

BIOL4380 Cell and Molecular Biology Laboratory

Fall 2007 Course Syllabus

Prerequisites

1. Satisfactory completion of Classical and Molecular Genetics (BIO3301).
2. Satisfactory completion of Eukaryotic Molecular and Cell Biology (BIO3302).
(Under most circumstances, I will allow concurrent enrollment.)
3. Satisfactory completion of Biochemistry Laboratory (BIO3380).

Instructor

Dr. Irina Borovkov office FO2.903, Lab phone 972-883-2277

email - ixb053000@utdallas.edu; irina512004@yahoo.com

Office hours: Wednesday 10:00 am - 12:00 pm

I am available during office hours and lab hours to discuss any educational matter that you think necessary. The easiest way to reach me is by e-mail.

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

Teaching assistants will be assigned to conduct the laboratories. You will have the same teaching assistant for the entire semester. You are encouraged to see the TAs about any problems with the exercises **during their posted office hours** or with an advance appointment. Please do not approach or interrupt the TAs in their respective laboratories at times other than their office hours.

e-mail address

Office hours/location

/MP 2.202

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Educational Philosophy

Responsibility and Role of the Professor – I will provide students with every reasonable *opportunity* to receive a quality education without sacrificing educational standards. I plan to use every educational tool at my disposal, to include:

- Holding office hours
- Answering e-mail questions/comments
- Designing meaningful laboratory experiments
- Assigning reading, problem sets, and lab reports
- Conducting review sessions
- Administering lab practicals and exams
- Making available fill-in-the-blank type lecture notes
- Making available lists of questions/concepts for studying for exams

I would expect students to learn and practice critical thinking skills to analyze and solve new problems.

Responsibility and Role of the Teaching Assistants (TA) - TA's will not simply fulfill the traditional role of conducting labs, grading reports, and providing answers. They will also play an active role in teaching hands-on science skills to include fostering critical thinking skills. They are fully in-charge of conducting a safe and meaningful laboratory experience for all students. As such, they will have substantial input in final course grades.

Responsibility and Role of the Students – Students must take a pro-active role in the educational process to include reading material prior to class, attending classes and labs on time, asking questions, and completing all assignments. Each student is individually responsible for the education they receive.

Molecular and cell biology techniques are not easy to perform. There will be some instances that the experiment might not work. But I believe that if you work hard and try to achieve good results, you can do it. So the laboratory will be results oriented. If an experiment did not work for a student, but worked for the most of the group, I will allow you to use someone's results, but some points will be taken off for that.

Grades

You can earn a total of 1030 points for assignments in this course. A break down is presented below:

Lab Reports	500 points	Extra credit	30 points
Mid-term Exam	150 points	Mid-term Lab Practical	100 points
Final Exam	150 points	Final Lab Practical	100 points

Final Grades – The final course grades will be assigned based upon the standard grading scale below:

<u>Points</u>	<u>Letter</u>	<u>Points</u>	<u>Letter</u>
<u>Earned</u>	<u>Grade</u>	<u>Earned</u>	<u>Grade</u>
970	A+	770	C+
940	A	740	C
900	A-	700	C-
870	B+	670	D+
840	B	640	D
800	B-	600	D-

Lab Reports –

You will be assigned eight lab reports worth 50 points each, two worth 25 points each, and one combined lab report worth 100 points.

You will be able to drop the lowest 50 point lab report or both 25 point lab reports.

In general, lab reports are due one week after having conducted the lab. The reports are due at the beginning of the lab period. **All questions** in the lab report need to be included with your answers.

Late reports will be deducted 5pts per day (Monday-Saturday) and 8pts for the weekend (Sunday only).

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. Therefore, **part of the lab report grades (and exam grades) will be composed of a subjective evaluation of your writing skills.** Throughout the semester, I will suggest reading assignments from A Short Guide to Writing about Biology, by Jan Pechenik. This book has been placed on reserve at the McDermott Library.

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.

Please, be on time to class! Tardiness is unprofessional and distracting to the instructors and your classmates.

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 only approve "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. Remember, students do not have the right to switch between lab 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 (the first occurrence will "use up" your "drop the lowest 50 point lab report grade"). 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 midterm exam.

Mid-term Lab Practical – In order to objectively test your laboratory technique, we will conduct a lab practical during your scheduled lab time. The intent is to test your ability to perform at the bench. The mid-term lab practical will be composed of several stations where you will be asked to perform a routine laboratory procedure that we have either previously discussed or actually performed in this course. You will receive a grade before going to the next station. One of the stations will be a written calculations test. *No partial credit is awarded for incorrect calculations.*

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

Final Lab Practical – For the final lab practical, you will either perform an experiment to answer a question that was given to at least 24 hours prior to the practical or will be given practical questions on topics covered throughout the semester. Your grade will be based upon your answer, quality of data, lab safety, and handling of "critical" samples. There will be no lab report to turn-in. Any techniques that you will need to know to answer the question will have been taught throughout the semester. In the event that you score poorly at the lab practical, a re-take will be available. The highest grade that can be earned on a re-take practical will be 77 points.

Laboratory Textbooks

Throughout the semester, I will suggest reading assignments from A Short Guide to Writing about Biology, by Jan Pechenik.

