

## BELARUSIAN STATE UNIVERSITY

## **CURRICULUM**

Speciality: 7-06-0532-01 Geography

Profiling: Remote Sensing and Spatial Analysis in Geoinformation Systems (GIS)

Degree: Master of Science Period of study: 2 year Full-time form of education

I. Schedule of the educational process

## II. Summary (in weeks)

SE NAME       1       8       15       22       29 09 6 13 20 13 20 13 13 13 13 13 13 13 13 13 13 13 13 13	- rugust	August	
	02	Exa	Internship Research Master's Thesis Vacation
1	= = = = =	= = = 30 6 18 3	6 10 :

X – Internship

// – Master's Thesis

: - Exams

/ - Research

= - Vacation

III. Curriculum

				Academic hours							Semesters											
ts:					As follows:					I year						II year						9
	The name of the module, academic discipline,	se	End-of-term test		lass		ork	ses	ses	1 semester, 15 weeks			2 semester, 15 weeks				emester weeks	0.0	4	semeste	er	e Code
$N_{2}$	course project (course work)	Exams	f-te	Total	Total in class	ıres	Laboratory work	Workshops	Seminar classes											SS		Competence
		_	)-pu	T	otal	Lectures	rato	orks	nar	Total	n cl	dits	Total	n cla	dits	Total	n cla	lits	tal	ı cla	lits	ube
			田		Ţ		apo	×	emi	To	Total in class	Credits	To	Total in class	Credits	To	Total in class	Credits	Total	Total in class	Credits	Co
7							T		S		To			Tot	155		Tot			Tot		
	State component			848	268	70	168	30		180	40	6	290	100	9	378	128	12				
1.1	Module «Research metodology»				1	-1					279					31.75				14417		UC-1,3,4,5, DPC-1
1.1.1	Methodology and research schools in geography	1		90	40	10		30		90	40	3										
1.1.2	Research seminar		1, 2,	270						90		3	90		3	90		3				
1.2	Module «Geoinformation analysis of geodata»																					UC-2, DPC-2
1.2.1	Geographic information systems in territorial management and planning	2		200	100	22	78						200	100	6							
1.2.2	Laser scanning and unmanned aerial technologies in GIS	3		90	40	10	30									90	40	3				
1.3	Module «Geodata modeling»							7.12 (1995) (1995)											W	SEE PER		DPC-3
1.3.1	Mathematical methods in geodata processing and analyzing	3		90	40	12	28									90	40	3				
1.3.2	Computer-aided design systems in scientific and innovative activities		3	108	48	16	32									108	48	3				
2.	Education institution component			1898	728	252	476		Till.	690	238	21	508	182	15	700	308	21				
2.1	Module «Remote sensing»	Car-																				
2.1.1	Remote sensing for earth observation		1	198	66	36	30	100		198	66	6										SC-1
//	Satellite data processing and image analysis	1		198	66	20	46			198	66	6										SC-2
7	Remote sensing of vegetation / Remote sensing of	*	_	32033						170	00	0										
2.1.3	urban areas		2	112	50	14	36				ene e		112	50	3			- 50	Security		i salku ar	SC-3
2.2	Module «Geographical information systems»			rëa v	r i H							N.							1000			
	Principles of geographical information science		1	198	66	20	46			198	66	6										SC-4
	Spatial modelling and analysis in GIS	2	2	198	66	20	46						198	66	6							SC-5
2.2.3	Python programming in GIS Spatial database management	2	2	198 96	66 40	20 16	46 24			96	40	3	198	66	6							SC-6 SC-7
	Module «GIS for natural resource			70	40	10	21			70	40	3		T. Land	131	-1		100	14771	F 9-12-11		30-7
2.4	management»		Partie	12			Olies Control			1000			1112	7/4				9.00	8.5			
2.4.1	GIS for mineral resource management		3	100	46	16	30									100	46	3				SC-8
	GIS for water resource management		3	100	46 46	16	30 30									100	46 46	3				SC-9
	GIS for soil resource management GIS for land resource management	3	3	100	48	16 14	34									100	48	3				SC-10 SC-11
2.4.5	GIS for environmental management / GIS for landscape planning and environmental protection	3		100	46	16	30									100	46	3				SC-12
2.5	Module «Spatial analysis in human geography and related fields»																		m.			
2.5.1	Spatial analysis in toponymics		3	100	36	12	24									100	36	3				SC-13
2.5.2	Logistics and spatial analysis of transport systems	3		100	40	16	24									100	40	3				SC-14
2.6.	Optional Subjects			/432	/280	12711	/280	4		/108	/70	/3	/108	/70	/3	/108	/70	/3	/108	/70	/3	
2.6	Russian as a foreign language*	/4	/1,2,3	/432	/280		/280			/108	/70	/3	/108	/70	/3	/108	/70	/3	/108	/70	/3	UC-7
2.7.	Series of Disciplines for Candidate Exams and additional Training <sup>1</sup>	AW		/338	/218	/66	/24	/96	/32	/206	/138	/2	/132	/80	/7	M Ly	<u> </u>					
2.7.1	Philosophy and methodology of science	/2		/124	/72	/40		100	/32	/62	/40		/62	/32	/3							UC-6
2.7.2	Foreign language	/2	12	/142	/96			/96		/72	/48		/70	/48	/4							UC-7
2.7.3	Information technologies: basics		/1	/72	/50	/26	/24	523/2		/72	/50	/2	10000	20200	50.00		Ujevak	-				UC-2
	er of Hours			2746	996	322	644	30		870	278	27	798	282	24	1078	436	33				
Number of Hours per Week											19	8		19			24					
Number of Exams				10							2			3			5					
Number of End-ofterm tests											3			3			6					

