BIOL 3380 Course Syllabus – Fall 2013
Biochemistry Laboratory

Course Information

BIOL 3380 Biochemistry Laboratory

Lecture	(SLC 2.303)	Section 001	Mon	2:30 PM – 3:45 PM
Laboratory	(SLC 2.207)	# Section 101	Tues	1:30 PM – 5:30 PM
		* Section 102	Wed	8:30 AM – 12:30 PM
		# Section 103	Wed	1:30 PM – 5:30 PM
		# Section 104	Thurs	8:30 AM – 12:30 PM
		# Section 105	Thurs	1:30 PM – 5:30 PM
		* Section 106	Fri	8:30 AM – 12:30 PM

Professor Contact Information

Dr. Scott Rippel — Office SLC2.410 phone 972-883-2510; Lab SLC 2.207 phone 972-883-2277; email - rippel@utdallas.edu

* Dr. Elizabeth Pickett — Office SLC2.402 phone 972-883-2646; Lab SLC 2.207 phone 972-883-2277; email - beth.pickett@utdallas.edu

Office hours:

We are also available at other times throughout the week to discuss any educational matter that you think necessary. Please email or call for an 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.

Teaching assistants will be assigned to grade the lab reports. You will have the same teaching assistant for the entire semester. 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 question then we strongly encourage you to contact us directly about our grading issues. We cannot make corrections unless you make us aware of issues.

My section is:_____

My pipetman set is:_____

My Undergraduate TA is:_____

Contact Info:_____

My Graduate TA is:_____

Contact Info:_____

Peer Name:_____

Peer Contact Info:_____

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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 and Lactate Dehydrogenase include Ni^{+2}-NTA affinity chromatography, ion chromatography, protein detection using Bradford, Lowry, 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, ion chromatography, protein detection using Bradford and spectrophotometric assays, SDS-PAGE separation, Western Blot analysis, and enzyme kinetics. Each laboratory experience builds or interconnects with the others and seeks a balance between biological content and conceptual understanding.

Outcomes: Students will therefore:

1. Become proficient in micropipetting and the fundamental math required for a introductory position in a modern molecular biology/biochemistry research laboratory
2. Gain a solid experience in basic solution preparation, enzyme assays, protein purification, SDS-PAGE and Western Blot analysis.
3. Learn how to properly present and process data, interpret data analytically and draw appropriate conclusions.
4. Express scientific ideas by writing them in a clear, concise, logical and accurate manner

Lecture	Lab	Exp #	Assignment
26 Aug	27-30 Aug	1	Lab Safety, Measurements, and Solutions; Math
02 Sept	----	----	No Lecture – Labor Day Holiday
----	03-06 Sept	Math	Math work shop
09 Sept	10-13 Sept	2	Purification/Characterization of a Phosphatase Enzyme
16 Sept	17-20 Sept	3	Expression of rGFP in *E. coli*
23 Sept	24-27 Sept	4	Purification of rGFP using Ni^{+2}-agarose
29 Sept	----	----	Optional Exam Review – Location TBD, 7-9pm
30 Sept	**----**	***Exam 1***	***Exam 1- Experiments #1-#3 and Lecture #4***
----	**01-04 Oct**	***Lab Calc Exam A***	***Lab Calculations Exam A*** and review graded Exam 1
07 Oct	08-11 Oct	5	Determining Protein Concentration of rGFP fractions
14 Oct	15-18 Oct	6	SDS-PAGE/Coomassie Blue analysis of rGFP fractions
21 Oct	22-25 Oct	7	SDS-PAGE/Western blot transfer of rGFP fractions
28 Oct	29 Oct-1 Nov	8	Western blot development
03 Nov	----	----	Optional Exam Review – Location TBD, 7-9pm
04 Nov	**----**	***Exam 2***	***Exam 2 - Experiments #4-#7 and Lecture #8***
---	**05-08 Nov**	***Lab Calc Exam B***	***Lab Calculations Exam B***, review graded Exam 2, and Writing Lab
11 Nov	**----**	**----**	**Combined Lab Report Due**
11 Nov	12-15 Nov	9	Purification of LDH
18 Nov	19-22 Nov	10	Enzyme kinetics of LDH
25 Nov	26-29 Nov	----	No Lecture/Lab – Thanksgiving Holiday
01 Dec	----	----	Optional Exam Review – SLC 2.303, 7-9pm
02 Dec	**---**	***Exam 3***	***Exam 3 - Experiments #1-#10***

Experiment	Assignment	Max Grade	Actual Grade
1	Lab Safety, Measurements, and Solutions	40	
----	Math Homework	20	
2	Purification/Characterization of a Phosphatase Enzyme	40	
3	Expression of rGFP in *E. coli*	40	
4	Purification of rGFP using Ni^{+2}-agarose	40	
Exam 1	*Exam 1- Experiments #1-#3 and Lecture #4*	120	
Calc Exam A	*Lab Calculations Exam A*	30	
5	Determining Protein Concentration of rGFP fractions	40	
6	SDS-PAGE/coomassie blue analysis of rGFP fractions	40	
7	SDS-PAGE/western blot transfer of rGFP fractions	40	
8	Western blot development	-NA-	-NA-
Exam 2	*Exam 2 - Experiments #4-#7 and Lecture #8*	120	
Calc Exam B	*Lab Calculations Exam B*	30	
3-8	Combined Report Experiments 3-8	80	
9	Purification of LDH using affinity chromatography	40	
10	Enzyme kinetics of LDH	40	
Exam 3	*Exam 3 - Experiments #1-#10*	120	
----	On Time Lab Attendance	30	
----	Clicker Participation	30	
----	Extra Credit		
----	**Drop your lowest 40 point lab report**	**(Minus 40)**	
----	**Final Grade**	**900**	

Points Earned	Letter Grade	Points Earned	Letter Grade	Points Earned	Letter Grade
873	A+	756	B	630	C-
846	A	720	B-	603	D+
810	A-	693	C+	576	D
783	B+	666	C	540	D-

Required Textbooks and Materials

The BIOL 3380 – Fall 2013 Biochemistry Laboratory Manual and Lecture Notes can be purchased at the University Bookstore located in the Visitor Center/Bookstore Building.