The lab manual will be placed on reserve at the University Copy Center (same building as University Bookstore) (972-883-2269).

Scholastic Dishonesty

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 person's lab report.
- Copying answers out of the lab manual or other source (textbook/website).
- Sharing a spreadsheet analysis of a data set.
- Copying another person's answers to homework problems.
- 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.

Scholastic dishonesty is a serious offense as stated in the University's "Handbook of Operating Procedures, Title V, Student Discipline and Conduct". **In accordance with University regulations, I am obligated 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/student/slifedishonesty.html>

Primary Goals of BIO4380

Apply understanding of scientific concepts instead of simply memorizing facts.

Master fundamental math required in the modern Molecular Biology Lab.

Be able to make and interpret figures, charts, and graphs.

Express scientific ideas by writing them in a clear, concise, logical, and accurate manner.

Gain solid experience in basic bacterial techniques, restriction digests analysis, cloning, and PCR/DNA fingerprinting.

Become familiar with basic animal cell culturing, centrifugation, microscopy, and immunological techniques.

I have intentionally prioritized these goals. Each one will be specifically measured or tested in some way throughout the semester.

BIOL 4380 Class Schedule – Spring 2007

Lecture (JO3.516)	Wed	3:00 PM – 4:50 PM
Laboratory (MP2.202)	101 Fri	9:00 AM – 1:00 PM
	102 Fri	2:00 PM – 6:00 PM
	103 Sat	10:00 AM - 2:00 PM

Lecture	Lab	Exp #	Assignment
22 Aug	17, 18 Aug	1a	Basic bacterial techniques I – Plate pouring, sterile technique, streaking, phenotype testing, replica printing
29 Aug	31 Aug, 1 Sept	1b**	Basic bacterial techniques II – Growth curves, tittering,
5 Sep	7, 8 Sep	2	Gel electrophoresis of pre-digested DNA
12 Sep	14, 15 Sep	3	Cloning I – Restriction digest and ligation
19 Sep	21, 22 Sep	4**	Cloning II – Bacterial transformation
26 Sep	28, 29 Sep	5	Cloning III – Isolation of plasmid DNA, restriction digest
3 Oct	----	----	Midterm Exam
	5, 6 Oct		<i>Lab Practical I</i>
10 Oct	12, 13 Oct	6 7**	Cloning IV – Plasmid mapping DNA fingerprinting using PCR
17 Oct			Transfection during lecture time
	19, 20 Oct	8	Basic cell culture techniques
24 Oct	26, 27 Oct	9	Biomembranes, Drug Delivery, and Ion Trapping
31 Oct	2, 3 Nov	10	Cell fractionation
7 Nov	9, 10 Nov	11**	Ames test
14 Nov			No lecture. Check results of Lab 11
	16, 17 Nov		<i>Final Lab Practical</i>
21 Nov			Final Exam on Experiments #1-#11,
27 Nov	----	----	Graduation Ceremony

** Denotes labs that require students to obtain/observe data outside of the normal scheduled lab/lecture periods in order to complete lab report questions.

Student Record of Grades

Experiment	Assignment	Max Grade	Actual grade
1a,1b	Basic Bacterial Techniques I and II	50	
2	Gel electrophoresis of pre-digested DNA	50	
3	Cloning I – Restriction digest and ligation	25	
4	Cloning II - Bacterial transformation	50	
5	Cloning III – Isolation of plasmid DNA, restriction digest	25	
Exam	Midterm Exam on Experiments #1-#5	150	
Practical	Midterm Lab Practical	100	
3-6, 8	Cloning IV – Combined Report	100	
7	DNA fingerprinting using PCR	50	
8	Basic cell culture techniques	50	
9	Biomembranes and Ion Trapping	50	
10	Cell fractionation	50	
11	Ames test	50	
Practical	Final Lab Practical	100	
Exam	Final Exam on Experiments #1-#11	150	
----	Extra Credit	10	
----	Extra Credit	10	
----	Subtract lowest 50 point lab report grade or both 25 point lab reports	Minus ?	
----	Final Grade	1030	

<u>Points Earned</u>	<u>Letter Grade</u>	<u>Points Earned</u>	<u>Letter Grade</u>
970	A+	770	C+
940	A	740	C
900	A-	700	C-
870	B+	670	D+
840	B	640	D
800	B-	600	D-

Schedule of reports submission:

Experiment	Assignment	Due
1a, 1b	Basic Bacterial Techniques I and II	7, 8, Sep
2	Gel electrophoresis of pre-digested DNA	14, 15 Sep
3	Cloning I – Restriction digest and ligation	21, 22 Sep
4	Cloning II - Bacterial transformation	28, 29 Sep
5	Cloning III – Isolation of plasmid DNA, restriction digest	5, 6 Oct
3-6, 8	Cloning IV – Combined Report	26, 27 Oct
7	DNA fingerprinting using PCR	19, 20 Oct
8	Basic cell culture techniques	26, 27 Oct
9	Biomembranes and Ion Trapping	2, 3 Nov
10	Cell fractionation	9, 10 Nov
11	Ames test	16, 17 Nov