Rector

Andrei D. Karol

« 11 » 2023

Registration number

BELARUSSIAN STATE UNIVERSITY

CURRICULUM

Speciality: 7-06-0511-01 Biology

Profiling: Molecular and Clinical Biology

Degree: Master of Science

Period of study: 2 years

I. Schedule of the educational process

II. Summary (in weeks)

YEARS	Academic Studies	Exams	Internship	Research	Master`s Thesis	Vacation	Total
I	35	6	4			7	52
II	18	3	6	12	2	2	43
	53	9	10	12	2	9	95

Legend: ☐ — Academic Studies ☒ — Internship ⫽ — Master`s Thesis
: — Exams / — Research = — Vacation

III. Curriculum

No	The name of the module, academic discipline, course project (course work)	Exams	End-of-term test	Academic hours						Courses / Semesters												Credits	Competence code
						As follows:				I course						II course							
										1 semester, 18 weeks			2 semester, 17 weeks			3 semester, 18 weeks			4 semester				
				Total	Total in class	Lectures	Laboratory work	Workshops	Seminar classes	Total	Total in class	Credits	Total	Total in class	Credits	Total	Total in class	Credits	Total	Total in class	Credits		
1	*State Component*			**1086**	**208**	**106**		**102**		**324**	**72**	**9**	**348**	**100**	**9**	**414**	**36**	**12**				**30**	
1.1	**Module «Man and the Biosphere»**																						UC-5, 6 DPC-1
1.1.1	Environmentology	1		108	36	24		12		108	36	3										3	
1.1.2	Methodology of Biological and Environmental Researches		1	108	36	8		28		108	36	3										3	
1.2	**Module «Genomics and Epigenetics»**																						UC-2, 5 DPC-2
1.2.1	Structural and Functional Organization of Genomes	2		120	50	30		20					120	50	3							3	
1.2.2	Epigenetics	2		120	50	30		20					120	50	3							3	
1.2.3	Bioinformatic analysis of biological and medical data	3		90	36	14		22								90	36	3				3	
1.3	**Module «Academic Research»**																						UC-4, 5, 6 DPC-3
1.3.1	Research Seminar		1,3	432						108		3				324		9				12	
1.3.2	Course Work			108									108		3							3	
2	*Education Institution Component*			**1986**	**736**	**276**	**320**	**140**		**708**	**252**	**21**	**558**	**204**	**15**	**720**	**280**	**21**					
2.1	**Module «Cell Biology and Signal Transduction»**																						SC-1
2.1.1	Cell Biology	1		120	42	28		14		120	42	3										3	
2.1.2	Free Radical Biology		1	90	36	24		12		90	36	3										3	
2.1.3	Signal Transduction		2	120	46	32		14					120	46	3							3	
2.2	**Module «Neurobiology and Neuropharmacology»**																						SC-2
2.2.1	Neurobiology	1		198	66	32		34		198	66	6										6	
2.2.2	Fundamentals of Neuropharmacology		2	120	46	32		14					120	46	3							3	
2.3	**Module «Molecular Biology and Microbial Ecology»**																						SC-3
2.3.1	Practicals on Cell Biology	2	1	396	144		144			198	72	6	198	72	6							12	
2.3.2	Practicals on Molecular Biology	3	2	444	176		176						120	40	3	324	136	9				12	
2.3.3	Microbial Ecology	1		102	36	24		12		102	36	3										3	
2.4	**Modules for choice (1 of 2)**																						
2.4.1	**Module «Introduction to Programming and Analysis of Transcriptomic Data»**																						SC-4
2.4.1.1	Introduction to R Programming	3		198	72	52		20								198	72	6				6	
2.4.1.2	Analysis of Transcriptomics Data		3	198	72	52		20								198	72	6				6	
2.4.2	**Module «Phenomic Analysis and Bioimaging»**																						SC-5
2.4.2.1	Phenomics	3		198	72	52		20								198	72	6				6	
2.4.2.2	Fluorescent and Luminescent Bioimaging		3	198	72	52		20								198	72	6				6	
3	*Optional subjects*			/432	/280			/280		/108	/70	/3	/108	/70	/3	/108	/70	/3	/108	/70	/3	/12	
3.1	Russian Language as Foreign*	/4	/1,2,3	/432	/280			/280		/108	/70	/3	/108	/70	/3	/108	/70	/3	/108	/70	/3	/12	UC-3

