<table>
<tr><td rowspan="8">General Information</td><td>Course title, code, and credits:</td><td>BIO 101, General Biology, 6 ECTS</td></tr>
<tr><td>Department</td><td>Life Sciences</td></tr>
<tr><td>Program (Bachelor’s/Master’s)</td><td>Bachelor’s</td></tr>
<tr><td>Teaching semester</td><td>Fall 2025</td></tr>
<tr><td>Instructor</td><td>PhD in Biology, Sabina Mehdiyeva</td></tr>
<tr><td>E-mail</td><td>mora271976@gmail.com</td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td>Lecture room/Schedule</td><td>Bakıxanov settlement, 478 Elshan Mehdiyev St., Room __ / Thursday and Saturday, 08:30 and 10:10</td></tr>
<tr><td>Consultation hour</td><td>To be scheduled by arrangement with students</td></tr>
<tr><td>Teaching language</td><td colspan="2">English Language</td></tr>
<tr><td>Prerequisite</td><td colspan="2">Not available</td></tr>
<tr><td>Course Type</td><td colspan="2">Compulsory</td></tr>
<tr><td>Primary and Additional Literature</td><td colspan="2">Required Textbooks:
1. Urry L. A. et all. Campbell Biology. 12th Edition. Pearson. 2020. – 1493 pp.
2. Iwasa J. , Marshall W. Karp's Cell and Molecular Biology, 9th Edition. Wiley. 2020. – 944 pp.
3. Lodish H., et all. Molecular Cell Biology. 9th Edition. W. H. Freeman. 2021. – 1264 pp.
4. Hills D.M., et all. Life: The Science of Biology. 12th Edition. W. H. Freeman. 2020. – 1296 pp.
5. Raven, P. H., et al. ISE Biology. 13th Edition. McGraw-Hill. 2022.– 1474 pp.
6. Bowman W., Hacker S. Ecology. 5th Edition. OUP USA. 2020. - 744 pp.
7. King L.A. Integrating Lecture and Lab: A General Biology Laboratory Manual. Cognella Academic Publishing. 3rd Edition. 2019 – 152 pp.
8. Tegegn K., et al. General Biology Laboratory Manual. – 2025.-74 pp. https://www.researchgate.net/publication/395012263_General_Biology_Biol_1012_Laboratory_Manual
Supplementary Textbooks:
1. Koduru U.D. General Biology. Khanna Publishing House. 2024. – 298 pp.
2. Green Ch., et all. General Biology Laboratory Manual. Kendall Hunt Publishing. 2021. – 310 pp.
3. Starr C., et all. Biology: The Unity and Diversity of Life. 15th Edition. Cengage Learning. 2018. – 992 pp.
4. Abali E.E., et al. Lippincott Illustrated Reviews: Biochemistry. 8th Edition. LWW.2021. – 640 pp.
5. Nalini Chandar, Susan M. Viselli. Lippincott Illustrated Reviews: Cell and Molecular Biology. 3th Edition. LWW.2023. – 288 pp.
6. Doan Th., et al. Lippincott Illustrated Reviews: Microbiology. 4th Edition. LWW.2019. – 448 pp.
7. Doan Th., et al. Lippincott Illustrated Reviews: Immunology. 3th Edition. LWW.2021. – 400 pp.
8. Crebs C., et al. Lippincott Illustrated Reviews: Neuroscience. 2nd Edition. LWW.2017. – 480 pp.
9. Christopher D. Richardson, Nicholas H. Acheson. Fundamentals of Molecular Virology. 3th Edition. Wiley.2025. – 672 pp.
10. Renneberg R. Biotechnology for Beginners. 3rd Edition. Academic Press. 2023. – 474 pp.</td></tr>
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<tr><td></td><td colspan="3">Internet resources:
https://openstax.org/subjects/science
https://academicworks.cuny.edu/cgi/viewcontent.cgi?params=/context/ny_oers/article/1012/&path_info=BIO1101OER.pdf
https://bio.libretexts.org/Courses/Harrisburg_Area_Community_College/BIOL_101%3A_General_Biology_1_-_Laboratory_Manual
https://oercommons.s3.amazonaws.com/media/courseware/relatedresource/file/Laboratory_Manual_BIO030_Revised_Fall_2019_OER_final_print_version_IpA49Uw.pdf?ResponseContentDisposition=attachment%3Bfilename%3D%22Laboratory_Manual_BIO030_Revised_Fall_2019_OER_final_print_version_IpA49Uw.pdf%22
https://bio.libretexts.org/Learning_Objects/Laboratory_Experiments/General_Biology_Labs
https://www.luc.edu/biology/111lab/
https://courses.lumenlearning.com/biolabs1/
https://oercommons.org/courseware/lesson/116774/overview
https://louis.pressbooks.pub/generalbiology1lab/front-matter/preface/
https://libguides.uml.edu/biologytextbooks/textbooks</td></tr>
<tr><td rowspan="3">Teaching methods</td><td colspan="2">Lecture</td><td>x</td></tr>
<tr><td colspan="2">Seminar</td><td>x</td></tr>
<tr><td colspan="2">Group discussion</td><td>x</td></tr>
<tr><td rowspan="8">Assessment</td><td>Components</td><td>Date/Deadline</td><td>Percentage (%)</td></tr>
<tr><td>Activity</td><td>During the semester</td><td>10</td></tr>
<tr><td>Presentation on an individual topic</td><td>During the semester</td><td>5</td></tr>
<tr><td>Assignments and tests (quiz 1, 2, 3, 4)</td><td>During the semester</td><td>10</td></tr>
<tr><td>Attendance</td><td>During the semester</td><td>5</td></tr>
<tr><td>Midterm exam</td><td></td><td>30</td></tr>
<tr><td>Final exam</td><td></td><td>40</td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
<tr><td>Course Description</td><td colspan="3">The General Biology course covers the fundamental regularities of the living world and the organization of life at the molecular, cellular, organismal, and population levels. The course begins with an overview of the establishment of biology as a science, its stages of development, its modern theoretical and practical significance, and its interrelations with other natural sciences. The core section provides a detailed explanation of cell structure and function, intracellular transport of substances, energy metabolism, and the transmission of genetic information. The mechanisms of cell division (mitosis and meiosis), heredity and variation, the principles of molecular genetics, as well as the application areas of modern genetic engineering and biotechnology are presented. The mechanisms of physiological systems in humans and animals (respiration, digestion, circulation, excretion, and neural and hormonal regulation, etc.) are studied comparatively, with particular emphasis on the similarities and differences among plant, animal, and human physiology. At the levels of populations, species, and ecosystems, the course introduces fundamental concepts of evolution, ecology, the stability of the biosphere, and interactions between living organisms and the environment. An overview of the integrative fields of contemporary biology—such as systems biology, biotechnology, and molecular biology—is also an essential component of the course.</td></tr>
<tr><td>Course Objectives</td><td colspan="3">General Objective:</td></tr>
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	The General Biology course is one of the core biological disciplines. Its aim is to develop in students a comprehensive understanding of the properties of living systems, the levels of organization of life, their molecular foundations and development, the role of living organisms in planetary processes, and the modern directions, challenges, and prospects of the biological sciences, as well as to prepare them for studying specialized courses. ***Specific Objectives:*** - To identify students' academic potential, motivate them toward science, and help them realize their potential. - To enable students to grasp the importance of ongoing research in the fields covered by General Biology for the present and future development of science. - To encourage students' active participation in the course and ensure an environment of mutual respect and understanding.
Learning Outcomes	**By the end of the course, students will know:** • The molecular bases of life; the structure and functions, molecular composition, division, life cycle, and types of metabolism of prokaryotic and eukaryotic cells. • Energy pathways and metabolic processes in plant and animal cells. • The significance of intercellular communication and cell receptors for vital functions. • The general foundations of genes, genomes, heredity, and the theory of evolution. • The characteristics of biological diversity; homeostasis; the respiratory, nutritional (digestive), endocrine, immune, and circulatory systems; and modes of adaptation of living organisms to the environment. • Reproduction and development of organisms at different levels of organization, their ontogenesis, and the main stages of their historical development—phylogeny. • Ecosystems and ecology, and the effects of climate and global climate change on organisms and their behavior. • The importance and necessity of conserving the biodiversity.
Policies (Teaching Policy and Conduct)	**<u>Course Organization</u>** - General information related to the course will be communicated to students during lectures. - New topics will be explained with visual aids (PPT and video files). - Before the midterm and final examinations, students' level of mastery will be checked (***Quizzes***). - During the semester, each student must give an individual presentation. Including discussion at the end, the presentation must not exceed 15 minutes. The presentation itself must be submitted in printed form. Presentation topics and rules will be explained in more detail in class. - During the semester, ***6 individual laboratory works*** are mandatory. A white lab coat must be worn in laboratory sessions. The results of each lab must be recorded in a notebook and will be graded by the instructor. - In laboratory sessions, students' understanding of previous topics and the principles of the laboratory work will be assessed at each class through oral and written checks. At the end of the semester, an overall grade will be determined ***(laboratory results together with participation will be evaluated). These rules will be explained in greater detail during class.*** **<u>General Rules</u>**