IV. Int	ernship				V. Reaserch	VI. Final Certification		
Internship Title	Semester	Weeks	Credits	Semester	Weeks	Credits		
Professional introductory (Data collection)	2	6	9	4	12	18	Master's Thesis	
Scientific research (Data analysis)	4	6	9					

## VII. Competence Matrix

Competence Code	Competence Name	Module Code, Disciplin Code						
UC-1	To apply methods of scientific knowledge in research activities, generation and implementation of innovative ideas	1.1.1						
UC-2	To solve research and innovation tasks based on the use of information and communication technologies	1.2.2, 2.7.3						
UC-3	To provide communication, demonstrate leadership skills, be capable of team building and development of strategic goals and objectives	1:1.1						
UC-4	To develop innovative receptivity and ability to innovate	1.1.1						
UC-5	To be able to predict the conditions for the implementation of professional activities and solving professional problems under conditions of uncertainty	1.1.1						
UC-6	To master the methodology of scientific cognition, to be able to analyse and evaluate the content and level of philosophic and methodological issues while solving the tasks related to scientific research and innovative activity	2.7.1						
UC-7	To use a foreign language for communication in interdisciplinary scientific environment in various formats of international cooperation, scientific research and innovative activity	2.6, 2.7.2						
DPC-1	To be able to apply conceptual and methodological framework in the field of geography for organisation of research activities, determining the relevance of research problem and developing research methods, professional conceptual apparatus in practice, to master information retrieval and analysis technology on topics related to professional activities	1.1.2						
DPC-2	To be able to apply geografic information tools while conducting spatial data analysis, solving research problems of territorial management and planning	1.2.1						
DPC-3	To perform mathematical processing and analysis of geodata, automated construction of scientific and innovative projects based on spatial information	1.3.1						
SC-1	To be able to use techniques for remote sensing data preprocessing and the implementation of visual and automated interpretation of general geographical and thematic information for various types of economic activity							
SC-2	To apply methods and algorithms including intellectual ones for solving problems of searching, recognizing and processing objects in images, processing and improving satellite data and images, calculating the objects characteristics in images							
SC-3	To apply methods and algorithms for automated processing of Earth remote sensing data for assessment of vegetation condition and thematic interpretation of urban areas							
SC-4	To use methods and means of integrating modern geoinformation information tools and technologies for collecting, processing, using and analyzing spatial data	2.2.1						
SC-5	To apply innovative methods and algorithms for geodata processing and analysis	2.2.2						
SC-6	To be able to use geographic information tools for spatial modeling and analysis, to create spatial data geoprocessing tools in the Python programming language to solve research and innovative tasks	2.2.3						
SC-7	To be able to perform mathmetical processing and statistical analysis of geodata, to implement the management of spatial databases of scientific and innovative projects	2.2.4						
SC-8	To apply geoinformation methods and techniques for visualizing, verifying and analyzing mineral resources data, to optimize its management and forecasting	2.4.1						
SC-9	To use methods and means of integrating modern information technologies for collecting, processing, using and analyzing water resources data in issues of its forecasting and management	2.4.2						
SC-10	To apply methods and techniques for visualizing, verifying and analyzing spatial soil information for tasks of soil cover assessment, digital mapping and monitoring	2.4.3						
SC-11	To use methods and means of integrating modern information technologies for collecting, processing, using and analyzing land resources data in issues of its forecasting and management	2.4.4						
SC-12	To use geoinformation tools and methods of integrating modern information technologies for collecting, processing and analyzing spatial data in the field of environmental management and environmental protection	2.4.5						
SC-13	To be able to use methods of toponymic databases building, performing spatial analysis of toponymic systems in order to identify the processes of territories development and household management peculiarities in the past	2.5.1						
SC-14	To be able to analyse logistics strategies and processes, transport logistics of enterprises, to optimize logistic processes and develop a strategy for transport logistics sevices development taking into account market demand and buisness entities operation features	2.5.2						

Developed on the basis of model curriculumof the speciality 7-06-0532-01 "Geography" (registration No 7-06-05-010/ $\pi p$ ., 18.01.2023)

APPROVED

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Recommended for approval by the Scientific and Methodological Council of Belarusian State University Record dated 29.02.2024  $\,N_{\!\!0}$  6.

<sup>\*-</sup> Depending on the level of Russian language of foreign citizens, the volume of classroom hours may change (increase/decrease (but not less than 140 classroom hours)/exemption from the studying the discipline).