No	The name of the module, academic discipline, course project (course work)	Exams	End-of-term test	Academic hours						Courses / Semesters													Credits	Competence code
						As follows:				I course						II course								
										1 semester, 18 weeks			2 semester, 17 weeks			3 semester, 18 weeks			4 semester					
				Total	Total in class	Lectures	Laboratory work	Workshops	Seminar classes	Total	Total in class	Credits	Total	Total in class	Credits	Total	Total in class	Credits	Total	Total in class	Credits		
4	*Additional training*			/338	/218	/66	/24	/96	/32	/206	/138	/2	/132	/80	/7							/9	
4.1	Philosophy and Methodology of Science	/2		/124	/72	/40			/32	/62	/40		/62	/32	/3							/3	UC-1
4.2	Foreign Language	/2		/142	/96			/96		/72	/48		/70	/48	/4							/4	UC-3
4.3	Information Technologies: Basics		/1	/72	/50	/26	/24			/72	/50	/2										/2	UC-2
	Number of Hours			3072	944	382	320	242		1032	324	30	906	304	24	1134	316	33				87	
	Number of Hours per Week										18			18			18						
	Number of Course projects																						
	Number of Course works		1								1												
	Number of Exams		10/3								4			3/2			3			-/1			
	Number of End-of-term tests		9/4								4/2			3/1			2/1						

IV. Industrial Internship				V. Research			VI. Final Certification
Internship Title	Semester	Weeks	Credits	Semester	Weeks	Credits	
Research I	2	4	6				Master's Thesis
Research II	4	6	9	4	12	18	

VII. Competence matrix

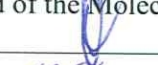| Competence code	Competence	Code Module, Discipline Code
UC-1	Apply the methods of scientific cognition in research activities, generate and implement innovative ideas	2.6.1
UC-2	To solve research and innovation problems based on the use of information and communication technologies	1.2, 2.6.3
UC-3	To carry out communication in a foreign language in the academic, scientific and professional environment for the implementation of research and innovation activities	2.1, 2.5.1, 2.6.2
UC-4	Provide communication, demonstrate leadership skills, be able to build teams and develop strategic goals and objectives	1.3
UC-5	Develop innovative receptivity and ability to innovate	1.1, 1.2, 1.3
UC-6	Be able to predict the conditions for the implementation of professional activities and solve professional problems in conditions of uncertainty	1.1, 1.3
DPC-1	To use modern methods of controlling living systems based on the principles of environmentalism and ecology, a set of methodological approaches to their study	1.1
DPC-2	Apply methodological approaches to the analysis of the structural and functional organization of genomes and epigenomes of different groups of organisms, methodological methods of bioinformatics and algorithms for processing various types of molecular-biological and medical data	1.2
DPC-3	To carry out search, critical analysis, generalization and systematization of scientific information, setting research goals and choosing optimal ways and methods to achieve them	1.3
SC-1	To use knowledge about the molecular basis of the functioning of cellular systems and mechanisms of biosignaling in the development of topical issues of animal and plant physiology, biotechnology, ecology, pharmacy, agriculture and forestry, to analyze and predict the pathophysiological consequences of oxidative stress at the level of cells, tissues and the whole organism	2.1
SC-2	To develop modern problems of higher nervous activity, to apply in practice the knowledge of integrative functions of the central nervous system and the molecular mechanisms of action of neuropharmacological drugs	2.2
SC-3	To develop fundamental and applied problems of physiology, biochemistry, microbiology, bioengineering using modern approaches of cell and molecular biology, cell culture, creation and analysis of plasmid structures, analysis of the generation of reactive oxygen species and the development of symptoms of programmed cell death, the use of polymerase chain reaction to study cellular responses	2.3
SC-4	Apply R programming skills, algorithms and approaches for transcriptomic data analysis in solving molecular genetic problems	2.4.1
SC-5	To use modern methods of phenotyping, fluorescence microscopy and chemiluminometer to solve fundamental and applied problems of biology and bioengineering	2.4.2

*Depending on the level of Russian language proficiency of foreign citizens, the volume of classroom hours may change (increase/decrease (but not less than 140 classroom hours)/exemption from studying the discipline)
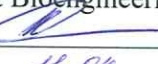
Developed on the basis of the Model Curriculum for the specialty 7-06-0511-01 «Biology», approved on 20.12.2022, registration No. № 7-06-05-003/пр.
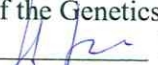
AGREED
Vice-Rector
for Academic Affairs and Education Innovations
_____ Alesia G. Prakharenka
_____ 11. 04. 2023

Dean of the Biological Faculty
_____ Vadim V. Demidchik
_____ 11. 04. 2023

Head of the Molecular Biology Department
_____ Anatoly N. Evtushenkov
_____ 11. 04. 2023

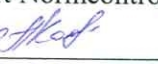Head of the Cell Biology and
Plant Bioengineering Department
_____ Ihar I. Smolich
_____ 11. 04. 2023

Head of the Genetics Department
_____ Natalia P. Maximova
_____ 11.04. 2023

Head of the Human and Animal
Physiology Department
_____ Anatoly G. Chumak
_____ 11. 04. 2023

AGREED
Head of
Academic Affairs Department
_____ Natalia I. Marozava
_____ 11. 04. 2023

Expert Normcontroller
_____ Angelica V. Kostenevich
_____ 11. 04. 2023

Recommended for approval by the Scientific and Methodological Council of Belarusian State University
Record dated 15.02.2023 No. 5