Molecular and Cell Biology Laboratory
BIOL 4380
Spring 2020
School of Mathematics and Natural Sciences
The University of Texas at Dallas

Course Title: Molecular and Cell Biology Laboratory, 3 semester hours

Lecture	(Online) BIOL4380.001	Monday	Instructors: Dr. Sadat and Dr. Klang
Lab	(Online) BIOL4380.301	Monday to Friday	Instructor: Dr. Sadat
	(Online) BIOL4380.302	Monday to Friday	Instructor: Dr. Sadat
	(Online) BIOL4380.303	Monday to Friday	Instructor: Dr. Klang
	(Online) BIOL4380.304	Monday to Friday	Instructor: Dr. Sadat
	(Online) BIOL4380.305	Monday to Friday	Instructor: Dr. Sadat

Lecture and Lab may be completed asynchronously

Course Start/End Date: Aug 17th – Dec 8th

Professor Contact Information

Dr. Eva Sadat
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Dr. Ida Klang
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Course Pre-requisites

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) – no exceptions.

Course Description

This is a 3 credit hour class that includes lecture and lab components. This course teaches current techniques that are utilized in a modern Molecular Biology research laboratory. Practical skills taught include phenotype testing of bacterial strains, plasmid DNA isolation, restriction digest analysis, DNA cloning and DNA fingerprinting using polymerase chain reaction (PCR). Advanced techniques include fundamental microscopy, DNA transfection and general characterization of animal cell cultures, sub-cellular fractionation using differential centrifugation, cell cycle and apoptosis study and fluorescent microscopy.

Student Learning Objectives/Outcomes

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.

Required Textbooks and Materials
The lectures and laboratory procedures with report questions will be posted on eLearning.
Laboratory schedule will be posted on eLearning in the beginning of the semester.

Suggested Course Materials
Recommended readings: Current protocols: Essential Laboratory techniques. Wiley publishing, ISBN987-0-470-08993-4

Instructional Mode: Remote

Course Platform: Powerpoints with voice recording and lab will be made available on eLearning for asynchronous viewing.

Students must adhere to the deadlines for submission of lab reports and completion of quizzes.

Please see here for more information about University policies regarding asynchronous instruction: https://www.utdallas.edu/fall2020/asynchronous-access-for-fall-2020/ COVID-19 Guidelines and Resources The information contained in the link lists the University's COVID-19 resources for students and instructors of record. Please see http://go.utdallas.edu/syllabus-policies.

Course outline/calendar

Week of	Lab Exercises and Exams	Quiz	Reports due	Lecture topic	Labster simulation
Week 1 8/17 – 8/21	E1: Basic bacterial techniques	Quiz 1: E1		E1	
Week 2 8/24 – 8/28	E2: Gel electrophoresis	Quiz 2: E2	Report 1	E2	Bacterial isolation
Week 3 8/31 – 9/4	E3: Cloning I – Restriction digest and ligation	Quiz 3: E3	Report 2	E3	Experimental Design
Week 4 9/7 – 9/11	E4**: Cloning II – Bacterial transformation, start bacterial cell culture*	Quiz 4: E4	Report 3	E4	Molecular Cloning
Week 5 9/14 – 9/18	E5: Cloning III – Isolation of plasmid DNA, restriction digest	Quiz 5: E5	Report 4	E5	Medical Genetics
Week 6 9/21 – 9/25	E6: Cloning IV – Plasmid mapping. E7: DNA fingerprinting using PCR	Quiz 6: E6 & E7	Report 5	E6, E7	Polymerase Chain Reaction
Week 7 9/28 – 10/2	**Mid-term Exam (E1-E6)**			**No lecture**	
Week 8 10/5 – 10/9	E8**:** Basic cell culture techniques**,** Transfection	Quiz 7: E8	Report 6 & 7	E**8**	Cell culture basics
Week 9 10/12 – 10/16	E 9: Fluorescent microscopy	Quiz 8: E9	Report 8	E9	Confocal Microscopy
Week 10 10/19 – 10/23	Writing full Cloning Report (E3-E6, E-8)		Full cloning report	**No lecture**	Gene Regulation
Week 11 10/26 – 10/30	E 10: Cell cycle, apoptosis	Quiz 9: E10	Report 9	E10	Mitosis
Week 12 11/2 – 11/6	E 11: Cell fractionation	Quiz 10: E11	Report 10	E11	CRISPR-Cas
Week 13 11/9 – 11/13	**Final Lab Exam (E7-E11)**	Quiz 11: online quiz E7-E11	Report 11	**No lecture**	
Week 14 11/16 – 11/20	**Make-up week for unprecedented closures**				

