



**INTEGRATED ACADEMIC STUDIES
OF MEDICINE
FIRST YEAR**

BIOLOGY

2025/2026

Course title

BIOLOGY

The course is evaluated with 3 ECTS.

There are 3 active classes per week (2 classes of lectures and 1 class of small group activities).

TEACHERS AND ASSOCIATES:

	First name and surname	Email	Academic title
1.	Biljana Ljujić	bljujic74@gmail.com	Full Professor
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5.	Marina Gazdić Janković	marinagazdic87@gmail.com	Associate Professor
6.	Danijela Cvetković	c_danijela@yahoo.com	Assistant Professor
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COURSE STRUCTURE:

Module	Name of the course module	Weeks	Classes of lectures (weekly)	Classes of small group activities (weekly)	Teacher – in charge
1.	Cell biology Reproduction and development	5	6	3	Prof. dr Marina Gazdic Jankovic

ASSESSMENT:

By fulfilling the pre-exam obligations and taking the final exam, the student can achieve a maximum of 100 points. The final grade is determined on the basis of the number of earned points, which could be earned in the following ways:

PRE-EXAM ACTIVITIES : Student can earn up to 30 points by answering 3 questions from that week's classes during the small group activities and, in accordance with the demonstrated knowledge, acquires 0-6 points.

A student has the right to take a final exam if he has achieved more than 50% of points on the pre-exam activities.

FINAL EXAM: The final exam is in the form of written/test exam, which is organized within the exam terms (dates), and includes total teaching material. In this way a student can earn up to 70 points in accordance with the demonstrated knowledge.

Module		Maximal number of points		
		Pre-exam activities	Final exam	Σ
1	Cell biology Reproduction and development	30	70	100
Σ		30	70	100

The final grade is formed as follows:

In order to pass the course, the student must pass the pre-exam activities and the final exam.
The final grade is formed according to the attached table.

Final grade	Number of points
10	91 – 100
9	81 – 90
8	71 – 80
7	61 – 70
6	51 – 60
5	< 51

FINAL EXAM

FINAL TEST
0-70 points

The test includes 35 questions.

LITERATURE:

The title of textbook	Authors	Publisher	Library of faculty
Human molecular biology	Epstein J.E.	Cambridge University press, UK, 2003.	
An introduction to embryology	Balinsky B.I.	5 th edition , Saunders College, Philadelphia, 1981.	

All lectures and material for small group work are available on the website of the Faculty of Medical Sciences: www.medf.kg.ac.rs

PROGRAM OF LECTURES

WEEK – 1:

ORGANISATION OF PROKARYOTE AND EUKARYOTE CELLS-CELL ORGANELES

lectures (2 classes)	small group activities (1 class)
Difference between prokaryotic and eukaryotic cells. Organization of eukaryotic cells. Cytoplasm, nucleus, mitochondria, ribosomes, endoplasmic reticulum, Golgi apparatus, lysosomes, cytoskeleton, peroxisomes, centrioles, cilia and flagella.	Difference between prokaryotic and eukaryotic cells. Organelles of prokaryotic and eukaryotic cells. Examination

CELL MEMBRANE, TRANSPORT OF MOLECULES ACROSS THE CELL MEMBRANE

lectures (2 classes)	small group activities (1 class)
Cell membrane-plasma membrane. Transport small molecules across the cell membrane. Transport of macromolecules, small molecules, endocytosis, and exocytosis.	Cell membrane – structure and transport molecules. Examination

NUCLEUS

lectures (2 classes)	small group activities (1 class)
Nucleus -structure, chromatin-types of chromatins, packing of chromatin to the metaphase chromosome, nucleolus.	Nucleus-structure of the nucleus, role in the inheritance process. Examination

WEEK – 2:

CHEMICAL COMPOSITION OF THE CELL

lectures (2 classes)	small group activities (1 class)
Chemical composition of the cell - important chemical elements, water, and organic compounds.	Chemical composition of the cell. Examination

NUCLEIC ACIDS-DNA AND RNA

lectures (2 classes)	small group activities (1 class)
Structure and function of DNA molecule. Denaturation and renaturation of DNA - hybridization. Types of DNA sequences. RNA molecule-a type of RNA molecules and their roles.	Nucleic acids. Examination

REPLICATION OF DNA. GENETIC CODE, CODON, ANTICODON

lectures (2 classes)	small group activities (1 class)
Replication of DNA molecules-enzymes in the process of replications, mechanism of DNA replication. Transitions and transversions in DNA molecule. Genetic code, codon, anticodon.	DNA molecule replication-animation of replication. Examination

WEEK – 3:**PROTEIN SYNTHESIS -TRANSCRIPTION**

lectures (2 classes)	small group activities (1 class)
RNA transcription - steps in RNA synthesis molecule.	RNA transcription - steps in RNA synthesis molecule. Examination

PROTEIN SYNTHESIS -TRANSLATION

lectures (2 classes)	small group activities (1 class)
Translation - stages in the translation process.	Translation - stages in the translation process, animation of translation. Examination

