

## **Syllabus for Biology 2420 – Microbiology Fall 2011 V2.0**

**Instructor:** Daryl Beatty

**Office:** HS-225-D

**Office phone:** 230-3433

**Email:** [daryl.beatty@brazosport.edu](mailto:daryl.beatty@brazosport.edu)

**Alt. phone** Office Professional – Debbie Duncan Office: HS-225-K Office phone: 230-3225

**Web Page:** [www.darylbeatty.org](http://www.darylbeatty.org) - For many class resources

### **1. Course Description**

This course is intended to be a transfer level course for nursing and allied health field majors. 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.

### **2. Prerequisites**

BIOL 1406 and BIOL2401 (A&P 1)

### **3. Course Goals**

**The following are the student learning outcomes:**

- Students are required to read a college-level textbook in addition to a college-level laboratory manual 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, laboratory quizzes and scientific journal on laboratory experiments.
- Students are required to give an in class presentation on a disease or microorganism of their choice using appropriate visual tools.
- Lecture requires students to think about processes invisible to the human eye. Lab requires problem solving capabilities and troubleshooting during lab activities. 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. Assessment is done by responses to select questions on written exams.
- Students acquire an understanding of the issues related to drug treatments, disease, and genetic breakthroughs in treating diseases. Students learn cloning, genetic engineering, mechanisms of carcinogens, and screening for different diseases. Students learn and demonstrate the use of micropipetters, colony counters, and different growth media for the use of culturing bacteria in lab. Students learn how to prepare their own culture media, isolate bacteria, and stain for diagnostic purposes. Students are assessed on these skills by classroom observation and written examination
- 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 employ the scientific method to effectively gather and analyze data. This also includes a background on a hypothesis versus a theory. Koch's postulates to determine agents of disease are studied. Students are assessed on their knowledge by results and conclusions in their scientific journal and written examination.
- 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.

- In laboratories, the students are required to demonstrate use of microscopes, **aseptic technique**, the use of culture media and **staining**. These techniques are demonstrated by classroom observations and written tests.
- Students are required to keep a **laboratory notebook** outlining their lab experience including objectives, methods, results, and conclusions. Assessment of their performance is measured through quizzes, lab data sheets and through instructor evaluation of laboratory techniques.

#### 4. Textbook and course material information

**Required Textbook:** Microbiology with Diseases by Body System. Robert Bauman.

**Required Lab Manual:** Microbiology: Laboratory Theory and Application. Leboffe & Pierce, 2<sup>nd</sup> ed.

**Recommended Lab Atlas:** Photographic Atlas for the Microbiology Laboratory. Leboffe and Pierce, 3<sup>rd</sup> ed.

**Web Resources:** Lecture material [www.darylbeatty.org](http://www.darylbeatty.org)

Online Homework: [www.masteringmicrobiology.com](http://www.masteringmicrobiology.com) Course ID: MICRO1

#### 5. Lab Requirements

This course has two weekly laboratories of two hour duration. The course syllabus will have the required laboratory exercises listed. It is **recommended** students keep a hard bound laboratory notebook which describes the lab and records results and conclusions. Students are required to prepare for the lab in advance by reading the exercises and enter objectives, materials and methods into the lab notebook.

Laboratory exercises and lab tests must be done the day they are scheduled. **There are no make up labs or tests. Students will turn in their lab reports, in a binder near the end of the semester.**

#### 6. Students with Disabilities

BC is committed to providing equal education opportunities to every student. BC offers services for individuals with special needs and capabilities including counseling, tutoring, equipment, and software to assist students with special needs. Please contact Phil Robertson, Special Populations Counselor, 979-230-3236 for further information.

#### 7. Academic Honesty

BC 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 **copying work of others**, cheating, **plagiarism, and collusion** shall be treated appropriately. **Any of these activities can lead to dismissal from class with an F and recommendation to be expelled from the college.** Please refer to the Brazosport College Student Guide for more information, this is available online at <http://www.brazosport.edu>, click on the link found on the left side of the homepage.

#### 8. Attendance and Withdrawal Policies

The Brazosport College Life Sciences Department believes attendance in both lecture and lab is critical for the comprehension of material. I will take attendance in Lecture and Lab. **The student is responsible for officially withdrawing from the course.** To officially withdraw from the course, students must complete and sign a withdrawal form, available in the Registrar's Office.

#### 9. Course Requirements and Grading Policy

Some topics are best addressed in a lecture setting while others are more suited for lab. Most of my class slides will be available online on my website: [www.darylbeatty.org](http://www.darylbeatty.org). The notes are not all inclusive and I will not cover all of the material in lecture. **You are strongly encouraged to take notes.** **You must read and study the textbook.**

For each testing period you will be given a study guide which consists of a set of questions and vocabulary words. These assignments are intended to keep you up with the material and help you gauge how prepared you are for the major exams. The questions should be answered and the words defined in order to learn the material.

