

**BIOL4380 Molecular and Cell Biology Laboratory
SYLLABUS**

School of Mathematics and Natural Sciences
The University of Texas at Dallas

Course: Molecular and Cell Biology Laboratory, 3 semester hours

Lectures Wednesday 2:30-3:45 pm, CN1.102

Lab: Friday 8:30 am - 12:30 pm

1:30 pm - 5:30 pm,

Saturday 10:00 am – 2:00pm, MP2.202

Instructor: Irina Borovkov, PhD

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Phone 972 883 6895; Lab phone 972-883-2277

Office FN3.208

Office hours: Wednesday 10 am - 12 pm

(by appointment)

Semester: spring 2009

Course Start/End Date: January 14th – May 1st

Course Description

Current techniques that are utilized in a modern Molecular Biology research laboratory. Practical skills taught include monitoring bacterial growth, phenotype testing of yeast and bacterial strains, plasmid DNA isolation, restriction digest analysis, DNA cloning, and DNA fingerprinting using the polymerase chain reaction (PCR). Advanced techniques include fundamental microscopy, DNA transfection and general characterization of animal cell cultures, sub-cellular fractionation using differential centrifugation, and chemical mutagen testing

Prerequisite:

1. Satisfactory completion of Classical and Molecular Genetics (BIO3301).
2. Satisfactory completion of Eukaryotic Molecular and Cell Biology (BIO3302).
3. Satisfactory completion of Biochemistry Laboratory (BIO3380).

Upon completion of this class, students will be able to:

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, and microscopy techniques.

Course Materials

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

Course Policy

When multiple sections of the course exist - Attendance at a different lab section time is not allowed without prior approval from the instructor. The instructor should be notified a week before the lab switch by e-mail.

“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.

Tardiness - all labs will start on time. If you are late, 1 point will be taken off the report for each 10 minutes late. Lab attendance is not allowed to students more than 30 minutes late without an important excuse.

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. 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 – Final lab practical will test your experimental ability as well as theoretical understanding of the concepts you learned in the lab during semester. Your grade will be based upon your answer, quality of data, lab safety, and handling of "critical" samples.

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.

Course Access and Navigation

Information about the course will be communicated through WebCT.

Students will use their UTD NetID account to login to the course at:

<http://webct.utdallas.edu>.

To get started with a WebCT course, please see the [Getting Started: Student WebCT Orientation](#).

If you have any problems with your UTD account or with the UTD WebCT server, you may send an email to: assist@utdallas.edu or call the UTD Computer Helpdesk at: **972-883-2911**. If you encounter any technical difficulties within the course site, please send an email to gmbasupport@utdallas.edu.

Interaction with Instructor: The instructor will communicate with students using the Announcements and Discussions tools.

Students may send personal concerns or questions to the instructor using UTD e-mail address provided. The instructor will reply to student emails within 3 working days under normal circumstances.

Student Assessments

Grading Information

You can earn a total of 1000 points for assignments in this course.

A break down is presented below:

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

Lab reports are due in the beginning of the lab, a week after performing the lab (see reports schedule below). One lowest 50 points report grade or two 25 points reports grades can be dropped.

Experiment	Assignment	Max 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	50
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	Ames test	50
11	Cell fractionation	25
Practical	Final Lab Practical	100
Exam	Final Exam on Experiments #1-#11	150
----	Extra Credit	
----	Extra Credit	
----	Subtract lowest 50 point lab report grade or both 25 point lab reports	Minus ?
----	Final Grade	1000

Grade criteria for the course

<u>Points Earned</u>	<u>Letter Grade</u>	<u>Points Earned</u>	<u>Letter Grade</u>
98-100%	A+	76-78%	C+
92-96%	A	72-75%	C
89-91%	A-	69-71%	C-
86-89%	B+	66-68%	D+
82-85%	B	62-65%	D
79-81%	B-	59-61%	D-

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

You will be given your report back in a week after submitting it except for 100 point report.

