BIOL 3380 Course Syllabus – Fall 2023
Biochemistry Laboratory

	Room	Section	Day	Time	Instructor
Lecture	**SCI 1.220**	**001**	Monday	8:30 am – 9:45 am	Pan, Rippel
Lab	SLC 2.207	**301**	Tuesday	8:30 am – 12:30 pm	STAFF
Lab	SLC 2.207	**302**	Tuesday	1:30 pm – 5:30 pm	Rippel
Lab	SLC 2.207	**303**	Wednesday	8:30 am – 12:30 pm	Rippel
Lab	SLC 2.207	**304**	Wednesday	1:30 pm – 5:30 pm	STAFF
Lab	SLC 2.207	**305**	Thursday	8:30 am – 12:30 pm	STAFF
Lab	SLC 2.207	**306**	Thursday	1:30 pm – 5:30 pm	Rippel
Lab	**SLC 2.206***	**307**	Thursday	1:30 pm – 5:30 pm	Pan
Lab	**SLC 2.206***	**308**	Friday	8:30 am – 12:30 pm	Pan
Lab	SLC 2.207	**309**	Friday	8:30 am – 12:30 pm	STAFF
Lab	**SLC 2.206***	**310**	Friday	1:30 pm – 5:30 pm	Pan

Contact Information

	Room	**Phone**	**email**
Dr. Jing Pan	FN 3.110	972-883-2884	jing.pan1@utdallas.edu
Dr. Scott Rippel	SLC 2.410	972-883-2510	rippel@utdallas.edu

Course Information

We are available during the week to discuss any educational matter that you think necessary. Please stop by any of the weekly lab sessions, email, or call for an in-person or TEAMS appointment.

If you have ideas for improvements to either the course or the laboratory facilities, please do not wait until the end of semester course evaluations to make those suggestions. We are fully open to constructive criticism, especially if alternative solutions are possible.

Graduate teaching assistants will be grading the lab reports under the supervision of the instructor. You are encouraged to contact the TAs about any questions concerning grading of the lab reports. If they are not able to satisfactorily answer your questions, then we strongly encourage you to contact us directly about our grading issues. We cannot make corrections unless you make us aware of issues.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Pre-Requisite:	BIOL2281 Introductory Biology Lab
Pre/Co-requisite:	BIOL3361 Biochemistry I
Suggested:	BIOL3301 Genetics

Course Description

BIOL3380 Biochemistry Laboratory (3 semester hours) Current techniques in the purification and characterization of enzymes to demonstrate fundamental principles that are utilized in modern biochemistry and molecular biology research laboratories. Practical skills taught include micropipetting, basic solution preparation, isolating crude enzyme extracts, and performing standard activity assays. Advanced experiments with Green Fluorescent Protein include Ni^{+2}-NTA affinity chromatography, protein detection using Bradford and spectrophotometric assays, SDS-PAGE separation, Western Blot analysis, and enzyme kinetics.

Student Learning Objectives/Outcomes

Objectives: The goal of this course is to give students hands-on learning of current techniques in the purification and characterization of enzymes to demonstrate fundamental principles that are utilized in modern Biochemistry and Molecular Biology research laboratories. Practical skills taught include micropipetting, basic solution preparation, isolating crude enzyme extracts, and performing standard activity assays. Advanced experiments with Green Fluorescent Protein and Lactate Dehydrogenase include Ni^{+2}-NTA affinity chromatography, protein detection using Bradford and spectrophotometric assays, SDS-PAGE separation, Western Blot analysis, enzyme kinetics, and basic clinical biochemistry assays. Each laboratory experience builds or interconnects with the others and seeks a balance between biological content and conceptual understanding.

Outcomes: Upon completing this course, students will gain both practical and analytical capabilities that are required for an introductory position in a modern molecular biology/biochemistry research laboratory

Students will be able to:
1. Perform basic math calculations used in biochemistry/molecular biology labs
2. Properly process and present data
3. Interpret data analytically and draw appropriate conclusions
4. Express scientific ideas by writing them in a clear, concise, logical, and accurate manner