REGULATION OF TRANSCRIPTION AND TRANSLATION

lectures (2 classes)	small group activities (1 class)
Regulation of transcription- pretranscriptional, transcriptional and post-transcriptional level. Regulation of translation.	Regulation of protein synthesis. Examination

WEEK – 4:**REPRODUCTION OF MOLECULES, BACTERIA, VIRUSES AND CELLS**

lectures (2 classes)	small group activities (1 class)
Reproduction of molecules in the cell. Reproduction of bacteria. Reproduction of viruses. Mitosis-karyokinesis and cytokinesis. Modifications of mitosis. Animation of mitosis.	Reproduction of molecules, bacteria and viruses. Cell division mitosis. Examination

REPRODUCTION BY GAMETES, PHASES IN GAMETOGENESIS, MEIOSIS AND THE SIGNIFICANCE OF MEIOSIS

lectures (2 classes)	small group activities (1 class)
Reproduction of organisms. Gametes. Phases of gametogenesis. Meiosis.	Meiosis. Gametes and gametogenesis. Examination

SPERMATOGENESIS

lectures (2 classes)	small group activities (1 class)
Spermatogenesis, spermiogenesis, structure of sperm, sperm biology, hormonal regulation of spermatogenesis, anomalies spermatogenesis.	Spermatogenesis, spermiogenesis, structure sperm, sperm biology, hormonal regulation of spermatogenesis, anomalies spermatogenesis. Examination

WEEK – 5:

OOGENESIS

lectures (2 classes)	small group activities (1 class)
Mammalian oogenesis, ovum biology, sexual cycle of female mammals.	Mammalian oogenesis, ovum biology, sexual cycle of female mammals. Examination

FERTILIZATION IN MAMMALS

lectures (2 classes)	small group activities (1 class)
Fertilization, fertilization in mammals, modifications fertilization process.	Fertilization, fertilization in mammals, modifications fertilization process. Examination

EMBRYONIC DEVELOPMENT OF MAMMALS

lectures (2 classes)	small group activities (1 class)
Developmental biology - morula, blastula, gastrula. Organogenesis. Embryonic formations in mammals.	Developmental biology - morula, blastula, gastrula. Organogenesis. Embryonic formations in mammals. Examination

LESSONS SCHEDULE FOR THE COURSE BIOLOGY

Module	Week	Type	method unit name	Teacher
1	6	L	Organization of cells of prokaryotes and eukaryotes-cellular organelles	Assoc. Prof. dr Marina Gazdić Janković
			Cell membrane-structure, transport of molecules across the cell membrane	
			Nucleus	
1	6	SGA	Organization of cells of prokaryotes and eukaryotes-cellular organelles	Assoc. Prof. dr Marina Gazdić Janković Ass. Dragica Pavlović Ass. Nikolina Kastratović
			Cell membrane-structure, transport of molecules across the cell membrane	
			Nucleus	
1	7	L	Chemical composition of the cell	Assoc. Prof. dr Marina Gazdić Janković
			Nucleic acids - DNA and RNA	
			Replication of the DNA molecule. Genetic code, codon, anticodon	
1	7	SGA	Chemical composition of the cell	Assoc. Prof. dr Marina Gazdić Janković Ass. Dragica Pavlović Ass. Nikolina Kastratović
			Nucleic acids - DNA and RNA	
			Replication of the DNA molecule. Genetic code, codon, anticodon	
1	8	L	Protein synthesis -transcription	Assoc. Prof. dr Marina Gazdić Janković

LESSONS SCHEDULE FOR THE COURSE BIOLOGY

Module	Week	Type	method unit name	Teacher
			Protein synthesis -translation	Assoc. Prof. dr Marina Gazdić Janković
			Regulation of transcription and translation	
1	8	SGA	Protein synthesis -transcription	Assoc. Prof. dr Marina Gazdić Janković Ass. Dragica Pavlović Ass. Nikolina Kastratović
			Protein synthesis -translation	
			Regulation of transcription and translation	
1	9	L	Reproduction of molecules, bacteria, viruses, and cells-mitosis	Prof. dr Biljana Ljujić
			Reproduction by gametes, stages in gametogenesis, meiosis, and the importance of meiosis.	
			Spermatogenesis	
1	9	SGA	Reproduction of molecules, bacteria, viruses, and cells-mitosis	Prof. dr Biljana Ljujić Ass. Dragica Pavlović Ass. Nikolina Kastratović
			Reproduction by gametes, stages in gametogenesis, meiosis, and the importance of meiosis.	
			Spermatogenesis	
1	10	L	Oogenesis	Assoc. Prof. dr Marina Gazdić Janković

LESSONS SCHEDULE FOR THE COURSE BIOLOGY

Module	Week	Type	method unit name	Teacher
1	10	SGA	Fertilization in mammals	Assoc. Prof. dr Marina Gazdić Janković
			Embryonic development of mammals	
			Oogenesis	Assoc. Prof. dr Marina Gazdić Janković Ass. Dragica Pavlović Ass. Nikolina Kastratović
			Fertilization in mammals	
			Embryonic development of mammals	