Each student is required to make a 10 minute presentation with visual aids on a current topic in microbiology.

Grading: (What you have been waiting for): Class and lab grades will be integrated into a single grade for the course.

Lab Grade:

Morphological Unknown	25 pts
Demo Skills	25 pts (aseptic tech )
Unknown Project	100 pts
Lab reports (near end of semester)	50 pts
Lab Quizzes/Reports (10 out of 12)	250 pts
Safety (gas lines, etc...)	<b><u>possible minus pts</u></b>
	<b>400 pts possible – lab</b>

<b>Overall Grade:</b>	Lab	400 pts
	Exams	400 pts (best 4 of 5, including final)
	Online Homework	100 pts
	Special Project	50 pts (Item 13 below)
	<u>Presentation</u>	<u>50 pts (Item 13 also)</u>
		1000 pts possible – total ( <b>this can vary depending on assignments</b> )

- A – 90-100%**
- B = 80 – 89%**
- C = 70 - 79%**
- D = 60 – 69%**
- F = < 60%**

## 10. Testing

There are typically four 100 point lecture exams. The exams may consist of short answer, multiple choice, case studies, and /or essay questions. If you take all four lecture exams at their scheduled times you have the option of taking the comprehensive final exam to replace a lower exam score. If you miss one of the four lecture exams you will take the comprehensive final exam during finals week as a “makeup” to replace the missing score.

The final exam is a comprehensive and will cover the entire course content. Doing well on the first four is a good idea.

Practical tests in the laboratory include a demonstration of aseptic technique (25 points) , stain quiz ( and identification of unknown organisms.

#### 11. Make-up policy

**There are no makeup lab quizzes or lecture exams. All assignments must be turned in at the assigned time. Tests may be taken EARLY in the LC, if you have a conflict, but not late. This is why we allow the lowest test to be dropped.**

#### 12. Student Responsibilities

Students are expected to fully participate in the course. The following criteria are intended to assist you in being successful in this course.

- a. Understand the syllabus requirements
- b. Use appropriate time management skills
- c. Communicate with the instructor
- d. Complete the course work on time
- e. Utilize online components (such as WebCT) as required.

#### 13. Projects and Assignments

- **Class Presentation:** Each person will select a current topic in microbiology and give a 10 min presentation in class using some type of electronic visual aids. The topic must be approved by the instructor.
- Reading assignments and case studies – Typically students will be given a reading assignment on a current topic in microbiology and will be required to write a summary of key points of the reading.
- **Special Project** – Reading assignment and written report on a topic in one of these areas:
  - Nosocomial infections, sanitation in medical settings
  - Personal sanitation
  - Hand Washing
  - Food Handling and Safety
  - Methods and principles of sterilization
  - Sanitation and disease in 3<sup>rd</sup> world countries
  - Water borne diseases and organisms, assuring a safe water supply
  - Other topics may be used with the approval of the instructor
- Study guides are given out for each test for students to use as a study aid.

#### 14. Other Student Services Information

- Information about the Library is available at <http://www.brazosport.edu/~lib/Information.htm> or by calling 979-230-3310.
- Information about study skills and tutoring for math, reading, writing, biology, chemistry, and other subjects is available in the Learning Assistance Center (LAC), see [www.brazosport.edu/~lac](http://www.brazosport.edu/~lac) or call 979-230-3253
- To contact the Life Sciences Department call 230-3225.
- The Student Services area provides assistance in the following:
  - Counseling and Advising      979-230-3040
  - Financial Aid                      979-230-3294
  - Student Activities                979-230-3355.
- To reach the Information Technology Department for computer, email, or other technical assistance call the Helpdesk at 979-230-3266

