Biology, Specialization: Molecular Biology (MSc) – course structure 2024-2025

1st year

1st semester

Courses	No. of hours	Lecture	Classes	Form of course completion	Credits ECTS	
					O	E
Advanced molecular biology[1]	60	20	40 (Lab)	Ex	6	-
Molecular microbiology[2]	60	20	40 (Lab)	Ex	5	-
Advanced biochemistry	60	20	40 (Lab)	Ex	5	-
Regulation of cellular processes	45	15	30 (Lab)	Ex	4	-
Analysis of biomolecules	45	-	45 (Lab)	Pg	4	-
Statistical methods in biology	30	-	30 (Lab)	Pg	2	-
Molecular evolution	15	15		Pg	1	-
Diploma seminar (I module - Writing and presentation of scientific papers)	30		30 (S)	Pg	3	-
On-line trainings: Work Hygiene and Safety (4 hours), Ethics and Disciplinary Liability of Students (2 hours), Library Training (2 hours)	(8)	-	-		-	-
Total:	**345 (+8)**				**30**	
					30	

Forms of classes (L – Lecture, Lab – Laboratory, K – Tutorial, S – Seminar); Ex – exam, Pg – pass with grade; O – obligatory course, E – elective course; 1) 2) elective complementary/extending courses will follow

2nd semester

Courses	No. of hours	Lecture	Classes	Form of course completion	Credits ECTS	
					O	E
Bioinformatics[3]	60	-	60 (Lab)	Ex	6	
A) Next-generation sequencing and beyond[3] or B) Molecular modelling[3]	30	-	30 (Lab) 30 (K)	Ex	-	3
A) Microbial infectivity, drug resistance and diagnostics[2] or B) Microbial genomics[2]	30	15 15	15 (Lab) 15 (Lab)	Ex	-	3
Innovations in environmental microbiology and sustainable development	15	15	-	Pg	1	-
Biochemical and molecular ecology	45	15	30 (Lab)	Ex	3	-
Other elective courses (2 to be chosen): 1. Human ecology 2. Animal and plant cell and tissue in vitro cultures 3. Vaccines and plasma-based preparations of therapeutic purpose 4. Host-pathogen interactions	30 30	-	-	Pg	-	3
Academic lecture	15	15		Pg	-	1
Foreign language	30		30 (K)	Pg	2	
Research project	100			Pg	5	
Diploma project				Pg	3	
Total:	**395**				**20**	**10**
					30	

Forms of classes (L – Lecture, Lab – Laboratory, K – Tutorial, S – Seminar); Ex – exam, Pg – pass with grade; O – obligatory course, E – elective course; 1) 2) 3) elective complementary/extending courses will follow

2nd year

3rd semester

Courses	No. of hours	Lecture	Classes	Form of course completion	Credits ECTS O	Credits ECTS E
Molecular biology in entrepreneurship	15	-	15 (K)	Pg	1	-
A) Protein bioengineering[1] or B) Current topics in cell signaling[1]	30	10 -	20 (Lab) 30 (K)	Ex	-	3
Elective courses in Humanities (two courses to be chosen from the given list)	60	60	-	Pg	-	4
Diploma seminar (II module)	30		30 (S)	Pg	3	-
Research project	140		140 (Lab)	Pg	6	-
Diploma project				Pg	3	
Foreign language	30		30 (K)	Ex	2	-
Theme Module I or Module II **Module I** (*Molecular biology for environment and industry*) 1. Molecular mechanisms of adaptation 2. Biocatalysis and biotransformation **Module II** (*Molecular biology for medicine*) 1. Medical genetics and molecular diagnostics 2. Development of biomolecules with desired characteristics	45 45	15 15	30 (Lab) 30 (Lab)	Pg		4 4
Total:	**395**				**15**	**15**
					30	

Forms of classes (L – Lecture, Lab – Laboratory, K – Tutorial, S – Seminar); Ex – exam, Pg – pass with grade; O – obligatory course, E – elective course; 1) 2) 3) elective complementary/extending courses will follow

4th semester

Courses	No. of hours	Lecture	Classes	Form of course completion	Credits ECTS O	Credits ECTS E
Synthetic biology	30	-	30 (K)	Ex	2	
Theme Module I or Module II **Module I** (*Molecular biology for environment and industry*) 1. Industrial microbiology 2. Biological control of plants **Module II** (*Molecular biology for medicine*) 1. Cellular and molecular immunobiology 2. Tumor biology	45 45	15 15	30 (Lab) 30 (Lab)	Pg	-	4 4
Diploma seminar (III module)	30	-	30 (S)	Pg	3	-
Research project	140	-	140 (Lab)	Pg	6	-
Diploma project				Pg	3	
Diploma thesis and final exam					8	
Total:	**290**				**22**	**8**
					30	

Forms of classes (L – Lecture, Lab – Laboratory, K – Tutorial, S – Seminar); Ex – exam, Pg – pass with grade; O – obligatory course, E – elective course