully understand the assignment and how he/she wants you to cite sources according to the policies as stated in the course syllabus. Remember, not citing work properly and then claiming not to know what plagiarism means is not a valid excuse.
2. When turning in an assignment, students must always submit a list of sources they used to complete the assignment. This is called “citing” sources. By citing sources, students are giving written acknowledgement that some of the work in their assignment is not an original idea and are giving due credit to the person who initially created the original idea or concept.
3. The most obvious time to properly cite a source is when using a direct quote from a book or website. The student should then put this passage in quotation marks in their assignment and give proper credit.

4. It is also important to cite sources even when they are not directly quoting the work or ideas of others. If a student paraphrases or summarizes a passage, which by definition is not a direct quotation, it still must be cited.
5. Students should always do their own work with no unauthorized assistance from others.
6. Unless otherwise stated, all quizzes, tests, and exams are to be done individually. Students may not use class notes, keep their books open, or use any unauthorized information for their own, or a fellow classmate's gain.
7. Without permission from faculty, never give (or receive) assistance to another student regarding any assignments (tests, quizzes, and/or exams included).
8. Students must not, unless they have the permission of all professors involved, turn in the same assignment for credit for more than one class.
9. It is considered cheating for a student to have another person take a test, quiz, or exam in their absence. Students must always take their own tests and submit their own work.
10. It is considered cheating to use a current or former student's exams, quizzes, or assignments to study for or complete current exams, quizzes, or assignments.
11. Academic dishonesty also includes the failure of a student to inform faculty, staff, or administration personnel in the event that are aware of other student(s) behaving dishonestly.

## **COURSE STRUCTURE AND ACHIEVEMENT SCORE**

A total of **400 points** can be obtained from the following laboratory activities.

### **QUIZZES (250 points)**

There will be 11 total quizzes for 25 points each. The lowest quiz grade will be dropped. Quizzes will cover content from the previous laboratory assignment and the readings for the upcoming laboratory assignment.

### **ASEPTIC TECHNIQUE TEST (25 points)**

An evaluation on a student's aseptic technique skill will be completed. This will be done individually and repeatable.

### **UNKNOWN PROJECT (125 points)**

A comprehensive project utilizing multiple skills learned within the microbiology lab will be completed to identify a mixed culture of Gram negative and Gram positive bacteria. The student will complete and submit for evaluation an isolation streak, Gram stain, dichotomous key chart, and written technical report.

## **ACHIEVEMENT SCORE SCALE**

SCORE	LETTER GRADE
$\geq 360$	A
$\geq 320$	B
$\geq 280$	C
$\geq 240$	D
$\leq 239$	F
Note: ' $\geq$ ' means 'greater than or equal to' ' $\leq$ ' means 'less than or equal to'	

## **ATTENDANCE AND WITHDRAWAL POLICIES**

Attendance is mandatory for BIOL 2306. Four (4) absences, whether excused or unexcused will result in no credit be awarded in this course, i.e. a grade of F will be given. It is better to drop the course if you miss that many meetings.

Each unexcused absence will result in the deduction of 10 points from the participation section of your score.

Excused absences can only be the following:

- Illness that is communicable or leads to hospitalization of you or someone that you are their primary caregiver.
- Death of a close relative or friend.

For absences to be excused you need to contact me by email or phone with a note from a health care provider explaining why you cannot attend the class meeting.

Examples of things not considered excused:

- Transportation problems
- Change in work schedule

## **MAKE-UP POLICY & EXTRA CREDIT**

All quizzes, exams, and homework assignments must be completed by the scheduled time. No make-up work will be allowed. Also, no extra credit is awarded. We have enough assignments and a variety of formats that you should be able to achieve the score if you work for it.

## **OTHER STUDENT SERVICES INFORMATION**

Information about the Library is available at <http://www.brazosport.edu/library> or by calling 979.230.3310.

For assistance with online courses, an open computer lab, online and make-up testing, audio/visual services, and study skills, visit Learning Services next to the Library, call 979.230.3253, or visit <http://www.brazosport.edu/learningservices>.

For drop-in math tutoring, the writing center, supplemental instruction and other tutoring including e-tutoring, visit the Student Success Center, call 979.230.3527, or visit <http://www.brazosport.edu/studentsuccesscenter>.

The Student Services provides assistance in the following:

Counseling and Advising	979.230.3040
Financial Aid	979.230.3294
Student Life	979.230.3355

To reach the Information Technology Department for computer, email, or other technical assistance call the Helpdesk at 979.230.3266.

