

General information	Subject name, code and number of credits	BIOT 190, Molecular Biology, 6 ECTS	
	Department	Life Sciences	
	Program (bachelor, master)	Bachelor's degree	
	Academic semester	Spring 2026	
	Teacher	Valeh Mammadli	
	E-mail	v.mammadli@khazar.org	
	Phone		
	Lecture hall/Table	Bakikhanov settlement, Elshan Mehdiyev street. 478.	
	Consultation hour	Time will be set after agreement with students.	
Language of instruction	English		
Type of subject	Mandatory		
Textbooks and additional literature	<p>Literature</p> <ol style="list-style-type: none"> <i>Bruce Alberts, Julian Lewis, Martin Raff, Keith Roberts, Alexander Johnson, Peter Walter, Dennis Bray, James D. Watson - Molecular Biology of the Cell 7th edition (2022)</i> <i>William S. Klug, Charlotte A. Spencer, Michael R. Cummings, Michael A. Palladino - Concepts of Genetics: Pearson New International Edition (2019)</i> <i>David P. Clark – Molecular Biology 3rd edition (2018)</i> <i>Hartwell, L.H. et al. – Genetics. From Genes to Genomes 5th edition (2018)</i> <i>Principles and Techniques of Biochemistry and Molecular biology – Wilson and Walker 8th edition (2018)</i> <i>Gerald Karp - Cell and Molecular biology 9th edition (2020)</i> 		
Teaching methods	Lecture		X
	Case analysis		X
	Group discussions		X
	Simulation		X
Evaluation	Components	Date/Deadlines	Percentage (%)
	Attendance (Activity)	During the semester	5
	Quiz	During the semester	10
	Group work	During the semester	15
	Midterm		30
	Final exam		40
	Total		100
Description of the course	Molecular biology is one of the most important fundamental disciplines in the system of biological education. The discipline "Molecular Biology" is necessary for students to understand the molecular level of life organization, to expand the scientific horizons of students, contributing to their development as independent		

	specialists, obtaining information not only about the structural and functional properties of nucleic acids and proteins, but also about the mechanisms of regulation and the relationship of biochemical processes flowing in the cell and organism.
Aim of the course	The purpose of the course is to form a scientific outlook on molecular biology as a complex discipline, to acquaint students with the principles, tasks and methods of molecular biology, to form knowledge about the structure and properties of biological macromolecules, as well as about the main molecular mechanisms underlying the functioning of living cells: the metabolism of biological macromolecules (DNA, RNA and proteins), principles of intracellular regulation. Solving problems in lessons contributes to a deeper understanding of the basic molecular biological processes. The objective of the course is to form students' understanding of the universal principles of functioning of the main molecular biological processes in the cells of various organisms - from bacteria to higher eukaryotes.
Expected outcomes	<p>As a result of studying the subject, the student should know:</p> <ul style="list-style-type: none"> • about the molecular biological basis for the origin of life, the structure and basic functions of nucleic acids and proteins, the properties of the genetic code, the mechanisms of replication, transcription and reverse transcription, translation, and the regulation of these processes in pro- and eukaryotes; • structure and functions of ribosomes; • the main enzymes that carry out the processes of reproduction and implementation of genetic information; • about mobile genetic elements, about modern methods of molecular biology. <p>Student should be able to:</p> <ul style="list-style-type: none"> - navigate the basic concepts and problems of "Molecular Biology"; - be able to explain the main stages of replication, transcription, translation in pro- and eukaryotes; - apply the acquired knowledge of molecular biology in the study of other biological disciplines, as well as in solving research problems and teaching activities. <p>Student should earn the knowledge of:</p> <ul style="list-style-type: none"> - the terminology of the discipline; - acquired knowledge for a deeper understanding of modern works.
Rules (Teaching policy and conduct)	<p><u>Lesson organization</u></p> <ul style="list-style-type: none"> - General information about the subject will be provided to students during the class. - New topics will be explained through the demonstration of visual aids (PPT and video files). - Students' mastery levels (Quiz) will be checked before the midterm and final exams.

- During the lessons, students' mastery of the previous topic will be evaluated through oral and written surveys, and a common grade will be given at the end of the semester (Activity).

- It is important to give presentations on individual topics during the semester. The presentation time should not exceed 15 minutes, including the discussion at the end. There will be a more extensive introduction to presentation topics and rules in the lesson.

- It is important to conduct 8 individual laboratory works during the semester. A white coat must be worn in the laboratory lesson. The results of the laboratory work must be recorded in a notebook. Each protocol should include the name of the laboratory work, its principle, progress, results and discussion sections, and should be checked by the teacher and evaluated through an oral survey. An average grade is calculated at the end of the semester. These rules will be discussed in more detail in class.

General rules

Attendance

Students need to attend all classes. Students must submit information about missing classes for certain reasons (illness, family situation, etc.) to the faculty dean's office. Students who miss more than 25% of classes are not allowed to take the exam.

