BIOL 3380 Course Syllabus – Summer 2009
Biochemistry Laboratory

Course Information

BIOL 3380 Biochemistry Laboratory

Lecture	(FO3.616)	All Sections Tues	2:30 PM – 3:50 PM
Laboratory	(MP 2.202)	Section U01 Thurs	8:30 AM – 12:30 PM
		Section U02 Thurs	1:30 PM – 5:30 PM

Professor Contact Information

Dr. Scott Rippel Office FN3.104 phone 972-883-2510
Lab MP2.202 phone 972-883-2277
email - rippel@utdallas.edu

Office hours:

I am available throughout the week to discuss any educational matter that you think necessary. Please email or call for an appointment.

Additionally, if you want to see improvement in the course or the laboratory facilities, you must express your concerns in a constructive manner. Do not wait until the end of semester course evaluations to suggest improvements that could have been made during the semester. I am fully open to constructive criticism, especially if alternative solutions are possible.

Teaching assistants will be assigned to conduct the laboratories. You will have the same teaching assistant for the entire semester. You are encouraged to contact the TAs about any questions concerning the labs or lab reports.

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, conducting pH measurements, 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, conducting pH measurements, 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 May	28 May	1	Lab Safety, Measurements, and Solutions
02 Jun	04 Jun	3	Purification/Characterization of a Phosphatase Enzyme
09 Jun	11 Jun	4	Purification of rGFP using Ni^{+2}-agarose
16 Jun	18 Jun	5	Determining Protein Concentration of rGFP fractions
23 Jun	25 Jun	---	NO LECTURE OR LAB
30 Jun	02 July	6	SDS-PAGE/Coomassie Blue analysis of rGFP fractions
06 July	----	----	Optional Midterm Review – MP2.202, 7-9pm
07 July	**----**	***Exam***	***Midterm Exam on Experiments #1-#5 and lecture #6***
----	09 July	7	SDS-PAGE/Western blot transfer of rGFP fractions
14 July	16 July	8	Western blot development
21 July	23 July	9	Purification of LDH
28 July	30 July	10	Enzyme kinetics of LDH
	----	----	Optional Final Review – MP2.202, 7-9pm
11 Aug	**---**	***Exam***	***Final Exam on Experiments #1-#10, 2pm***

Experiment	*Assignment*	*Max Grade*	Actual grade
1	Lab Safety, Measurements, and Solutions	40	
3	Purification/Characterization of a Phosphatase Enzyme	40	
4	Purification of rGFP using Ni^{+2}-agarose	40	
5	Determining Protein Concentration of rGFP fractions	40	
6	SDS-PAGE/coomassie blue analysis of rGFP fractions	40	
Exam	Midterm Exam on Experiments #1-#6 and	150	
7	SDS-PAGE/western blot transfer of rGFP fractions	-NA-	-NA-
8	Western blot development	-NA-	-NA-
4-8	Combined Report Experiments 4-8	80	
9	Purification of LDH using affinity chromatography	40	
10	Enzyme kinetics of LDH	40	
Exam	Final Exam on Experiments #1-#10	150	
	On time attendance	40	
----	Extra Credit		
----	Extra Credit		
----	**Final Grade**	**700**	

Required Textbooks and Materials

The lab manual and course notes are available at the Copy Center located in the same building as the University Bookstore (972-883-2265)

BIOL 3380 – Summer 2009: Biochemistry Laboratory Manual, Rippel

BIOL 3380 – Summer 2009: Biochemistry Laboratory Lecture Notes, Rippel

Grading Policy

You can earn a total at least 700 points for assignments in this course. A break down is presented below:

On time attendance	40 points
Lab Reports	360 points
Mid-term Exam	150 points
Final Exam	150 points

Final Grades – The final course grades will be assigned based upon the standard grading scale below. I 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
686	A+	546	C+
651	A	518	C
630	A-	490	C-
616	B+	476	D+
588	B	518	D
560	B-	420	D-

Course & Instructor Policies

Lab Reports – You will perform 9 experiments and be assigned 7 lab reports each worth 40 points and one combined report worth 80 points. *Because of the short summer semester, it is imperative that you attend all lab sessions. Make up labs are not permitted.* In general, lab reports are due one week after having conducted the lab. The reports are due at the beginning of the lab period. Late reports will be deducted 4pts per weekday and 8pts for the weekend. A late combined lab report will be deducted 8 pts per day. It is the student's responsibility to get the late lab reports to their TA. If you put a lab report in a TA's mailbox, it is your responsibility to call/notify the TA. Do not assume that you put the report in the correct mailbox or that the TA actually received the report.

Always make a complete copy of your lab report before turning it into the TA. 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 on the handout. In general, the format will be presentation of data, calculations, and short answers to discussion questions. I expect reports to be typed (except for figures and calculations). Laboratory reports will not be accepted from students who do not participate in the laboratory session.

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.

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. Some labs have pre-lab homework.

Please, be on time to class! Tardiness is unprofessional and distracting to the instructors and your classmates. To help encourage on time lab attendance, several of your lab reports will have a "on time attendance" grade of up to 5 points.

When multiple sections of the course exist - Attendance at a different lab section time is not allowed without prior approval from the Instructor. I generally will only approval "switches" due to medical/graduate school interviews. Do not expect to be granted a "switch" at the last minute or because of other reasons. In any event, the TA who supervised your work will grade your lab report. Beware if you switch to a section whose TA grades "harder" than your normal TA. 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.)

I understand that the grading will not be completely consistent between sections. At the end of the semester, I 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.

"Excused Absences" - You are **not** allowed to make up missed laboratories. In the event that you are unable to attend a different lab section because of either being admitted at a hospital or attending a medical/graduate school interview, then you will receive a "NG" (no grade) for that experiment. A "NG" does not count for or against your course grade.

Mid-term Exam – The mid-term exam will cover the material presented through and including lab just prior to the scheduled midterm exam.

Final Exam - The final exam will be a comprehensive exam that will focus primarily on the latter experiments.

Field Trip Policies
Off-campus Instruction and Course Activities

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.

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 students 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 applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, 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.

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.

While each student in the course will perform the same experiment and be assigned the same lab report requirements, the analysis and reporting of that data is to be totally an individual effort. Examples of unacceptable collaboration are:

- Copying another (current or former) student's lab report, homework, or extra credit work.
- Copying answers out of the lab manual or other source (textbook/website).
- 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.

In accordance with University regulations, I am obligate to investigate and refer potential scholastic dishonesty instances to the Dean of Students. I am not able to "handle it at my level." Protect yourself – I urge you to read the information located on UTD Student Life Website:

http://www.utdallas.edu/judicialaffairs/

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures.*

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

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 students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

> The contact information for the Office of Disability Services is:
> The University of Texas at Dallas, SU 22
> PO Box 830688
> Richardson, Texas 75083-0688
> (972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a

religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

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