**Since online labs may be completed asynchronously, weekly quizzes, lab report submissions, and Labster simulations will be due every Friday by 11:59 pm.

(E = Experiment)

Grading Policy
(including percentages for assignments, grade scale, etc.)

You will write 10 reports on the laboratories performed worth 30 points each (Lowest report score will be dropped.)
There will be 11 quizzes worth 10 points each (Lowest quiz score will be dropped.)

There will be two exams worth 100 points each.
You will write one 100 points report on the cloning experiment.
There will be 10 Labster simulations at 8 points each included in the total points for the course

A break down is presented below:

Lab Reports 9 @ 30 points each (lowest score dropped)	270
Quizzes 11 @ 10 points each (lowest score dropped)	100
Mid-term Exam	100
Final lab Exam	100
Cloning report	100
Labster @ 8 points each	80
Total	750

The final course grades will be assigned based upon the standard grading scale below.

Points Earned / Percentage	**Letter Grade**	**Points Earned/Percentage**	**Letter Grade**
>727 / 97-100%	A+	>570 / 76-78%	C+
>690 / 92-96%	A	>540 / 72-75%	C
>667 / 89-91%	A-	>517 / 69-71%	C-
>645 / 86-88%	B+	>495 / 66-68%	D+
>615 / 82-85%	B	>465 / 62-65%	D
>592 / 79-81%	B-	>398 / 59-61%	D-

Course & Instructor Policies

eLearning: To perform the laboratory procedure properly, you need to be familiar with the protocol. Lab protocols and report questions will be posted on eLearning at least 2 days before the lab.
Printed laboratory protocol is required during the lab.

Lab Exams: Midterm and final exams will be online and will include mostly multiple choice questions, fill-in-the-blanks, short answers and true/false questions.

Assignments and quizzes: Most of the labs will have a pre-lab assignment, such as an experimental flow-chart. To see if you need to prepare a flow-chart, read the report questions before the lab.

If a pre-lab assignment is due, a submission link will be provided on eLearning and the submission deadline will be Friday at 11:59 pm.

You need to have a basic understanding of the goal and expectations of the procedure performed. To ensure that you understand it, you will have a lab quiz based on the lecture material. That week's quiz will be available on eLearning and will be due by Friday at 5:00 pm.

Reports: You will write a report on the experiment performed and submit it the following week. Each lab report submission link will be provided on eLearning. Reports are due on Friday by 11:59 pm. There will be 3 points taken off for each day of late submission for the regular reports and 5 points per day for the 100-point report.

The reports will be graded and returned in one week. You have a week after receiving the graded report to dispute the grade with the TA. After that, you can discuss the issue, but you cannot argue for a grade change other than a calculation error.

Labster simulations: You will have an opportunity to earn points for Labster simulations – 8 pts per lab (for 10 labs).
Beginning Week 2, you can gain points by completion of Labster simulations online. The Labster lab simulation modules will cover techniques and protocols that may be covered in lab. The Labster modules sometimes include additional topics not covered in lecture but will serve to enrich your experience in the Molecular and Cell Biology lab. The simulation links are available in each weekly folder.

Comet Creed
This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

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 expect 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, instructors are required to refer instances of potential scholastic dishonesty to the Dean of Students and the Office of Community Standards and Conduct. 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 from the internet, 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. 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 regraded.
- 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 were your own results (unless explicitly permitted by the instructor).

Scholastic dishonesty is a very serious offense and will NOT be tolerated. We generally recommend a sanction of a zero for an assignment and/or an F for the course.

University Policies

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

The descriptions and timelines contained in this syllabus are subject to change at any time at the discretion of the instructor.