Student Guide and Calendar can be found at:

<http://www.brazosport.edu/StudentServices/Documents/2015-2016%20Student%20Guide%20and%20Calendar.pdf>

# SCHEDULE

## Microbiology –Tentative Schedule Spring 2016

**This is a guide and is subject to change at the discretion of the instructor. You will be informed of any changes**

	Date	Lab Schedule	Lab Exercise
1	Tues, Jan 12	<ul style="list-style-type: none"> <li>○ <b>Lab 1: Safety &amp; Intro to Media</b></li> <li>○ Safety &amp; Lab Practices pp. 1-6</li> <li>○ Lecture text Chap. 6 pp. 167-170 &amp; 177-181 (167-170 &amp; 178 – 182)</li> <li>○ Media Prep - Demo</li> <li>○ Ubiquity of Bacteria</li> </ul>	<ul style="list-style-type: none"> <li>○ 1.3 Demo p. 19</li> <li>○ 2.1 p.52 Ubiquity of Microorganism</li> <li>○ Read p. 51</li> </ul>
2	Thurs, Jan 14	<ul style="list-style-type: none"> <li>● <b>Lab 2: Tools of the Lab</b></li> <li>● Results</li> <li>● Lecture text Chap. 6 pp.174 – 177 (pp.175-178)</li> <li>● Aseptic Technique – read p.25</li> <li>● Streak Plate</li> </ul>	<ul style="list-style-type: none"> <li>○ 1.4 p. 26 Aseptic Transfers &amp; Inoculation Methods</li> <li>○ 1.5 p. 39 Streak Plate Method of Isolation</li> </ul>
3	Tues, Jan 19	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 1 – 25 pts</b> (pp. 1-6, 1.3, 2.1 &amp; notes)</li> <li>○ <b>Lab 3: Colony Morphology &amp; Growth in Broth</b></li> <li>○ Results</li> <li>○ Colony morph.</li> <li>○ Growth in broth</li> </ul>	<ul style="list-style-type: none"> <li>○ 2.2 p. 59 Colony Morphology</li> <li>○ 2.3 p. 69 Growth Patterns on Slants</li> <li>○ 2.4 p. 73 Growth Patterns in Broth</li> </ul>
4	Thurs, Jan 21	<ul style="list-style-type: none"> <li>○ <b>Lab 4: Microscopy</b></li> <li>○ Lecture text Chap. 4 pp. 96-101 (pp.97-102)</li> <li>○ Lecture Text Ch. 11 pp. 322 – 325 (pp. 319 – 322)</li> <li>○ Results</li> <li>○ Microscope Care and use</li> <li>○ Review standard shapes/arrangements of bacteria</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.1 p. 126</li> <li>○ Read p. 125</li> <li>○ Examine prepared slides</li> </ul>
5	Tues, Jan 26	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 2 – 25 pts</b> (1.4, 1.5, 2.2, 2.3, 2.4 &amp; notes)</li> <li>○ <b>Lab 5: Specimen Prep, Staining &amp; Aerotolerance</b></li> <li>○ Lecture text Chap.4 pp. 106 – 111 (pp.107 - 112)</li> <li>○ Aerotolerance Chap. 6 pp.166-168 (pp.168-169)</li> </ul>	<ul style="list-style-type: none"> <li>○ 2.6 p. 81 Fluid Thioglycollate Medium</li> <li>○ 2.11 p.108 Steam Sterilization</li> </ul>
6	Thurs, Jan 28	<ul style="list-style-type: none"> <li>○ <b>Lab 6 – Simple and Negative Stain</b></li> <li>○ Results</li> <li>○ Read pp. 167 – 170</li> <li>○ Chap. 11 pp.322 – 325 (pp. 320-322)</li> <li>○ Simple stain</li> <li>○ Negative stain</li> <li>○ <b>Aseptic technique test – 25pt</b></li> </ul>	<ul style="list-style-type: none"> <li>○ 3.4 p. 159 Simple Stain</li> <li>○ 3.5 p. 165 Negative Stain</li> </ul>
7	Tues, Feb 2	<b>No formal lab – lab will be open to practice stains, streak plate and aseptic techniques – Advise you attend</b>	
8	Thurs, Feb 4	<b>No formal lab – lab will be open to practice stains, streak plate and aseptic techniques – Advise you attend</b>	
9	Tues, Feb 9	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 3 – 25 pts.</b> (3.1,2.6, 2.11 &amp; notes)</li> <li>○ Lecture text Chap. 3 cell walls pp. 63 – 66 (pp. 65</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.6 p. 169 Gram Stain</li> </ul>