	Attendance Attendance at all classes is required. If students miss classes for certain reasons (illness, family circumstances, etc.), they must submit documentation to the Faculty Dean's Office. Students who miss **more than 25%** of classes are **not admitted to the exam**. **Lateness** A student who is more than **10 minutes late** to class will be marked absent. Nevertheless, the student will be allowed to enter the class. **Quizzes** A student who, for reasons reported in advance to the instructor and the Dean's Office, that cannot take a quiz, may take it in the following week. **Examinations** All matters related to participation in exams or missing exams are resolved by the Faculty administration. Missing an exam is permitted **only** with the Dean's authorization. Exemptions from exams due to public/social activities are not allowed. Examinations are **cumulative**. The topics for the midterm and final exams are provided to students before the exams. The majority of questions on the final exam are based on material covered **after** the midterm. **Completion of the Course** A student who scores **60% or higher** is considered to have successfully completed the course. Otherwise, the student must retake the course. **Violations of Exam Rules** In cases of violating exam rules (attempted cheating, cheating, disrupting the exam process, and other unlawful actions), the student's exam paper will be **annulled**. **Classroom Conduct** Students must do everything possible to ensure an appropriate academic environment during class. Unauthorized talking, unnecessary movements, and other unethical behavior are strictly prohibited. Students should participate actively in class, ask questions when necessary, and not remain outside discussions. ***It is forbidden to disrupt the class process and ethical rules, to hold unauthorized discussions among students, and to use mobile phones during class.***

