

## Biology, Specialization: Molecular Biology (MSc) – course structure 2023-2024

### 1<sup>st</sup> year

#### 1st semester

Courses	No. of hours	Lecture	Classes	Form of course completion	Credits ECTS	
					O	E
Advanced molecular biology <sup>1)</sup>	60	20	40 (Lab)	Ex	5	-
Molecular microbiology <sup>2)</sup>	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 (1 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)	-	-		-	-
<b>Total:</b>	<b>345 (+8)</b>				<b>29</b>	
					<b>29</b>	

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 <sup>3)</sup>	60	-	60 (Lab)	Ex	5	
A) Next-generation sequencing and beyond <sup>3)</sup> or B) Molecular modelling <sup>3)</sup>	30	-	30 (Lab)	Ex	-	3
A) Microbial infectivity, drug resistance and diagnostics <sup>2)</sup> or B) Microbial genomics <sup>2)</sup>	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 3
Academic lecture	15	15		Pg	-	1
Foreign language	30		30 (K)	Pg	2	
Research project	100		100 (Lab)	Pg	8	
<b>Total:</b>	<b>395</b>				<b>19</b>	<b>13</b>
					<b>32</b>	

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

## 2<sup>nd</sup> year

### 3rd semester

Courses	No. of hours	Lecture	Classes	Form of course completion	Credits ECTS	
					O	E
Molecular biology in entrepreneurship	15	-	15 (K)	Pg	1	-
A) Protein bioengineering <sup>1)</sup> or B) Current topics in cell signaling <sup>1)</sup>	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	9	-
Foreign language	30		30 (K)	Ex	2	-
Theme Module I or Module II <b>Module I</b> ( <i>Molecular biology for environment and industry</i> ) 1. Molecular mechanisms of adaptation 2. Biocatalysis and biotransformation  <b>Module II</b> ( <i>Molecular biology for medicine</i> ) 1. Medical genetics and molecular diagnostics 2. Development of biomolecules with desired characteristics	45 45	15 15	30 (Lab) 30 (Lab)	Pg		4 4
<b>Total:</b>	<b>395</b>				<b>15</b>	<b>15</b>
					<b>30</b>	

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	E
Synthetic biology	30	-	30 (K)	Ex	2	
Theme Module I or Module II <b>Module I</b> ( <i>Molecular biology for environment and industry</i> ) 1. Industrial microbiology 2. Biological control of plants  <b>Module II</b> ( <i>Molecular biology for medicine</i> ) 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	9	-
Diploma thesis and final exam					8	
<b>Total:</b>	<b>290</b>				<b>22</b>	<b>8</b>
					<b>30</b>	

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