BIOT 5222L **Advanced Metabolism - LAB** **Credit Hours: 2**

Semester:	Spring	**Year:**	2024
Class Day/Time:	Tuesdays, 1:30-5:30p	**Class Location:**	112.1 & Lab B3 and B4

Instructor of Record: Dr. Mitsuo Ikebe Coordinator
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Office Hours: Thursday between 4 to 5 P.M. and other times with appointment

Course Description: Lab Component. The primary objective of this course is to learn how to plan and perform experiments broadly related to metabolism, and analyze and interpret the experimental data.

Prerequisite: BIOT 5312 **Co-requisite:** BIOT 5222

Goals of Course & Course Objectives:

Course Objectives:

1. To demonstrate the ability to obtain laboratory results within a prescribed period of time marked by milestones.
2. To understand the basic principles and best practices of maintaining a proper lab notebook.
3. To be able to design and carry out an experiment to measure the biochemical characteristics of enzymes, calculate, plot and interpret kinetic data.
4. To be able to design and carry out experiments related to membrane biology and signal transduction.
5. To be able to understand the methods and carryout experiments related to muscle physiology, lung physiology, blood clotting, cancer and vascular physiology.
6. To be able to analyze the experimental data and prepare formal lab reports.
7. To be able to communicate and discuss the basic theory and practice of experiments performed in the class.

Student Learning Outcomes (Course Competencies):

1. The student will be able to learn the practice of good lab notebook recording
2. The student will be able to learn how to use common laboratory equipment
3. The students will be familiar with graphic and analytic tools available to presentation of experimental data and analysis of data
4. The student will be able to prepare and manipulate lipid vesicles.
5. The student will be able to assay enzymatic activity and determine kinetic constants.
6. The student will be able to understand one or more methodology available for studying signal transduction.
7. The student will be able to prepare cell samples to measure the cell contraction and able to assay the effect of hormone/neurotransmitter in muscle cell contraction.
8. The student will be able to fractionate blood cells, identify different blood cell types, and measure blood clotting reactions.

9. The student will be able to learn the techniques to examine the relationship of metabolism and the development of various diseases.

Course Assessment/Methods of Evaluation:
The student will be evaluated based on class participation, ability to follow oral and written instructions in performing experiments, basic understanding of the concept, methods and procedures of experiment that will be performed, successful completion of experiments, keeping the lab note book, and providing lab reports. Maintaining the lab notebook and providing the formal lab reports will have more weightage than all other assessments. Students who successfully complete the course will demonstrate a thorough understanding of fundamental metabolic, cellular physiology and enzymological principles used in biotechnology, including basic background information, theory and application.

- **Keeping Lab Notebook:** This will be based on recordkeeping, writing and data analysis in the lab notebook in timely fashion.
- **Written Lab Reports:** There will be six **short** reports and four **full reports** written in correct scientific technical format will be scored based on content, clarity, and quality of writing. **The full lab** reports must include the following sections: Title, Summary (including purpose), Introduction (including Background), Materials and Methods, Results, Discussion, References. **The short** lab report must include the following sections: Title, Purpose, Materials and Methods, Results and Discussion. **Due Date is one week after the lab at 5:00pm. (80% of grade including Examination)**

- **Examinations:** There will be non-comprehensive exams (a final) on the subjects that do not assign the lab report. The exams will be of a subjective format based on preceding lectures and are their worth is proportionate to number of classes covered for the exam in the final grade calculation.

- **All documents have to be typed, and handwritten documents are not acceptable.**

- **Class Participation and Attendance: Punctual attendance is critical, and active participation in lab experiment is very important. It is critical to sign (legibly) the sign-up sheet for each class to record your attendance. Students are expected to be in attendance for the majority of the class time. If not, students will not get full-credit for attendance. Tardiness of more than 30 min may not get full credit. (20% of grade)**

- **Each short lab will have 100 points. A lab module that extends to two lab classes will have 200 points (full lab report).**

- A grade of less than a B may result in loss of Graduate Assistantships.
- No grades will be withheld for completion of work except in extreme circumstances.
- Every attempt will be made to hand out reading assignments and descriptions of lab procedures one week prior to their performance. Therefore, students will be expected to be prepared at the beginning of each lab.
- Lab reports will be expected to be formal write-ups with an emphasis on computer manipulation and presentation of data as is expected in industry and research laboratories. Most of these reports should have a Title, Purpose, Summary,

Background, Materials, Methods, Results, Discussion, References and Answers to and questions posed.

Work turned in late will lose 5% (1 day late), 10% (2-3 day late), 20% (4-7) and 30%(7-14) of the points possible. Reports turned in more than two weeks late will not be accepted.

