

**CATALOGUE OF PROGRAMS AND COURSES**  
**TAUGHT AT THE UNIVERSITY OF MINING AND GEOLOGY**  
**"ST. IVAN RILSKI"**  
**2021/2022**

**COURSES THAT CAN BE TAUGHT IN FOREIGN LANGUAGE**

**EQF Level 7 "Master"**

Year*	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)	Language of instruction	Course leader
					Lectures per week	Exercises / Seminars per week				
1	Autumn	112239	Reservoir Geology and Rock Properties & Reservoir Fluids	E	2	2	60	5	ENG, RUS	Prof. Efrosima Zaneva-Dobranova
1	Autumn	112119	Unconventional sources of hydrocarbons	E	2	2	60	5	ENG, RUS	Prof. Efrosima Zaneva-Dobranova
1	Autumn	112156	Properties of natural gases and gaseous fuels	E	2	2	60	5	ENG, RUS	Prof. Efrosima Zaneva-Dobranova
1	Autumn	112227	Organic petrology	E	2	2	60	5	ENG	Assoc. Prof. Alexander Zdravkov
1	Autumn	112235	Organic geochemistry	E	2	2	60	5	ENG	Assoc. Prof. Alexander Zdravkov
1	Spring	112129	Mining geology	CA	2	2	60	5	ENG	Assoc. Prof. Stanislav Stoykov
1	Autumn	112121	GIS in Hydrogeology	E	3	2	75	5.2	ENG	Assoc. Prof. Kamen Popov
1	Spring	112124	Remote sensing in geology	E	2	2	60	5	ENG	Assoc. Prof. Kamen Popov
1	Spring	292114	Chemical and physicochemical methods for water treatment	E	3	3	90	5	ENG, RUS	Prof. M. Panayotova
1	Autumn	332119	Embedded Systems (Microcontrollers)	E	2	2	56	8	ENG, RUS	Assoc. Prof. Y. Gorbounov
1	Spring	332142	Reprogrammable systems	E	2	2	56	8	ENG, RUS	Assoc. Prof. Y. Gorbounov
1	Autumn	132109	Gemmology	E	2	3	75	6	ENG	Prof. Kostov, Prof. Tzankova
1	Autumn	132146	Geoarchaeology	E	1	1	60	5	ENG	Prof. Kostov, Assoc.Prof. Pristavova

Year*	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)	Language of instruction	Course leader
					Lectures per week	Exercises /Seminars per week				
1	Autumn	132137	Gem testing and grading	CA	2	2	56	5	ENG	Assist. Prof. Tzankova
1	Spring	132111	Metamorphism and metamorphic processes	E	2	2	56	5	ENG	Assoc. Prof. Pristavova
1	Spring	132115	Topomineralogy	E	2	2	60	5	ENG	Prof. Kostov
1	Autumn	272178	Corporate Social Responsibility	E	3	1	60	5	ENG	Assist. Prof. Dr. Vessela Petrova
1	Autumn	272172	Environmental impact management	E	3	1	60	5	ENG	Assist. Prof. Dr. Vessela Petrova
1	Spring	272236	Organizational Behaviour and Business Communication	E	2	-	30	2	RUS	Assoc. Prof. Dr. Maria Fartunova
1	Spring	272170	Sociology of Management	E	3	1	60	5	RUS	Assoc. Prof. Dr. Maria Fartunova
1	Spring	272173	Standardization and Certification	E	2	1	30	3	ENG	Assist. Prof. Dr. Vessela Petrova
1	Spring	272274	Technological Renovation and Social Dynamics	CA	2	1	30	3	RUS	Assoc. Prof. Dr. Maria Fartunova
1	Autumn	122267	Application of GIS in landscape studies	E	1	4	75	7	ENG	Assist. Prof. Dr. Valentina Nikolova
1	Autumn	171126	Ecology and environmental protection	E	2	3	75	7	ENG	Assoc. Prof. Dr. Ivan Dimitrov
1	Autumn	122169	GIS analysis in geological prospecting	E	2	3	75	7	ENG	Assist. Prof. Dr. Dimitar Sachkov
1	Autumn	122170	GIS documenting and management of protected areas	E	30	3	75	7	ENG	Assist. Prof. Dr. Dimitar Sachkov
1	Autumn	122266	Programming in GIS environment	E	1	4	75	7	ENG	Assist. Prof. Dr. Dimitar Sachkov
1	Autumn	122268	Spatial data infrastructure	E	1	4	75	7	ENG	Assist. Prof. Dr. Valentina Nikolova
1	Autumn	122165	Special methods of 3D geological analysis	E	2	3	75	7	ENG	Assoc. Prof. Dr. Ivan Dimitrov
1	Spring	142232	Digital images processing	E	1	4	75	7	ENG	Assist. Prof. Dr. Dimitar Sachkov
1	Spring	122171	Geodynamic processes and events	E	2	45	75	7	ENG	Assoc. Prof. Dr. Ivan Dimitrov

1	Spring	122172	Geological maps compilation in GIS	E	1	4	75	7	ENG	Assist. Prof. Dr. Dimitar Sachkov
1	Spring	112124	Remote sensing in geology	E	2	3	75	7	ENG	Assoc. Prof. Dr. Kalin Ruskov
2	Autumn	122173	Pre-thesis practical work (summer)	CA	4 weeks			12	ENG	Pre-thesis practical work (summer)
2	Autumn		Thesis preparation and defense		13 weeks			15	ENG	Thesis preparation and defense