		<ul style="list-style-type: none"> <li>– 68)</li> <li>○ Gram stain</li> </ul>	
10	Thurs, Feb 11	<ul style="list-style-type: none"> <li>○ Acid Fast Stain</li> <li>○ Capsule stain</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.7 p. 177 Acid-Fast Stain</li> <li>○ 3.8 p. 183 Capsule Stain</li> </ul>
11	Tues, Feb 16	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 4 – 25 pts.</b> (3.4, 3.5, 3.6 &amp; notes)</li> <li>○ Endospore stain</li> <li>○ Motility</li> <li>○ Flagella – review prepared slides</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.9 p. 187 Endospore</li> <li>○ 3.10 p. 193 Motility</li> <li>○ 3.11 p. 197 Flagella</li> </ul>
12	Thurs, Feb 18	<ul style="list-style-type: none"> <li>○ <b>Morphological Unknown – 25 points</b></li> <li>○ <b>Turn in Data Sheet for 3.12</b></li> </ul>	<ul style="list-style-type: none"> <li>○ 3.12 p. 201</li> </ul>
13	Tues, Feb 23	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 5 – 25 pts.</b> (3.7, 3.8 3.9, 3.10, 3.11, &amp; notes)</li> <li>○ Selective Media</li> </ul>	<ul style="list-style-type: none"> <li>○ 4.1 – 4.6 p. 209</li> <li>○ Read p. 207</li> </ul>
14	Thurs, Feb 25	<ul style="list-style-type: none"> <li>○ Results</li> <li>○ Lecture text Chap. 10, pp. 298 -300 (pp. 297 – 299)</li> <li>○ Antibiotic Sensitivity Test</li> </ul>	<ul style="list-style-type: none"> <li>○ 7.2 p. 397</li> </ul>
15	Tues, Mar 1	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 6 – 25 pts.</b> (4.1 – 4.6 and notes)</li> <li>○ Results antibiotic sensitivity test</li> <li>○ Differential Tests - Oxidation and Fermentation media</li> </ul>	<ul style="list-style-type: none"> <li>○ 5.1 – 5.6 p. 240</li> <li>○ Read p 237</li> </ul>
16	Thurs, Mar 3	<ul style="list-style-type: none"> <li>○ Results</li> <li>○ Lecture Chap. 12 – Introduction of Eukaryotes pp. 353 – 357, 358, 360 – 370</li> <li>○ Microscopic Observation of Eukaryotes</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.3 – Eukaryotic Organisms</li> <li>○ Observe slides of various eukaryotes</li> </ul>
	Tues, Mar 8		
	Thurs, Mar 10		
17	Tues, Mar 15	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 7 – 25 pts.</b> (5.1 – 5.6, 7.2 and notes)</li> <li>○ Utilization, Decarboxylation, Deamination and Hydrolytic Enzymes</li> </ul>	<ul style="list-style-type: none"> <li>○ 5.7 – 5.13 p. 273</li> </ul>
18	Thurs, Mar 17	<ul style="list-style-type: none"> <li>○ <b>Quiz 8 – 25 pts.</b> (ID pictures of eukaryotes, 3.3 and notes)</li> <li>○ Results of 5.7 – 5.13</li> <li>○ Lecture text Chap 13, pp. 390 – 394 in preparation for Plaque Assay</li> </ul>	
19	Tues, Mar 22	<ul style="list-style-type: none"> <li>○ Plaque Assay</li> </ul>	<ul style="list-style-type: none"> <li>• 6.3 p. 375</li> </ul>
20	Thurs, Mar 24  *Last day to drop	<ul style="list-style-type: none"> <li>○ <b>Quiz 9 – 25 pts. (6.3 &amp; notes)</b></li> <li>○ Results and discussion of plaque assay</li> <li>○ Lecture text Chap. 13 pp. 405 – 406 (pp.400-402)</li> <li>○ Culturing Viruses</li> </ul>	
21	Tues, Mar 29	<ul style="list-style-type: none"> <li>○ Hydrolytic enzymes</li> <li>○ Combination Differential media</li> </ul>	<ul style="list-style-type: none"> <li>○ 5.14 p. 307</li> <li>○ 5.16 p. 315</li> <li>○ 5.18 – 5.19 p. 323</li> <li>○ 5.21 p. 341</li> <li>○ 5.23 p. 351</li> </ul>
22	Thurs, Mar 31	<ul style="list-style-type: none"> <li>○ <b>Quiz 10 – 25 points</b> (5.7 – 5.13 &amp; notes)</li> <li>○ Results and Discussion</li> <li>○ Assign Morbidity &amp; Mortality Report for lecture</li> </ul>	
23	Tues, Apr 5	<ul style="list-style-type: none"> <li>○ <b>Quiz 11 – 25 pts.</b> (5.14, 5.16, 5.18, 5.19, 5.21, 5.23)</li> <li>○ Work on Unknown Chart</li> </ul>	
24	Thurs, Apr 7	<b>Unknown Chart Due – 25 points</b>	



25	Tues, Apr 12	Start Unknown Project	
26	Thurs, Apr 14	Unknown Project	
27	Tues, Apr 19	Unknown Project cont.	
28	Tues, Apr 21	Unknown project cont.	
29	Thurs, Apr 26	○ <b>Turn in Unknown Project - 75 points</b>	
30	Tues, Apr 28	No Lab	
	May 4 *Grades posted		