Linked Program Learning Outcomes:
The student learning outcomes listed above address the following Biotechnology Program PLOs:

- PLO-1. The student will demonstrate English communication skills in both oral and written forms.
- PLO-2. The student will demonstrate mastery of basic and advanced biotechnology methods
- PLO-3. The student will demonstrate the ability to safely operate basic and advanced laboratory equipment, analytic devices and computers.
- PLO-4. The student will demonstrate independent and critical thinking skills integrated with the ability to utilize multiple informational resources.
- PLO-5. The student will explain the principles, mechanisms and interrelatedness of both in vivo and in vitro biochemical, molecular biological and genetic processes.

Textbook:
Biochemistry (4th Edition), by Donald Voet and Judith G. Voet, © John Wiley & Sons, Inc., 2011; ISBN 978-0-470-57095-1

Course Content: Enclosed

Other Class Policies:
Attendance:
Regular or punctual attendance is expected. If a student misses a class or lab, the student is responsible for obtaining any information distributed during those times. Make-ups are possible only under certain instances (labs cannot be made up). Arrangements for any make-ups and/or missed labs should be discussed directly with the instructor for that day's class.

Academic Honesty:
Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

Cheating
Dishonesty of any kind involving examinations, assignments, alteration of records, wrongful possession of examinations, and unpermitted submission of duplicate papers for multiple classes or unauthorized use of keys to examinations is considered cheating. Cheating includes but is not limited to:

- Using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class.
- Falsifying or inventing any information, including citations, on an assigned exercise.
- Helping or attempting to help another in an act of cheating or plagiarism.

Plagiarism
Plagiarism is presenting the words or ideas of another person as if they were your own. Materials, even ideas, borrowed from others necessitate full and complete acknowledgment of the original authors. Offering the work of another as one's own is plagiarism and is unacceptable in the academic community. A lack of adequate recognition constitutes plagiarism, whether it utilizes a few sentences, whole paragraphs, articles, books, audio-visual materials, or even the writing of a fellow student. In addition, the presentation

of material gathered, assembled or formatted by others as one's own is also plagiarism. Because the university takes such misconduct very seriously, the student is urged to carefully read university policies on Misconduct in Research and Other Scholarly Activity 05.00. Examples of plagiarism are:

- Submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another.
- Submitting a work that has been purchased or otherwise obtained from an Internet source or another source.
- Incorporating the words or ideas of an author into one's paper without giving the author due credit.

Grade disputing:
The instructor of the class is the primary authority with respect to a student's proficiency and the grade in that class. A student who believes that his or her grade in a specific class reflects a capricious, arbitrary or prejudiced academic evaluation of the class and would affect the final grade, the student should first discuss the matter with the instructor of the class as soon as possible he/she knows the grade.

If no satisfactory resolution is reached with the instructor, or if the instructor is unavailable, and the student wishes to appeal, the student shall appeal to the course director. If the course director is unavailable, the dispute involves the course director or the decision of the course director is not acceptable to the student, the student may initiate a formal grade appeal in writing with the department head within two weeks of the last day of the semester in which the disputed grade was earned. Once a formal grade appeal is initiated, the appeal process will undergo the standard, the university-wide formulated appeal process.

Adding/Dropping:
The official deadline for adding and dropping courses is as published in the academic calendar and Graduate Bulletin (typically the day before Census Day). However, students are strongly encouraged to meet with their graduate advisor or the Program Coordinator prior to adding/dropping courses. Movement into and out of classes after the 4th class day requires approval of the Program Director. Students can drop until mid-semester without a WP or WF. Drops after mid-semester require approval of the Dean. Each student is responsible for their own enrollment status with the university.

Disability Accommodations:
UTHSCT abides by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, which mandate reasonable accommodations be provided for students with documented disabilities. If you have a disability and may require some type of instructional and/or examination accommodations, please contact me early in the semester so that I can provide or facilitate provision of accommodations you may need. If you have not already done so, you will need to register with the Student Services Office (located on the UT Tyler Campus). You may call 903-566-7079 for more information.

Program:	Master of Science in Biotechnology
Degree:	MS
Department:	Cellular and Molecular Biology
School:	Medical Biological Sciences
Course:	**BIOT5101/6101 – Biotechnology Research Seminar I & II**

Area	Marketable Skill*
TECHNOLOGY SKILLS	**Graphics or photo imaging software -** GraphPad, Adobe, ImageJ
	Office suite software — Microsoft Office (Word, Excel)
	Presentation software — Microsoft PowerPoint
SKILLS	**Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
	Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
ABILITIES	**Oral Comprehension** — The ability to listen to and understand information and ideas presented through spoken words and sentences.
	Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
	Oral Expression — The ability to communicate information and ideas in speaking so others will understand.
WORK ACTIVITIES	**Analyzing Data or Information** — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

*All marketable skills listed for this course and program were drawn from the Knowledge, Skills, and Abilities identified by the US Department of Labor and Statistics for “Biological Technicians” and “Molecular and Cellular Biologists” as published on O*Net Online (www.onetonline.org)