BIOL 3380 Fall 2023 Course Calendar

Lecture SCI 1.220	Lab SLC 2.206/7	Topic	Due Dates
21 Aug	22-25 Aug	No lecture/lab	----
28 Aug	29 Aug-01 Sep	**Lab 1** - Safety, Measurements, Solutions **Math HW**	Q1 before lab 1 LR1 before lab 2 Math HW before lab 2
04 Sep	05-08 Sep	No lecture/lab – Labor Day	----
11 Sep	12-15 Sep	**Lab 2** - Purification/Characterization of a Phosphatase Enzyme	Q2 before lab 2 LR2 before lab 3
18 Sep	19-22 Sep	**Lab 3** - Expression of rGFP in *E. coli*	Q3 before lab 3 LR3 before lab 4
25 Sep	26-29 Sep	**Lab 4** - Purification of rGFP using Ni^{+2}-agarose	Q4 before lab 4 LR4 before lab 5
02 Oct	03-06 Oct	**Lab 5** - Determining Protein Concentration of rGFP fractions	Q5 before lab 5 LR5 before lab 6
09 Oct	---	In-person Open Question and Answer Review Session	
---	10-13 Oct	**Exam 1 and Calc A** covering lectures 1-5 and labs 1-5 Conducted in the lab room during your enrolled lab session	
16 Oct	17-20 Oct	**Lab 6** - SDS-PAGE analysis of rGFP fractions	Q6 before lab 6 LR6 before lab 7A
23 Oct on-line VO-PPT	24-27 Oct	**Lab 7A** - SDS-PAGE/Western blot transfer rGFP	While Lecture 7a is on-line, *we WILL conduct Lab 7a in-person.* Q8/LR8 before Lab 9
	23 Oct – 03Nov	**Lab 8** - Lab Multi-column purification Lecture 8: on-line VO-PPT lecture Lab 8: on-line lab	
30 Oct	31 Oct – 03 Nov	**Lab 7b** - Western Blot Development rGFP	Q7 before lab 7b LR7 before lab 9
06 Nov	07-10 Nov	**Lab 9** - UV-visible Spectroscopy	Q9 before lab 9 LR9 before lab 10
13 Nov	14-17 Nov	**Lab 10** - Enzyme kinetics - LDH	Q10 before lab 10 LR10 before Exam 2
20 Nov	21-24 Nov	No lecture/Lab – Thanksgiving Break	
27 Nov	---	In-person Open Question and Answer Review Session	
----	28 Nov – 01 Dec	**Exam 2 and Calc B** focusing on lectures 6 -10 and labs 6-9 Conducted in the lab room during your enrolled lab session	

Grading Policy

A breakdown of possible points earned during the course is presented below:

Assignment	Points		Assignment	Points
Lab Reports	270		Exam 1	150
Quizzes	100		Exam 2	150
Math Homework	20		Calculations Exam A	40
On Time Lab Attendance	30		Calculations Exam B	40
Top Hat Lec Questions	30			

Final Grades – The final course grades will be assigned based upon the standard grading scale below. We do not "give" any points at the end of the semester to raise a student's letter grade. Students earn their grade throughout the semester.

Points Earned	Letter Grade		Points Earned	Letter Grade		Points Earned	Letter Grade		Points Earned	Letter Grade
805	A+		722	B+		639	C+		556	D+
780	A		697	B		614	C		531	D
747	A-		664	B-		581	C-		498	D-

Students who enroll after the semester start date may be given additional time to complete the on-line quizzes and complete lab reports with data provided. Contact the instructor as soon as you enroll for details.

Required Textbooks and Course Materials

Background reading materials, lecture notes, lab protocols, and lab report questions can be accessed through the eLearning lecture course website. Quizzes and assignment submissions links are found in the eLearning lab website.

Students must download and subscribe to the Top Hat paid subscription service to answer in lecture questions utilizing their phone (or some other electronic device with internet capability). The subscription service may be purchased thru Top Hat directly or the University Bookstore.

Students must bring lab protocols to class as either a full-page hardcopy or a standard size laptop/tablet. Cellphones may NOT be utilized to access for lab protocols (students who attempt to will be directed to leave the lab).

Class materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved AccessAbility Resource Center (ARC) accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Course Policies

Covid-19 policy – We expect everyone to follow the current published CDC covid guidelines. Please do NOT come to class or lab if you have tested positive or are potentially contagious. Failure to act responsibly severely jeopardizes the health, safety, and social plans of your peers, their family/friends, and the instructors.

If you are absent because of covid, you will need to get lecture notes from your peers. With appropriate documentation (typically lab results or selfie with at-home covid test) we will provide on-line data to complete lab reports.

Lecture/Lab Materials – Fill-in the blank lecture notes, background readings, lab protocols, and lab report questions for each lab topic will be available on the eLearning *lecture website*.

Lecture Participation – You will have the opportunity to earn points based on your participation in the lecture class as documented via use of your Top Hat response app. Students *must* be present in the lecture hall to receive credit. *Submitting Top Hat response while not in the lecture room will be considered an academic integrity issue.* Participation points will NOT be awarded if you fail to either bring or properly utilize your Top Hat app during lecture. Questions with a correct answer are worth 2 pts: 1 pt for responding and 1pt for answering correctly. Some questions do not have a correct answer and are only worth 1pt for responding. Students who earn between 70%-100%, 60-69%, 50-59%, 0-49% of the total possible Top Hat points will receive 30, 25, 20, or 0 course points.

Lab Quizzes and Lab Reports – Each experiment consists of an online pre-lab quiz (10pts) and a post experiment lab report (30pts). Lab report questions will be posted in the eLearning *lecture website*. All graded submission links including on-line quizzes will be posted in your eLearning *lab website*. All graded assignments must be submitted electronically through your eLearning *lab website* ***before*** your enrolled lab session. Your lowest 30pt lab report score will be automatically dropped from the final grade.

