BIOLOGY

INEGRATED ACADEMIC STUDIES

OF MEDICINE

FIRST YEAR

2023/2024

Course title

BIOLOGY

ECTS: 3
Number of active teaching hours (weekly): 3 (2 lectures teaching classes, 1 practical class)
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TEACHERS AND ASSOCIATES:

	First name and surname	Email	Academic title
1.	Olivera Milošević-Djordjević	olivera@kg.ac.rs	Full Professor
2.	Vladislav Volarević	drvolarevic@yahoo.com	Full Professor
3.	Biljana Ljujić	bljujic74@gmail.com	Associate Professor
4.	Danijela Todorović	dtodorovic@medf.kg.ac.rs	Associate Professor
5.	Marina Gazdić Janković	marinagazdic87@gmail.com	Assistant Professor
6.	Danijela Cvetković	c_danijela@yahoo.com	Assistant Professor
7.	Nikolina Kastratović	n_kastratovic@outlook.com	Facilitator

COURSE STRUCTURE:

Module	**Name of the course module**	**Weeks**	**Teaching Lectures (weekly)**	**Practice (weekly)**	**Teacher – in charge**
1	Cell biology. Reproduction and development.	5	6	3	Prof. dr Olivera Milošević-Djordjević
					Σ 30+15=45

Examination Methods:

The grade is equivalent to the number of points earned (see tables). Points are earned in two ways:

ACTIVITY DURING THE CLASSES:

In this way, the student earns up to 30 points, by answering 3 questions from that week's classes at the practical classes and, in accordance with the demonstrated knowledge, gaining from 0 - 6 points.

FINAL EXAM:

The student takes the final test during the exam period. In this way, the student can acquire 70 points, according to the attached grading scheme.

Module		**Maximal number of points**		
		Activity during the classes	Final test	**Σ**
1	Cell biology Reproduction and development	30	70	100
Σ		**30**	**70**	**100**

Determination of final grade:

To pass the exam, the student must earn the minimum of 51 total points and to fulfill the following:
1. to earn more than 50% points on activity during classes
2. to earn more than 50% points on the final exam, which includes total teaching material.

Grading system

Final grade	**Total number of points Points grade**	**Description**
10	91 – 100	**Excellent**
9	81 – 90	**Exceptionally good**
8	71 – 80	**Very good**
7	61 – 70	**Good**
6	51 – 60	**Passing**
5	< 51	**Falling**

FINAL EXAM

FINAL TEST
0-70 points

GRADING OF THE FINAL TEST
The test includes 35 questions.
Each question is worth 2 points.

LITERATURE:

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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (1 class)
RNA transcription - steps in RNA synthesis molecule.	RNA transcription - steps in RNA synthesis molecule. Examination

PROTEIN SYNTHESIS -TRANSLATION

Teaching lectures (2 classes)	Practical class (1 class)
Translation - stages in the translation process.	Translation - stages in the translation process, animation of translation. Examination

REGULATION OF TRANSCRIPTION AND TRANSLATION

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (1 class)
Reproduction of organisms. Gametes. Phases of gametogenesis. Meiosis.	Meiosis. Gametes and gametogenesis. Examination

SPERMATOGENESIS

Teaching lectures (2 classes)	Practical class (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

Teaching lectures (2 classes)	Practical class (1 class)
Mammalian oogenesis, ovum biology, sexual cycle of female mammals.	Mammalian oogenesis, ovum biology, sexual cycle of female mammals. Examination

FERTILIZATION IN MAMMALS

Teaching lectures (2 classes)	Practical class (1 class)
Fertilization, fertilization in mammals, modifications fertilization process.	Fertilization, fertilization in mammals, modifications fertilization process. Examination

EMBRYONIC DEVELOPMENT OF MAMMALS

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

WEEKLY COURSE SCHEDULE

COURSE	WEDNESDAY	THURSDAY	FRIDAY
BIOLOGY **from 06.12. to 12.01.** **(2+1)**	**LECTURES** **08:00 - 11:45** **14:10 - 14:55** (H44) **PRACTICE** **15:00 - 18:00** (H44)	**PRACTICE** **08:00 - 11:00** (H44)	**PRACTICE** **08:00 - 11:00** (H44)

LECTURES AND PRACTICAL CLASSES

Module	Week	Type	Teaching and practice lectures	Teacher
1	6	L	Organization of cells of prokaryotes and eukaryotes-cellular organelles	Prof. dr Vladislav Volarević
			Cell membrane-structure, transport of molecules across the cell membrane	Prof. dr Vladislav Volarević
			Nucleus	Prof. dr Vladislav Volarević
1	6	P	Organization of cells of prokaryotes and eukaryotes-cellular organelles	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
			Cell membrane-structure, transport of molecules across the cell membrane	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
			Nucleus	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
1	7	L	Chemical composition of the cell	Prof. dr Vladislav Volarević
			Nucleic acids - DNA and RNA	Prof. dr Vladislav Volarević
			Replication of the DNA molecule. Genetic code, codon, anticodon	Prof. dr Vladislav Volarević
1	7	P	Chemical composition of the cell	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
			Nucleic acids - DNA and RNA	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
			Replication of the DNA molecule. Genetic code, codon, anticodon	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
1	8	L	Protein synthesis -transcription	Prof. dr Vladislav Volarević

LECTURES AND PRACTICAL CLASSES

Module	Week	Type	Teaching and practice lectures	Teacher
			Protein synthesis -translation	Prof. dr Vladislav Volarević
			Regulation of transcription and translation	Prof. dr Vladislav Volarević
1	8	P	Protein synthesis -transcription	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
			Protein synthesis -translation	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
			Regulation of transcription and translation	Prof. dr Vladislav Volarević Mr. ph. Nikolina Kastratovic
1	9	L	Reproduction of molecules, bacteria, viruses, and cells-mitosis	Asst. Prof. Marina Gazdić Janković
			Reproduction by gametes, stages in gametogenesis, meiosis, and the importance of meiosis.	Asst. Prof. Marina Gazdić Janković
			Spermatogenesis	Asst. Prof. Marina Gazdić Janković
1	9	P	Reproduction of molecules, bacteria, viruses, and cells-mitosis	Asst. Prof. Marina Gazdić Janković Mr. ph. Nikolina Kastratovic
			Reproduction by gametes, stages in gametogenesis, meiosis, and the importance of meiosis.	Asst. Prof. Marina Gazdić Janković Mr. ph. Nikolina Kastratovic
			Spermatogenesis	Asst. Prof. Marina Gazdić Janković Mr. ph. Nikolina Kastratovic
1	10	L	Oogenesis	Asst. Prof. Marina Gazdić Janković

LECTURES AND PRACTICAL CLASSES

Module	Week	Type	Teaching and practice lectures	Teacher
			Fertilization in mammals	Asst. Prof. Marina Gazdić Janković
			Embryonic development of mammals	Asst. Prof. Marina Gazdić Janković
1	**10**	**P**	Oogenesis	Asst. Prof. Marina Gazdić Janković Mr. ph. Nikolina Kastratovic
			Fertilization in mammals	Asst. Prof. Marina Gazdić Janković Mr. ph. Nikolina Kastratovic
			Embryonic development of mammals	Asst. Prof. Marina Gazdić Janković Mr. ph. Nikolina Kastratovic