



Jordan University of Science and Technology
Faculty of Science & Arts
Biotechnology & Genetic Engineering Department

BT453 Molecular Biology (Lab)

First Semester 2020-2021

Course Catalog

1 Credit Hours. Students will learn principles and practice of basic molecular biology techniques such as agarose gel electrophoresis, nucleic acid purification (plasmid and genomic DNA, RNA), nucleic acid quantification, DNA restriction digestion and analysis, polymerase chain reaction (PCR), Sanger DNA sequencing and basics computer based DNA sequence analysis and data acquisition over the internet. In addition, students will learn about the nature and selection of DNA cloning vectors, restriction enzymes and other reagents used in molecular biology techniques.

Text Book

Title	Human Molecular Biology Laboratory Manual
Author(s)	Stefan Surzycki
Edition	1st Edition
Short Name	Ref # 1
Other Information	

Instructor

Name	Miss REHAN BANI_HANI
Office Location	-
Office Hours	
Email	rtbanihani8@just.edu.jo

Class Schedule & Room

Section 1:

Lecture Time: Sun : 14:30 - 16:30

Room: LAB 11 (PH1 L1)

Section 2:

Lecture Time: Mon : 08:30 - 10:30

Room: LAB 11 (PH1 L1)

Section 3:

Lecture Time: Mon : 10:30 - 12:30

Room: LAB 11 (PH1 L1)

Section 4:

Lecture Time: Tue : 14:30 - 16:30

Room: LAB 11 (PH1 L1)

Section 5:

Lecture Time: Wed : 14:30 - 16:30

Room: LAB 11 (PH1 L1)

Section 7:

Lecture Time: Mon : 14:30 - 16:30

Room: LAB 11 (PH1 L1)

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Introduction: lab rules and biosafety	
Week 2	DNA Isolation I	
Week 3	DNA Isolation II & Plasmid Isolation	
Week 4	RNA Isolation	
Week 5	Gel Electrophoresis & DNA Quantitation	
Week 6	Polymerase Chain Reaction I	
Week 7	Polymerase Chain Reaction II	
Week 8	Restriction Endonucleases	
Week 9	Midterm Exam	
Week 10	Primer Design + SNP Genotyping By RFLP	
Week 11	DNA Sequencing I	
Week 12	DNA Sequencing II	
Week 13	Transformations & Cloning	
Week 14	Final exam	

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Know, List and explain safety issues and proper practices associated with standard molecular techniques, including bacterial culture, electrophoresis, and nucleic acid purification. [1A, 1B]	10%	Midterm Exam
Explain, demonstrate and practice principles of sterile technique and DNA and RNA purification and quantification [1A, 1B]	20%	Midterm Exam
Understand and explain many types of PCR techniques and its application and the troubleshooting in PCR protocol. [1B, 1D]	20%	Practical and Quizzes, Final Exam
Use and explain the application of various standard bioinformatics techniques to experimental planning and analysis, including sequence accessing and manipulation, restriction endonucleases, multiple sequence alignment and PCR primers design. [1B]	20%	Practical and Quizzes, Final Exam
Independently plan, execute and document a basic DNA cloning experiment involving PCR amplification, cloning into an appropriate DNA vector, plasmid DNA isolation, DNA sequencing and restriction enzyme analysis with agarose gel electrophoresis to evaluate success of the procedure in total. [1A, 1B, 1C]	30%	Final Exam

Relationship to Program Student Outcomes (Out of 100%)					
A	B	C	D	E	F
25	55	10	10		

Evaluation	
Assessment Tool	Weight
Midterm Exam	30%
Practical and Quizzes	20%
Final Exam	50%

Policy	
General Rules	1. Your class attendance is mandatory. Absences in excess of 20% of the total lecture hours will result in your being dropped from the course with a failing grade. 2. Make-up exam appeals should be filed within one week of the missed exam. 3. Cell phones are prohibited during examinations and must be turned off during lecture. No incoming or outgoing calls or text messages are allowed. 4. Unethical conduct, including cheating during examinations, will result in punishment by the university administration.

Lab Reports	There will be 2 Lab reports. The lab reports should have the following sections: abstract, introduction (literature background), results, discussion and references. Scientific references should be cited in the text and presented in a list (a bibliography at the end of the report). Labs that require a report, you will typically be given specific instructions on the format. Since the kinds of labs vary through the course, formats may be somewhat different for each report. Feel free to ask the lab instructor about these issues if you're not sure. Lab reports, unless otherwise specified, must be typed and neat. Lab reports that have many typographical errors or are unintelligible will be returned immediately for correction. Lab reports that are late will be reduced by 10%, with another 10% for each additional day late.
Quizzes	To provide additional motivation for reading the lab material, a short test will be given at the beginning of certain labs. You will be notified about that in advance.
Work outside of the regular lab period	The practice of molecular biology cannot easily be restricted to a three-hour lab period. It is unavoidable that students will be required on a many occasions either to come to the lab briefly the day before lab to set up certain tasks for the next day, or to return to the laboratory the day following a particular experiment to examine their results.
Cleanup	You are responsible for cleaning your working area and all equipment used in the exercise before you leave your laboratory section. The lab instructor will check your bench before you leave the laboratory. Notify the laboratory instructor if there is a spill. Clean your glassware before leaving the lab so that you do not contaminate the next group's results.
Waste Disposal	There are separate containers in the lab for general waste, sharp objects, and biohazard materials. Please place all refuse in the proper container; these containers ensure the safe removal of waste from the laboratory. If you have a question, ask your lab instructor before you dump waste in the wrong container.
Safety Issues and Other Suggestions	<p>? No eating or drinking in the lab. Enjoy the lab and the opportunity to interact with others, but please don't get carried away and disturb other students. ? Many reagents used in BT453 are toxic, so remember to protect yourself. ? If chemicals are toxic (i.e., phenol & strong acids and bases), work in the fume hood ? Wear good shoes that cover your feet, sandals won't protect you from spills ? Wear gloves when working with hazardous or carcinogenic substances (i.e., ethidium bromide) ? Read the lab handout before coming to lab. Be familiar with the lab procedures ? If you have questions after reading the lab handout, please ask. There is no question that is too silly to ask. If you don't understand, probably others don't either ? If you make a mistake in lab, that's OK. Tell others in your group about the problem, and describe it in your notebook. Check with the lab instructor. Molecular biology experiments are often long and complex, so there will be plenty of mistakes ? Clean up your area and any mess that you made during lab. Put materials away. Failure to clean up your work area may cause your grade to drop ? Make sure that you understand how to use the 2 positions on micropipettes (i.e., suck and blow out). Ask if you are unsure ? Always make sure that the centrifuge rotors are firmly seated on the drive shaft before starting a spin. If the rotor comes off during the spin, it could ruin the centrifuge ? When starting a centrifuge, always wait until the instrument has reached top speed before you walk away. If it shakes and rattles, shut it off quickly before it is damaged ? Treat the lab equipment with care. Items such as the thermal cycler , spectrophotometers, and the gel photography system are highly expensive</p>

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