BIOLOGY 2420 LAB

APPLIED MICROBIOLOGY

1 CREDIT HOURS

FALL 2017

Section: 3,4,5,6,7 **Bldg:** LDB
Time: T & W **Room:** 119D

Course Coordinator and Lecturer:
Dr. Jordan Clark

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Head Lab Instructor:
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Prerequisites: A minimal grade of C or better in Human Anatomy (BIO 2401), Human Physiology (BIO 2402) and a course in introductory chemistry are required. This course may not be applied for biology major credit and is open only to students pursuing degrees in nursing, physical therapy, physical education, or other related health fields.

> **NOTE: A minimum GPA of 3.0 (B average) in science courses is required to even apply to Nursing School. Students admitted to Nursing School have an average GPA of 3.4. So, if you want to get into Nursing School, obtain no less than a B in all of your pre-nursing courses. In addition, nursing schools tend to look more favorably on applicants who do not retake any single course more than once, or have more than two different courses retaken.**

Course Description: All of you have been involved in science laboratory components during your coursework at previous institutions. All of these were based on active learning, the idea that students DOING enhances learning compared to students simply reading about it, or listening to a lecture on it. As the famous quote goes, "tell me and I forget, show me and I remember, involve me and I understand." While active involvement is important, this lab goes beyond the approach of students simply performing activities based on instructions given. Inquiry-based learning (IBL) is a pedagogical approach in which learning is based on students asking and answering questions, thus it is very similar to the experimental process used by professional scientists. The instructor does not give the students' knowledge, but instead guides students to discover the knowledge themselves, and therefore also learn the discovery process. In this lab you will work in groups to not only solve problems, but also to learn to ask the right questions. IBL is also called open learning, or exploratory learning. This fits well with the concepts-based approach in this course overall, where the focus is understanding rather than memorizing a list of facts. To take an

example from the lab, the focus is not memorizing the four steps of the Gram stain, but understanding how the Gram stain works, why the results appear the way they do, and how this differential stain is utilized in microbiology. What is the point of all this? I want to encourage you in this lab to be curious, to explore, to investigate, to consider carefully, and finally, to understand. Your responsibility is to be prepared, and to give your best efforts.

A related topic is EXPERIMENTAL DESIGN. All of you can recite the scientific method, but designing experiments to give clear, interpretable results that test a hypothesis is far more challenging than it sounds. Part of the IBL you do in this course will involve you designing and proposing experiments. In the simplest form, an experiment is a method to test an idea in a rigorous way which will minimize bias and error. Another way to explain an experiment is that it involves repeating a process, each time varying only one thing (changing one variable only, such as temperature). Positive controls are included in experiments to be sure the methods are working properly (i.e., including a catalase positive organism along with your unknown in the catalase test). Negative controls have a similar function (i.e., including a buffer-only sample when do spectrophotometry). Conclusions from data are much stronger when controls are included, as confidence in the methods is higher. I do not want you to think in terms of "right or wrong" answers from experiments, but rather, what are possible explanations of the results (and there are usually multiple explanations).

Required Text

General Microbiology and Applied Microbiology Biology 3470 and 2420 Laboratory Manual (2016) is available only from Eagle Graphics, at 1304 Sam Houston Avenue. This is a loose leaf version, so purchase a three-ring binder to hold it (1.5 or 2 inch diameter suggested). This custom manual is produced for this course, so is not available elsewhere. Proceeds from the sale of this manual go to student scholarship funds.

Optional for the laboratory is *A Photographic Atlas for the Microbiology Laboratory, 4th Edition* (3rd edition is fine as well), by Leboffe and Pierce, from Morton Publishing Company. Students who are visual learners have found this atlas very helpful in the lab for knowing what to expect for experimental tests and procedures. The custom lab manual does not have elaborate pictures, to keep costs down. Copies of this should be available in the on-campus bookstore.

Recommended reading: *Get Ready for Microbiology*, by Garrett and Penn, pub by

Benjamin Cummings, ISBN 0-321-59592-0. A copy of this book is on reserve at the University Library so you can take a look at it free of charge, please take advantage of this resource. In addition, you can find this book in the Study Area of the Pearson Mastering Microbiology website.

NOTE: I'll be posting handouts, lecture notes, chapter objectives, assignments, schedule, etc. on Blackboard. You should plan to access the course site often (daily). The course schedule is continuously updated.

Attendance and Expectations: Attendance is mandatory. Each class meets for approximately 3 hours once a week and you are expected to be present the entire class period or until you are dismissed. There

is a 10 minute tardy policy: If you arrive after the first 10 minutes of lab you will be given a zero for that lab's quiz.

Course Evaluation

Assessment	**Points**	**Weight(%)**
Quizzes	10	25
Progress reports	Vary	10
Lab Project	100	65
Total		***100***

Should an error be made in scoring exams, I must be informed within a week of the time exam grades are posted. Corrections will not be considered after that period.

UNIVERSITY POLICIES

ACADEMIC DISHONESTY:

All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

Cell phones must be put on vibrate and put away during class, and absolutely during exams. If your cell phone is out during testing days, then your exam will be taken up and you will receive a "0" for the test, and face possible additional disciplinary action.

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY:

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911 (a) (2) defines a religious holy day as: "a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20…." A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s).

The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed. For a complete listing of the university policy, see:

http://www.shsu.edu/~vaf_www/aps/documents/861001.pdf

STUDENTS WITH DISABILITIES POLICY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:
http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf

VISITORS IN THE CLASSROOM:

Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

Lab Safety: Cell telephones must be turned off and put away before class begins**.** Students are prohibited from reading, sleeping, texting, talking at inappropriate times, or engaging in any other form of distraction. Your TA will discuss lab safety and protocol in detail during the first meeting.

Tentative Schedule

Lab Number	Activity
2 **Microscopy Week**	• Lab safety and intro • Group assignments • Sterile Techs • Intro to Microscopy
3 **Staining Week**	• Gram stain • Endospore stain • Capsule stain • Extra
4 **Cultures and Assays Week Part I**	• Differential • Selective • Temperature • pH • Interaction plates
5 **Cultures and Assays Week Part II**	• Metabolic tests(catalase,oxidase,KOH) • Phenol Red • KIA
6 **Cultures and Assays Week Part III**	• Biofilm formation • Blood agar • Antibiotic sensitivity
Identification of Unknowns	
7	Unknown 1 •
8	Unknown 1 •
9	Unknown 2 •
10	Unknown 2 •
11	Unknown 3 •
12	Unknown 3
13	•
14	**Thanksgiving**
15	**Presentations**