Scholastic Dishonesty

The University has policies and discipline procedures regarding scholastic dishonesty. Detailed information is available on the [Scholastic Dishonesty](#) web page. All students are expected to maintain a high level of responsibility with respect to academic honesty. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced.

Course Outline/Schedule

BIOL 4380 Class Schedule – Spring 2009

Lecture (CN 1.102)		Mon	2:30 PM – 3:45 PM
Laboratory (MP2.202)	001	Fri	8:30 AM – 12:30 PM
	002	Fri	1:30 PM – 5:30 PM
	003	Sat	10:00 AM – 2:00 PM

Lecture	Lab	Exp #	Assignment
14 Jan	16, 17 Jan	1a	Basic bacterial techniques I – Plate pouring, sterile technique, streaking, phenotype testing, replica printing
21 Jan	23, 24 Jan	1b	Basic bacterial techniques II – Growth curves, titting
28 Jan	31, 31 Jan	2	Gel electrophoresis of pre-digested DNA
4 Feb	6, 7 Feb	3	Cloning I – Restriction digest and ligation
11 Feb	13, 14 Feb	4**	Cloning II – Bacterial transformation
18 Feb	20, 21 Feb	5	Cloning III – Isolation of plasmid DNA, restriction digest
25 Feb		<i>Exam</i>	<i>Midterm Exam</i>
	27, 28 Feb	<i>Practical</i>	<i>Midterm Lab Practical</i>
4 March	6, 7 March	6 7**	Cloning IV – Plasmid mapping DNA fingerprinting using PCR
11 March	13, 14 March	8	Transfection at the time of the lecture Basic cell culture techniques
18 March	20, 21 March		Spring break
25 March	27, 28 March		No classes – 100 points report writing
1 April	3, 4 April	9	Cell fractionation
8 April	10, 11 April	10	Ames test
15 April	17, 18 April	11**	Biomembranes, Drug Delivery, and Ion Trapping Check Ames results
22 April		<i>Exam</i>	Final Exam on Experiments #1-#11
	24, 25 April	<i>Practical</i>	<i>Final Lab Practical</i>

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

BIOL 4380 Reports Schedule – Spring 2009

Lab	Report due	Exp #	Assignment
16, 17 Jan	No report	1a	Basic bacterial techniques I – Plate pouring, sterile technique, streaking, phenotype testing, replica printing
23, 24 Jan	No report	1b	Basic bacterial techniques II – Growth curves, titting
31, 31 Jan	Report 1a	2	Gel electrophoresis of pre-digested DNA
6, 7 Feb	Report 1b report 2	3	Cloning I – Restriction digest and ligation
13, 14 Feb	Report 3	4**	Cloning II – Bacterial transformation
20, 21 Feb	Report 4	5	Cloning III – Isolation of plasmid DNA, restriction digest
		<i>Exam</i>	<i>Midterm Exam</i>
27, 28 Feb	Report 5	<i>Practical</i>	<i>Midterm Lab Practical</i>
6, 7 March	No report	6 7**	Cloning IV – Plasmid mapping DNA fingerprinting using PCR
13, 14 March	Report 7	8	Transfection at time of the lecture Basic cell culture techniques
20, 21 March			Spring break
27, 28 March			No classes – 100 points report writing
3, 4 April	Report 8 100 points report	9	Cell fractionation
10, 11 April	Report 9	10	Ames test
17, 18 April	No report	11**	Biomembranes, Drug Delivery, and Ion Trapping Check Ames results
		<i>Exam</i>	Final Exam on Experiments #1-#11
24, 25 April	Report 10, report 11	<i>Practical</i>	<i>Final Lab Practical</i>

Syllabus Addendum

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.

Students need to be on time for lectures and especially for laboratory. Students that are late for more than 15 minutes will not be allowed to the lab.

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.

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. Last day to drop the class with "W" is April 7th, WP or WF withdrawal is Jan 29th to March 16th

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 dean 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.

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 given below. Additional information is available from the office of the school dean.

http://www.utdallas.edu/Business_Affairs/Travel_Risk_Activities.htm