Schedule (subject to change)

Week	Date/Day	Course Topics	Textbooks/Assignments
I	**18.09.2025** **20.09.2025**	**Topic № 1. Introduction.** Subject, objectives, and research methods of General Biology. Interrelations of biology with other natural sciences; its role in modern science and societal development. The Science of Life and Its Chemical Basis. Levels of organization of life and general properties of living organisms. ***Laboratory Work № 1.*** General laboratory safety rules and introduction to the scientific method.	***Required textbooks:*** *1) səh. 1-8; 4) səh. 48 -68; 5) səh. 1-17; 7) səh. 3 - 5.*
II	**25.09.2025** **27.09.2025**	**Topic № 2. Biology of the Cell.** Organization of living cells. Discovery of cells; their basic and distinctive properties. Two fundamental classes of cells. Structures of prokaryotic and eukaryotic cells. Organelles of eukaryotic cells and their main functions.	***Required textbooks:*** *1) səh. 93-102; 2) səh. 92-110; 3) səh.185-200; 5) səh. 62-85; 7) səh. 16-18; 8) səh. 3-4.*

		Laboratory Work № 2. Scientific Measurements (Metric System, Study Techniques, and Vocabulary).	
III	**02.10.2025** **04.10.2025**	**Topic № 3. Biology of the Cell.** Activity of living cells. Cytoskeleton and cell motility. Mechanisms of intracellular transport and signal transduction. Structure and functions of biomembranes. Cellular energetics: energy transformations and metabolism. Photosynthesis and respiration. **Quiz 1**	***Required textbooks:*** *1) səh. 150-202; 2) səh. 79-87; 3) səh. 105-116; 4) səh. 122-123; 6) səh.10-15; 7) səh. 2-8.*
IV	**09.10.2025** **11.10.2025**	**Topic № 4. Biology of the Cell.** Life cycle of living cells. Mitosis. Meiosis. Regulation and control mechanisms of the cell cycle. Apoptosis and necrosis. Cancer cells. Cell culture (cell engineering) and imaging (bioimaging). Bioprinting. ***Laboratory Work № 3.*** Basic Tools of Biologist and Handling Skills (handling glassware and equipment: handling chemicals and Microbiology material).	***Required textbooks:*** *1) səh. 112-121; 2) səh. 738-741; 4) səh. 194-211;5) səh. 92-169; 7) səh. 7-19.*
V	**16.10.2025** **18.10.2025**	**Topic № 5. Tissue Biology.** Growth and differentiation of living cells and their integration into tissues. Cell–cell and cell–extracellular matrix adhesion. Basal lamina of the extracellular matrix. Connective tissue. Adhesive interactions in motile and non-motile cells. Structure of plant and animal tissues. ***Laboratory Work № 4.*** Preliminary Use of the Microscope (handling and care; adjusting; cleanup and storing; orientation of images).	***Required textbooks:*** *2) səh.369-400; 3) səh. 3419 - 3594,; 8) səh. 19-26..*
VI	**23.10.2025** **25.10.2025**	**Topic № 6. Fundamentals of Genetics and Molecular Biology.** Chromosomal basis of heredity. DNA structure, replication, and repair. Genes and genomes. Genetic code. Regulation of gene expression. Structure, synthesis, and functions of major biological molecules. **Quiz 2**	***Required textbooks:*** *1) səh. 266 -311; 2) səh. 960-1000; 3) səh. 1165 -1548; 4) səh. 68 - 72;5) səh. 230-335.*
VII	**30.11.2025** **01.11.2025**	**Topic № 7. Modern Fields of Genetics and Molecular Biology.** Omics disciplines (genomics, proteomics, metabolomics, etc.). Systems biology. Structural biology. Synthetic biology. ***Laboratory Work №5.*** Fresh mount preparation and observation of plant and animal cells under the light microscope.	***Required textbooks:*** *3) səh. 642-652; 4) səh. 394-396; 5) səh. 368-385.*
<u>Midterm exam</u>			

