MS in Biotechnology Program

BIOT 5310 Fundamentals of Biomedical Research Credit Hours: 3

Semester: Fall **Year:** 2024
Class Day/Time: Thursdays 9 am – 12 pm **Class Location:** Rm 12.1

Instructor of Record: Dr. Pierre Neuenschwander
Office: 107.2 (Dr. Neuenschwander)
Office Phone: 903-877-7593 (Dr. Neuenschwander)
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Office Hours: Any time by appointment

Course Description: Designed for students desiring research projects directed by UT Tyler Biotechnology faculty, to provide an orientation into the research laboratory workplace, to develop skills in planning a laboratory project, and to present their work in both an oraland written context.

Prerequisite: As per program entry **Co-requisite:** None

Goals of Course & Course Objectives:

Objectives (Learning Outcomes):

1. To develop an understanding of basic laboratory workings, rules and expectations.
2. To prepare the student to enter the laboratory with a level of independence.
3. To expose the student to both student and faculty research seminars so as to enhance their own professional presentation ability.

Student Learning Outcomes (Course Competencies):
Knowledge and Understanding:
Students' understanding will be evaluated with both oral and written components. Students who successfully complete this course will demonstrate:

- A thorough understanding of laboratory concepts and practices.
- The ability to think independently and defend and discuss their ideas.

Course Assessment/Methods of Evaluation:

Assignments: Consists of in class and homework assignments (30%).

Participation: Consists of attendance, participation in discussions, and submission of rotation selections and thesis lab selections on-time (10%).

Laboratory Rotations: Students are required to rotate through four research labs for two weeks in each lab. During rotations students are required to shadow researchers and perform experiments under the guidance of the Principal Investigator of the lab. After each rotation, the student will submit a written report of the studies performed (60%).

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-4. The student will demonstrate independent and critical thinking skills integrated with the ability to utilize multiple informational resources.

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Textbook:
At the Bench – A laboratory Navigator by Kathy Barker; Cold Spring Harbor Laboratory Press (ISPN 0-87969-708-3)

Course Content:

Week 1 (8/29) Introduction/lab safety/notebook/scientific writing 1 **(Neuenschwander)**

Week 2 (9/5) Lab organization/scientific writing 2 **(Neuenschwander)**

Week 3 (9/12) Faculty Presentations 1 (5 presentations)

Week 4 (9/19) Faculty Presentations 2 (5 presentations)

Week 5 (9/26) Faculty Presentations 3 (5 presentations)

Week 6 (10/3) Faculty Presentations 4 (5 presentations)

Week 7 (10/10) Lab Rotation 1 — *Class time lecture topic:* Note Keeping **(Neuenschwander)**

Week 8 (10/17) Lab Rotation 1 — *Class time lecture topic:* Image Manipulation **(Lella)**
Rotation Report #1 due tomorrow

Week 9 (10/24) Lab Rotation 2 — *Class time lecture topic:* Chemical Safety/rDNA/Radioisotopes Infectious organisms **(Kurdowska)**

Week 10 (10/31) Lab Rotation 2 — *Class time lecture topic:* Animals/Humans/RCR **(Kurdowska)**
Rotation Report #2 due tomorrow

Week 11 (11/7) Lab Rotation 3 — *Class time lecture topic:* Statistics 1 **(Ndetan)**

Week 12 (11/14) Lab Rotation 3 — *Class time lecture topic:* Statistics 2 **(Ndetan)**
Rotation Report #3 due tomorrow

Week 13 (11/21) Lab Rotation 4 — *Class time lecture topic:* **TBD**

Week 14 (11/28) **Thanksgiving** **– no class**

Week 15 (12/5) Lab Rotation 4 — *Lecture topic:* **TBD**
Rotation Report #4 due tomorrow

Week 16 (12/12) **FINALS WEEK** **– no class**

Reading Assignments:

Chapters 1 – 6, *At the Bench – A Laboratory Navigator* by Kathy Barker; Cold Spring Harbor Laboratory Press (ISBN 0-87969-708-3).

Laboratory Rotations:

Four rotations. Each rotation is for two weeks. A rotation report is required after each rotation.

Other Class Policies:

Attendance:
Students are expected to attend all classes. Students will be allowed to miss **1 class** without penalty. Additional absences will be handled as follows:

2 absences	Lose 10% of overall grade in class
3 absences	Lose 15% of overall grade in class
4 absences	Lose 20% of overall grade in class
5 + absences	Student will have to remediate the course

Students will be considered absent if they arrive more than **15 minutes** after the start of class.

Emergencies
In the event of an emergency or sickness, the student **MUST** contact their PI and/or the Program Coordinator (Mr. Yonatan Moya) by phone or email **THE DAY OF** the expected absence. Failure to do so will result in the absence being counted as 2 absences, resulting in a 10% decrease in the class grade.

Assignments
Students are expected to turn in assignments on time. Late assignments will be handled as follows:

1 day late	5% deducted from overall assignment grade
2 – 3 days late	10% deducted from overall assignment grade
4 – 7 days late	20% deducted from overall assignment grade
7+ days late	30% deducted from overall assignment grade

Participation:
Student participation is required for the successful completion of this course. If a student decides not to participate in class, the professor may reserve the right to give an F in the course.

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 policy Sec. 8-802. Academic Dishonesty. 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.

AI (Artificial Intelligence) Policy:
UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

Use of AI is not permitted in this course at all.

To best support your learning, you must complete all graded assignments by yourself to assist in your learning. Doing your own work, without human or artificial intelligence assistance, is best for your efforts in mastering course learning objectives. This exclusion of other resources to help complete assignments includes artificial intelligence (AI). Refrain from using AI tools to generate any course context (e.g., text, video, audio, images, code, etc.) for any assignment or classroom assignment.

Adding/Dropping:
The official deadline for adding and dropping courses is as published in the academic calendar (Registrar Withdrawal webpage). 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. Each student is responsible for their own enrollment status with the university.

Disability Accommodations:
UT Tyler HSC 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 accommodation, please contact me early in the semester so that I can provide or facilitate the 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 main campus). You may call 903-566-7079 for more information.

A listing and description of all student policies can be found here: Manual of Policies and Procedures for Student Affairs.

MS in Biotechnology Program

MARKETABLE SKILLS FOR YOUR CV/RESUME

Program:	Master of Science in Biotechnology
Degree:	MS
Department:	Cellular and Molecular Biology
School:	Medical Biological Sciences
Course:	**BIOT5310 – Fundamentals of Biomedical Research**

Area	Marketable Skill*
TASKS	Maintain accurate laboratory records and data.
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.
WORK ACTIVITIES	**Documenting/Recording Information** — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.
	Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.
	Processing Information — Compiling, categorizing, calculating, tabulating, or verifying information or data.
	Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.
WORK CONTEXT	Wear Common Protective or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, or PPE.
	Importance of Being Exact or Accurate

*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)