

Subject	BIOLOGY AND GENETICS, WITH BASIC ELEMENTS OF BIOCHEMISTRY		
Type	Type	Semester	ECTS
	MANDATORY (M)	I	5
Lecturer	Dr.Sc. Fitim Kastrati		
Goals and objectives	<p>Acquiring the fundamental principles underlying the nature, functions and diversity of life; understanding the concepts of simplicity/complexity, biological organization and homeostasis, environment and evolution.</p> <p>Understanding the chemical organization and functioning of living systems, and the aspects of cell organization, genetic information, metabolism, reproduction and development.</p> <p>Acquiring the needed prerequisites to approach the study of anatomy, physiology and other disciplines related to the human body, and particularly for the study of exercise, training methods, and the biology, biochemistry and genetics of human performance.</p>		
Learning outcomes	<p>The course will help the student understand and apply the following concepts:</p> <ul style="list-style-type: none"> ✓ Life, energy, living systems and the biosphere; genetics, evolution and bioengineering; health and the role of physical activity and lifestyle. ✓ Basics of chemistry and biochemistry: atoms and molecules, chemical bonds and reactions, structural and functional biomolecules. ✓ The cell and its components: nucleus, cytoplasm and organelles, membrane and cell transport; diversity of cells and organisms; microorganisms, and their role in the environment and human health. ✓ Principles of metabolism and energy transformations in living systems, and main metabolic paths. ✓ Organization of the genetic material and its functioning: DNA and RNA; the genetic code and the synthesis of proteins; development and gene-environment interactions. ✓ Reproduction, evolution and environment; DNA replication, cell division and organism reproduction; human health, society and future perspectives; assisted reproduction, genetic engineering, biotechnologies, artificial intelligence. 		
Content	Java	Topics	
	1	Syllabus Presentation	
	2	Introduction to general and integrative biology: Energy and matter; properties of life; cells and living beings; body organization and movement structures.	
	3	Basic elements of chemistry and biochemistry: Atoms and molecules; chemical bonds and reactions; acids and bases; biomolecules; proteins and enzymes in metabolism; contractile proteins and movement.	
	4	Basic elements of chemistry and biochemistry	
	5	Atoms and molecules; chemical bonds and reactions; acids and bases; biomolecules; proteins and enzymes in metabolism; contractile proteins and movement.	
	6	The cell, structures and functions: The cell and its diversity; prokaryotes and eukaryotes; membrane and passage of substances; cytoplasm, cytoskeleton and movement structures; nucleus, nucleic acids and their functions.	
	7	Cell metabolism: Flow of energy and matter, the laws of thermodynamics; energy-saving strategies, enzymes; Energetic metabolism, photosynthesis and respiration.	
	8	Mid-exam – 1	
	9	Genetics and reproduction: DNA and RNA, the genetic code and the synthesis of proteins; genetic expression; genes and chromosomes	
	10	DNA and reproduction, mitosis and meiosis; asexual and sexual reproduction, variability, mutations; sex determination	
	11	Mendel's laws; sex-linked traits; examples of human genetic traits in health and disorder; genes and sport.	
	12	Development and gene-environment interaction	
	13	The microbioma and its role in health and evolution	
	14	environmental change; biotechnologies and genetic engineering	
	15	Mid-exam – 2	

Teaching/learning methods	Activity	Weight (%)	
	Lectures	40%	
	Laboratory	30%	
	Research	10%	
	Independent and group learning	20%	
Methods of Evaluation	Methods of evaluation:	%	
	Participation	10%	
	a) Medium-term exam-1	40%	
	b) Medium term exam - 2	40%	
	Course design (developing a training program for a certain group with disabilities)	10%	
Sources	Sources	Number	
	Lectures	1	
	Presentations	1	
	Web of Science	1	
	PubMed	1	
	Scopus	1	
ECTS Workload	Activity	Weekly hours	Workload
	Lectures	3	36
	Lab	1	12
	Course project	n/a	22
	Independent work	n/a	55
Literature	Campbell N.A., Biology, 11th Ed., Pearson 2016.		
	Solomon E.P., Berg L., Martin D., Biology, 7th Ed., 2004.		
Ethical standards	This course follows the UBT College Code of Ethics, requiring all students to behave accordingly. Any instance of academic misconduct, including but not limited to fraud, plagiarism, or other forms of dishonesty, will lead to significant penalties like failure of specific assessment or the entire course, as well as further disciplinary measures in line with UBT College's academic integrity policies.		
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