VIII	**06.11.2025** **08.11.2025**	**Topic № 8. Biotechnology.** Methods of classical biotechnology (fermentation, antibiotic production, selection/breeding methods in agriculture). Methods of molecular biotechnology (recombinant DNA technology, genetic engineering and genome editing). Medical biotechnology. Agricultural and industrial biotechnology. ***Laboratory Work № 6.*** Introduction to molecular biology methods. Isolation of plant DNA.	***Required textbooks:*** *1) səh. 415-438; 5) səh. 241 – 361; 8) səh. 57 – 60.*
IX	**13.11.2025** **15.11.2025**	**Topic № 9. Immunology.** Immunity and its types**.** Cell-mediated and humoral immune responses. Antigens and antibodies: structures and mechanisms that stimulate immune responses. Vaccination methods and the formation of immunological memory**.** Immunomodulators. ***Laboratory Work № 7.*** Testing for biologically important molecules **(**carbohydrates, proteins and lipids**)**.	***Required textbooks:*** *1) səh. 952 – 974; 3) səh. 4075-4245; 4) səh. 886 - 907; 5) səh. 1103-1127.*
X	**20.11.2025** **22.11.2025**	**Topic № 10. Physiology.** Classification of physiology by research object **(**plant, animal, human physiology**),** by level of biological organization **(**general, systems, etc.), and by research direction **(**comparative, ecological, pathological, applied physiology**)**. Main areas of plant, animal, and human physiology. **Quiz 3**	***Required textbooks:*** *4) səh. 887 - 890; 5) səh.74-78.*
XI	**27.11.2025** **29.11.2025**	**Topic № 11. Mechanisms of Evolution.** Charles Darwin's theory of evolution based on gradual change. Natural and artificial selection. Populations and adaptive evolution. Speciation (microevolution). Modern evolutionary theories (Modern Synthesis, Kimura's Neutral Theory, Punctuated Equilibrium, etc.).	***Required textbooks:*** *1) səh.563 - 568; 4) səh. 491-591; 5) səh. 443 – 517.*
XII	**04.12.2025** **06.12.2025**	**Topic № 12. Evolutionary history of biodiversity.** Biodiversity. Phylogenetic trees. Bacteria and Archaea. Protists. Plants. Evolution of seed plants. Fungi. Animal diversity. Invertebrates. Origin and evolution of vertebrates.	***Required textbooks:*** *1) səh. 553-568; 4) səh. 1287-1323.*
XIII	**11.12.2025** **13.12.2025**	**Topic № 13. Diversity of plant form and function.** Structure, growth, and development of vascular plants. Acquisition and transport of resources in vascular plants. Plant nutrition. Reproduction and biotechnology of angiosperms**.** Plant responses to internal and external signals.	***Required textbooks:*** *1) səh. 618 - 651; 4) səh. 773-886; 5) səh. 762 – 898.*
XIV	**18.12.2025** **20.12.2025**	**Topic № 14. Diversity of animal form and function.** Fundamentals of animal form and function. Animal nutrition, circulation, and respiration. Immune system.	***Required textbooks:*** *1) səh. 673 - 753; 4) səh.*

		Osmoregulation and excretion. Hormones and the endocrine system. Reproduction and development. Nervous system. Sensory and motor mechanisms. Animal behavior. **Quiz 4**	*691-772; 5) səh. 899 – 1155..*
XV	**25.12.2025** **27.12.2025**	**Topic № 15. Ecology.** Subject and tasks of ecology. Organisms and environmental factors. Biogeography. Population ecology. Community (biocoenosis) ecology. Species interactions. Global climate variability. Conservation biology**.**	***Required textbooks:*** *1) səh. 1164 - 1285; 4) səh. 1217 - 1342; 5) səh. 1185 – 1338; 6) səh. 40 - 60.*
Final exam			

This syllabus provides complete information about the course; any changes will be announced in advance.