The Turning Technologies "ResponseCard RF LCD" clickers can be purchased at the University Bookstore and at the Off Campus Bookstore.

Grading Policy

You can earn a total of at least 900 points for assignments in this course. A break down is presented below:

Lab Reports	420 points	Exam 1	120 points
On Time Lab Attendance	30 points	Exam 2	120 points
Clicker Participation	30 points	Exam 3	120 points
Calculations Exam A	30 points		
Calculations Exam B	30 points		

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.

Minimum Points Earned	Letter Grade	Minimum Points Earned	Letter Grade	Minimum Points Earned	Letter Grade
873	A+	756	B	630	C-
846	A	720	B-	603	D+
810	A-	693	C+	576	D
783	B+	666	C	540	D-

Course & Instructor Policies

Electronic usage during lectures – Given the style of lecture notes for this course, you do not need electronic devices (smart phones, iPads, and/or laptops). We require that all electronics be turned off during lectures. These types of devices can easily become a distracter to you, your classmates, and the instructors. If this policy causes a learning impairment please see us so we can make appropriate accommodations.

Lab Reports – You will perform 10 experiments and be assigned 9 lab reports each worth 40 points and one combined report worth 80 points. The lowest 40 point lab report will automatically be dropped from the final grade. There is an additional 20 point math homework assignment.

Pre-lab homework for the current lab is due at the beginning of the lab you attend. Late pre-lab homework will not be accepted for a grade.

Lab reports for previously conducted labs are due at the beginning of your normally enrolled section (regardless of the section you actually attend). Late reports will be deducted 4 pts per weekday and 6pts for the weekend. A late combined lab report will be deducted 8 pts. Reports over one week late will not be accepted.

It is the student's responsibility to get any late lab reports to their TA or Instructor. If you put a lab report in a TA's or Instructor's mailbox, it is your responsibility to promptly contact the TA/Instructor. Do not assume that you put the report in the correct mailbox or that the TA/Instructor actually received the report. "Late" emailed lab reports to the Instructor will be accepted only to stop the "late points" penalty from accumulating. A hard copy must be turned in for grading during the next schedule course meeting. The hard copy MUST match the emailed copy.

Always make a complete copy of your lab report before turning it in for grading. This will prevent problems when you need data from previous labs to complete the current lab report.

The lab report format will vary from week to week depending upon the type of experiment that was performed. Please do not waste your times answering questions, writing "traditional" report sections, or making tables/graphs that are not asked for in the lab report. In general, the format will be pre-lab homework, presentation of data, calculations, and short answers to discussion questions. Reports must be typed (except for figures and calculations). Pre-lab homework and 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.)

We understand that the grading will not be completely consistent between sections. At the end of the semester, we will *consider* the possibility of adding points to those lab sections that appeared to have a TA who graded harsher than other TA's. Please do not try to compare grading of lab reports between sections.

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 past.

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 loose additional points from your report.

The lab actually begins with reading the lab manual for the upcoming experiment. It is important that you come to the lecture with some basic knowledge of what we will be performing in the upcoming experiment. There will be in-lecture/lab quizzes. Most labs have pre-lab homework (see lab manual).

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 from both Instructors. 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 is still due during your normally enrolled lab section.* Your normally assigned TA will grade your report, regardless of the section you actually attended. Remember, students do not have the right to switch between lab sections.

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.)

We understand that the grading will not be completely consistent between sections. At the end of the semester, we will *consider* the possibility of adding points to those lab sections that appeared to have a TA who graded harsher than other TA's. Please do not try to compare grading of lab reports between sections.

Missed Lab – There are no scheduled "make-up" labs in this course. Students are expected to make prior arrangements with the Instructors to attend an alternate section. If additional seating is not available the missed lab will become the student's "drop grade."

Class Participation: You will have the opportunity to earn points based on your participation in the lecture class as documented via use of your clicker. Participation points will NOT be awarded if you fail to either bring or properly utilize your clicker during lecture (i.e., turning it on, responding to quiz questions, responding to attendance checks, etc.). Battery failure before or during the lecture will not be an acceptable excuse for failing to participate. 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 clicker points will receive 30, 25, 20, or 0 course points.

Exams – The exams will cover the material presented through and including the lecture just prior to the scheduled exam. The last exam will be more comprehensive in nature. The calculations exams will cover basic laboratory calculations. You must bring your own calculator to the exam. *No graphing, programmable, or cell phone calculators 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. He or she is 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, I am obligate 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). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

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:

- 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).
- Using another student's clicker in an attempt to earn points for that student or allowing another student to use your clicker in an attempt to earn points for you.

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 Judicial Affairs Office. 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.