**Microbiology –Tentative Schedule  
Fall 2011**

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

Date	Lecture Topic	Lecture Reading	Lab Schedule	Lab Exercise
Aug. 30 Tues	Syllabus, History of Microbiology	Chapter 1	<ul style="list-style-type: none"> <li>○ Safety &amp; Lab Practices pp. 1-6</li> <li>○ Lecture text Chap. 5 pp. 145 – 148 and 156-160</li> <li>○ Media Prep - Demo</li> <li>○ Ubiquity of Bacteria</li> </ul>	<ul style="list-style-type: none"> <li>○ 1.2 Demo p. 13</li> <li>○ 2.1 p.48</li> <li>○ Read p. 47</li> </ul>
Sept. 1 Thurs	Modern Age of Microbiology	Chapter 1	<ul style="list-style-type: none"> <li>○ Results</li> <li>○ Lecture text Chap. 5 pp.153 – 156</li> <li>○ Aseptic Technique – read p. 19</li> <li>○ Streak Plate</li> </ul>	<ul style="list-style-type: none"> <li>○ 1.3 p. 20</li> <li>○ 1.4 p. 29</li> </ul>
Sept. 5	College Closed Labor Day			
Sept. 6 Tues	Cell Structure and Function	Chapter 2	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 1 – 25 pts</b> (pp. 1-6, 1.2, 2.1 &amp; notes)</li> <li>○ Results</li> <li>○ Colony morph.</li> <li>○ Growth in broth</li> </ul>	<ul style="list-style-type: none"> <li>○ 2.2 p. 55</li> <li>○ 2.3 p. 65</li> <li>○ 2.4 p. 69</li> </ul>
Sept. 8 Thurs	Cell Structure and Function	Chapter 2	<ul style="list-style-type: none"> <li>○ Lecture text Chap. 3 pp. 72 -76</li> <li>○ Results</li> <li>○ Microscope Care and use</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.1 p. 120</li> <li>○ Read p. 119</li> <li>○ Examine prepared slides</li> </ul>
Sept. 13 Tues	Classification and ID of Microorganisms	Chapter 3	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 2 – 25 pts</b> (1.3, 1.4, 2.2, 2.3, 2.4 &amp; notes)</li> <li>○ Lecture text Chap.3 pp. 81-87</li> <li>○ Aerotolerance Chap. 5 pp.146-147</li> </ul>	<ul style="list-style-type: none"> <li>○ 2.6 p. 77</li> <li>○ 2.13 p.115 (optional)</li> </ul>
Sept. 15 Thurs	Microbial Nutrition and Growth <b>Last day to get presentation topic approved</b>	Chap. 5 pp. 161 - 173 (rest of chapter covered in lab)	<ul style="list-style-type: none"> <li>○ Results</li> <li>○ Read pp. 140, 145-148</li> <li>○ Chap. 10 pp.303 - 308</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. 149</li> <li>○ 3.5 p. 155</li> </ul>
Sept. 20 Tues	<b>Exam #1 – 100 points</b>		<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 3 – 25 pts</b> (3.1,2.6 &amp; notes)</li> <li>○ Water Disinfection Lab</li> <li>○ (Not in your lab book, bring 3 empty 16 oz plastic water bottles )</li> </ul>	
Sept. 22 Thurs	Controlling Microbial Growth in the Environment	Book Chap. 8 Online Chap 9	<ul style="list-style-type: none"> <li>○ Interpret Results from Water Disinfection lab</li> </ul>	
Sept. 27 Tues	Controlling Microbial Growth in the Body	Book Chap 9 Online 10	<ul style="list-style-type: none"> <li>○ Lecture text Chap.2 cell walls pp. 37 - 40</li> <li>○ Gram stain</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.6 p. 159</li> </ul>

Sept. 29 Thurs	Characterizing and Classifying Prokaryotes	Book Ch. 10 Online 11	<ul style="list-style-type: none"> <li>○ Acid Fast Stain</li> <li>○ Capsule stain</li> <li>○ India Ink for capsule</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.7 p. 167</li> <li>○ 3.8 p. 173</li> <li>○ Dufilho's capsule stain - Handout</li> </ul>
Oct. 4 Tues	Characterizing and Classifying Eukaryotes	Book Ch. 11 Online 12	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 4 – 25 pts.</b> (3.4, 3.5, 3.6,3.7, 3.8, india ink &amp; notes)</li> <li>○ Endospore stain</li> <li>○ Motility</li> </ul>	<ul style="list-style-type: none"> <li>○ 3.9 p. 177</li> <li>○ 3.10 p. 183</li> <li>○ 3.11 p. 187</li> </ul>
Oct. 6 Thurs	Characterizing and Classifying Viruses, Viroids and Prions	Book Ch. 12 Online 13	<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. 191</li> </ul>
Oct. 11 Tues	<b>Exam 2 – 100 pts</b>		<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 5 – 25 pts</b> (3.9, 3.10, 3.11 &amp; notes)</li> <li>○ Lecture text Chap. 9, pp. 281 - 283</li> <li>○ Antibiotic Sensitivity Test</li> </ul>	<ul style="list-style-type: none"> <li>○ 7.2 p. 371</li> </ul>
Oct. 13 Thurs	Infection, Infectious Diseases <b>Turn in Special Project – 75 points</b>	Book Ch. 13 Online 14	<ul style="list-style-type: none"> <li>○ Results</li> <li>○ Lecture Text Ch. 10 pp. 303 – 308, 314 - 318</li> </ul>	<ul style="list-style-type: none"> <li>○ Observe Slides of various prokaryotes</li> </ul>
Oct. 18 Tues	Immunization & Immune Testing	Book Ch. 16 Online 17	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 6 – 25 pts</b> (7.2 &amp; notes)</li> <li>○ Selective Media</li> </ul>	<ul style="list-style-type: none"> <li>○ 4.1 – 4.6 p. 198</li> <li>○ Read p. 197</li> </ul>
Oct. 20 Thurs	Aids and Other immune	Book Ch. 17 Online 18	<ul style="list-style-type: none"> <li>○ Results</li> </ul>	<ul style="list-style-type: none"> <li>○</li> </ul>
Oct. 25 Tues	Microbial diseases of the Skin & Wounds ( <b>Turn in draft of presentation- 25 pts</b> )	Online 19	<ul style="list-style-type: none"> <li>○ <b>Lab Quiz 7 – 25 pts</b> (4.1 – 4.6 and notes)</li> <li>○ Differential Tests - Oxidation and Fermentation media</li> </ul>	<ul style="list-style-type: none"> <li>○ 5.1 – 5.6 p. 226</li> <li>○ Read 225</li> </ul>
Oct. 27 Thurs	Microbial diseases of the Nervous System & Eyes	Chapter 20	<ul style="list-style-type: none"> <li>○ Results</li> <li>○ Microscopic Observation of Eukaryotes</li> </ul>	<ul style="list-style-type: none"> <li>○</li> </ul>
Nov. 1 Tues	Microbial diseases of the Cardiovascular & Systemic diseases	Chapter 21	<ul style="list-style-type: none"> <li>○ <b>Quiz 8 – 25 pts</b> (5.1 – 5.6 and notes)</li> <li>○ Lecture text Chap 12, pp. 380 – 384</li> <li>○ Plaque Assay</li> </ul>	<ul style="list-style-type: none"> <li>○ 6.3 p. 349</li> </ul>
Nov.3 Thurs	<b>Exam 3 – 100 points</b>		<ul style="list-style-type: none"> <li>○ Results and discussion</li> <li>○ Lecture text Chap. 12 pp. 390 – 392 – Culturing Viruses</li> </ul>	
Nov. 4	<b>Last Day to Withdraw</b>			