Rules for being late

A student who is more than 10 minutes late for a class is recorded as absent. However, the student is allowed to take the class.

Quiz

A student who does not participate in the exam for reasons that have been notified to the teacher and the dean's office in advance may take the exam the following week.

Exams

All issues related to a student's participation in the exam or skipping the exam are resolved by the faculty administration. Absence from the exam is possible only with the permission of the dean's office. Absence from exams due to social activities is not allowed. Exams must be cumulative. The topics of the midterm and final exams are given to students before the exam. Most of the questions in the final exam are compiled based on the materials taken after the midterm exam.

Completion of course

A student who scores 60% or more is considered to have completed the course. Otherwise, the student must retake the course.

Violations of exam rules

In cases of violation of the existing rules in exams (attempts to cheat, transfers, disrupting the course of the exam and other illegal actions), the student's exam work is canceled.

Behavior in classes

	<p>The student must do everything possible to create appropriate academic conditions during the lesson. Unauthorized talking, unnecessary actions, etc. unethical behavior are absolutely not allowed. The student must actively participate in the lesson, ask questions when necessary and not be left out of discussions. Lesson organization</p> <p>- General information about the subject will be provided to students during the lecture. - The new topic will be explained by demonstrating visual aids (PPT and video files). - Before the midterm and final exams, the students' mastery levels (Quiz) will be checked. - Students' mastery of the previous topic is determined by oral questioning. - It is necessary to conduct 12 individual laboratory works during the semester. A white coat must be worn in the laboratory lesson.</p> <p>The results of the laboratory work must be recorded in a notebook. The name, principle, progress, results and discussion sections of the laboratory work must be written in each protocol and must be checked by the teacher and evaluated through an oral survey. At the end of the semester, a common grade is given. These rules will be discussed in more detail in the lesson.</p> <p><i>Violating the teaching process and ethical rules during class, as well as unauthorized discussions between students and the use of mobile phones, are prohibited.</i></p>
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APPROXIMATE DIVISION OF HOURS BY TOPICS AND CALENDAR-THEMATIC PLAN

Week	Date	Topic	Literature
1.	19.02.2026	Subject, history of formation and development of molecular biology.	<i>Textbook: 1 (chapter 1), 2 (chapter1),</i>
2.	26.02.2026	Structure and properties of nucleic acids.	<i>Textbook: 1, 2, 3 (chapter 2,3)</i>
3.	05.03.2026	Structure of the pro and eukaryotic genome.	<i>Textbook: 1, 2, 3, (chapter 4),4 (chapter3,4,5)</i>
4.	12.03.2026	Organization of chromosomes in eukaryotes. Genetic code.	<i>Textbook: 4(chapter 7),5 (chapter 6),7 (chapter 6)</i>
5.	19.03.2026	DNA Replication	<i>Textbook: 4 (chapter 10) ,5 (chapter8),7 (chapter 7)</i>
6.	26.03.2026	DNA damage and mutation	<i>Textbook: 3 (chapter10),5 (chapter 11),6 (chapter 11),7 (chapter 9,10)</i>
7.	02.04.2026	DNA reparation	<i>Textbook: 3 (chapter10),5 (chapter</i>

			<i>11),6 (chapter 11),7 (chapter 9,10)</i>
		<u>Midterm</u>	
8.	09.04.2026	Transcription in Eukaryotic and Prokaryotic organisms	<i>Textbook: 4(chapter 14,15,16,17), 5 (chapter 13), 6 (chapter 13), 7 (chapter 11)</i>
9.	16.04.2026	Transcriptional regulation in eukaryotes and prokaryotes. Operon.	<i>Əsas dərslik: 1, 2, 3 (chapter 15),4 (chapter 14,15,16,17), 7 (chapter 8)</i>
10.	23.04.2026	RNA Processing	<i>Textbook: 1, 2, 3 (chapter 9), 4 (chapter 23), 6 (chapter 15), 7 (chapter 14)</i>
11.	30.04.2026	Protein biosynthesis: translation in prokaryotes and eukaryotes	<i>Textbook: 1, 2, 3 (chapter 17), 4 (chapter 27)</i>
12.	07.05.2026	Translational and post-translational regulation	<i>Textbook: 1, 2, 3 (chapter 20), 6 (chapter 19), 7 (chapter 22)</i>
13.	14.05.2026	Epigenetic inheritance	<i>Textbook: 3,4chapter 22), 6 (chapter 21),</i>
14.	21.05.2026	Vectors, molecular cloning and genetic engineering	<i>Textbook: 4(chapter 23),5 (chapter 19)</i>
15.	28.05.2026	Basic and advanced methods of Molecular Biology	<i>Əsas dərslik: 1, 2, 3 (chapter 23),4 (chapter 24)</i>
		<u>Final exam</u>	

This curriculum reflects complete information about the subject and any changes will be notified in advance.