Lab Quizzes may be resubmitted multiple times for grading ***before*** the deadline. Late quizzes will NOT be accepted.

Lab Reports will be deducted 3 points for each 24 hr late period. Lab Reports over one week late will not be accepted.

The lab report formats will vary from week to week depending upon the type of experiment that was performed. Please do not waste your time writing "traditional" report sections or making tables/graphs that are not asked for in the lab report. In general, the format will be short answer questions, calculations, presentation of data, and applying the concepts type questions to current or new data. Reports must be typed (figures and calculations may be neatly handwritten and electronically embedded into your lab report). Lab reports will not be accepted from students who do not completely participate in the laboratory session.

The TA's are committed to grading consistently within their sections. If you notice a difference between grading particular questions, please bring them to the TA's attention. They have been instructed to readjust grades to the students benefit. (i.e. No one will lose points for an Instructor or TA's error.)

You have one week from the time a graded lab report is returned to you to contest the severity of the grading by the TA. Except for clerical errors in the grade book, we will not consider changing the lab report grade after that week has passed.

Science is more than reading a book or performing a laboratory technique followed by filling in bubbles on a scantron or short answers on a lab report. Brilliant ideas are easily lost if they are not communicated clearly and concisely in a logical and accurate manner. If your lab report writing/presentation is confusing you may lose additional points from your report.

The lab actually begins with reading the background material, attending the lecture, and conducting the online pre-lab quiz BEFORE the upcoming experiment. It is important that you come to the lab with some basic knowledge of the experiment we will be performing.

Please, be on time to class! Tardiness is unprofessional and distracting to the instructors and your classmates. Part of your overall grade includes an "on time attendance" grade.

Switching Lab Sections - Attendance at a different lab section time is not allowed without prior approval of the instructor. Do not expect to be granted a "switch" at the last minute. *If you are given permission to attend another lab section, your previous lab report and your lab quiz are still due during your normally enrolled lab section - regardless of when your scheduled lab time is and when your switch lab time is.* Remember, students do not have the right to switch between lab sections. Switching labs is at the discretion of the instructor(s). **Accommodation for absence due to religious observance should be brought to instructor's attention by census day as indicated on the UTD academic calendar.**

Missed Labs – There are no scheduled "make-up" labs in this course. If you miss a lab you cannot submit the lab report and will automatically receive a "0." Please remember that your lowest 30pt lab report score will be automatically dropped from the final grade.

Exams – Written exams will occur during your scheduled lab session. However, we reserve the right to conduct the exams in the scheduled lecture time/room. Do NOT schedule work/personal appointments during the lecture day/time. When appropriate, we will provide a basic calculator and ruler for all exams. *No personal calculators or cell phones will be allowed.*

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.
The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. They are expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to the submission as one's own work or material that is not one's own. In general, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

In accordance with University regulations, we are obligated to investigate and refer potential scholastic dishonesty instances to the Dean of Students. We are not able to "handle it at our level." We urge you to protect yourself by reading the information located on UTD Office of Student Affairs website: http://www.utdallas.edu/deanofstudents/students/
Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details).

Each student will be performing the same experiment and be assigned the same lab report questions. Good scientists collaborate with others. In general principle, we have no issues with students collaborating together. However, the analysis and reporting of all data and lab report

answers is to be totally an individual effort. Examples of unacceptable collaboration include but are not limited to:

- Submitting Top Hat answers when not present in the lecture room.
- Copying another (current or former) student's lab report, homework, or extra credit work.
- Copying answers out of the lab manual or other sources (textbook/website) without appropriate quoting and referencing.
- Sharing a spreadsheet analysis of a data set.
- Copying another's answers during a quiz or exam.
- Changing a graded paper and requesting that it be regarded.
- Failing to turn in an assignment and then suggesting that the TA/Instructor lost it.
- Falsification of data.
- Presenting data, graphs, gels, or blots from another (current or former) student as if it was your results (unless explicitly permitted by the instructor).

Let us reiterate that scholastic dishonesty is a very serious offense and we will NOT tolerate it. While cheaters may not be concerned about intellectual honesty, our integrity is on the line if we suspect academic dishonesty and do nothing about it. *Suspicion of academic dishonesty WILL be reported to the Office of Community Standards and Conduct. We generally recommend a sanction of a zero for an assignment and/or an F for the course.*

Additional Topics

This course will follow all the rules and regulations as set forth by the University which can be accessed at the current UTD website (http://www.utdallas.edu). Please consult this website for additional important information concerning:

Student Conduct & Discipline	Student Grievance Procedures
Disability Services	Religious Holy Days
Copy Right Laws	Early Class Withdraw
Incomplete Grade Policy	Email Use

These descriptions and timelines are subject to change at the discretion of the instructors.