Nov. 8 Tues	Microbial diseases of the Respiratory System	Chapter 22	<ul style="list-style-type: none"> <li>○ <b>Quiz 9 – 25 pts (6.3 &amp; notes)</b></li> <li>○ <b>Utilization, Decarboxylation, Deamination and Hydrolytic Enzymes</b></li> <li>○</li> </ul>	○ 5.7 – 5.13 p. 257
Nov. 10 Thurs	Microbial diseases of the Digestive System	Chapter 23	<ul style="list-style-type: none"> <li>○ Results and discussion</li> <li>○ Lecture text Chap 13, pp. 422 – 427 – Epidemiology of Infectious Disease</li> </ul>	○ 7.3 p. 377
Nov. 15 Tues	Microbial diseases of the Urinary & Reproductive System	Chapter 24	<ul style="list-style-type: none"> <li>○ <b>Quiz 10 – 25 points (5.7 – 5.13 &amp; notes)</b></li> <li>○ Hydrolytic enzymes</li> <li>○ Combination Differential media</li> <li>○ Antimicrobial susceptibility and resistance.</li> </ul>	<ul style="list-style-type: none"> <li>○ 5.14 p. 293</li> <li>○ 5.16 – 5.18 p. 301</li> <li>○ 5.20 – 5.21 p. 321</li> </ul>
Nov. 17 Thurs	Applied and Environmental Microbiology	Chapter 25	<ul style="list-style-type: none"> <li>○ Results and discussion</li> <li>○ <b>Quiz 11 - Morbidity and Mortality report due – 25 points</b></li> </ul>	
Nov. 22 Tues	<b>Exam 4- 100 points</b>		<ul style="list-style-type: none"> <li>○ <b>Quiz 12 – 25 pts (5.14, 5.16 – 5.18, 5.20 – 5.21)</b></li> </ul>	
Nov. 24 Thurs	<b>No Classes – Thanksgiving</b>		<b>No Lab</b>	
Nov. 29 Tues	<b>Class Presentations – 75 pts</b>		<ul style="list-style-type: none"> <li>○ <b>Start Unknown Project</b></li> </ul>	○ p. 455 - 480
Dec. 1 Thurs	<b>Class Presentations – 75 pts</b>		<ul style="list-style-type: none"> <li>○ Unknown project cont.</li> </ul>	
Dec. 6 Tues	<b>Class Presentations – 75 pts</b>		<ul style="list-style-type: none"> <li>○ Unknown project cont.</li> </ul>	
Dec. 8 Thurs	<b>Class Presentations – 75 pts / Review for final</b>		<ul style="list-style-type: none"> <li>○ <b>Turn in Unknown Project - 100</b></li> </ul>	
Dec.13 Tues 5 PM	<b>Optional Final Comprehensive</b>	<b>Finals Week</b>	No Lab	