\* According to the curriculum of the University of Mining and geology; ENG = English; RUS = Russian; E = Exam; CA = Continuous assessment

### EQF Level 6 "Bachelor"

Year*	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)	Language of instruction	Course leader
					Lectures per week	Exercises / Seminars per week				
2	Spring	291102	Analytical Chemistry	E	2	3	70	8	ENG	Assoc. Prof. Mintcheva
2	Spring	291106	Hydrochemistry	E	2	2	56	7	ENG RUS	Prof. M. Panayotova
3	Spring	291108	Instrumental methods for gas analysis	E	2	1	42	6	ENG	Assoc. Prof. Mintcheva
2	Autumn Spring	291104	Organic Chemistry	E	3 2	3 1	84 42	8 5	ENG	Assist. Prof. Dr. Gicheva
2	Autumn	291105	Physical Chemistry	E	2	3	70	5	ENG RUS	Prof. M. Panayotova
4	Autumn	291107	Protective metal coatings	E	2	1	42	6	RUS ENG	Assoc. Prof. Kanazirski; Assoc. Prof. Nedyalkova
3	Autumn	331143	Computer Architectures	E	2	0	28	3	ENG, RUS	Assoc. Prof. Y. Gorbounov
2	Spring	331112	Digital Electronics	E	3	2	70	7	ENG, RUS	Assoc. Prof. Y. Gorbounov
3	Spring	111105	Coal geology	E	3	3	84	7	ENG	Assoc. Prof. Alexandar Zdravkov

Year*	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)	Language of instruction	Course leader
					Lectures per week	Exercises / Seminars per week				
3	Spring	111155	Geology and Geochemistry of the Fossil Fuels	E	2	2	56	5	ENG	Assoc. Prof. Alexandar Zdravkov
3	Autumn	111102	Fundamentals of geochemistry	E	3	2	70	6	ENG	Assoc. Prof. Stanislav Stoykov
3	Autumn	111141	Geochemistry	E	2	3	70	6	ENG	Assoc. Prof. Stanislav Stoykov
4	Autumn	111131	Industrial Types Deposits of Mineral Resources	E	2	2	56	6	ENG	Assoc. Prof. Stanislav Stoykov
2	Spring	111118	Mineral Resources	E	2	1	42	4	ENG	Assist. Georgi Liutov
3	Autumn	111117	Geology and Prospecting of Mineral Deposits	E	2	2	56	5	ENG	Assoc. Prof. Stanislav Stoykov
3	Spring	111104	Geology of mineral deposits	E	3	3	84	7	ENG	Assoc. Prof. Stanislav Stoykov
4	Autumn	111108	Deposits of industrial minerals and rocks	E	3	3	84	7	ENG	Assoc. Prof. Stanislav Stoykov
1	Autumn	121120	Prospecting and Exploration of Mineral Deposits	E	3	1	56	8	ENG	Assoc. Prof. Stanislav Stoykov
4	Spring	111145	3D Geological Modelling	CA	0	3	56	4	ENG	Assoc. Prof. Kalin Ruskov
2	Spring	111103	Fundamentals of geostatistics	E	2	2	56	5	ENG	Assoc. Prof. Kalin Ruskov
3	Spring	112121	Geographic information systems - GIS	CA	1	2	42	3	ENG	Assoc. Prof. Kamen Popov
4	Spring	111210	Physics of layer	CA	2	2	56	5	ENG, RUS	Prof. Efrosima Zaneva-Dobranova

Year*	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)	Language of instruction	Course leader
					Lectures per week	Exercises / Seminars per week				
4	Autumn	111112	Prospecting and exploration of oil and gas deposits	E	2	2	56	5	ENG, RUS	Prof. Efrosima Zaneva-Dobranova
1	Spring	271115	Economics	E	3	1	56	7	RUS	Prof. Dr. Emil Dimov
2	Spring	271106	Economics and Finances	E	2	1	42	4	RUS	Prof. Dr. Emil Dimov
4	Autumn	271153	Entrepreneurship Knowledge	E	3	2	70	6	RUS	Assoc. Prof. Dr. Maria Fartunova
4	Autumn	271104	Human Resource Management	E	3	2	70	7	RUS	Assist. Prof. Dr. Boryana Trifonova
3	Spring	271163	Project Management	E	3	2	70	8	ENG	Assist. Prof. Dr. Borislava Galabova
4	Autumn	271274	Technological Renovation and Social Dynamics	E	3	1	56	5	RUS	Assoc. Prof. Dr. Maria Fartunova
1	Autumn	131101	Crystallography and Mineralogy	E	3	3	70	6	ENG	Prof. Kostov
1	Autumn	131139	Fundamentals of Mineralogy	E	2	2	56	5	ENG	Prof. Kostov
1	Spring	131325	Fundamentals of Gemmology	CA			42	3	ENG	Prof. Kostov, Assist. Prof. Tzankova
2	Spring	131332	Environmental Geochemistry	CA			56	4	ENG	Prof. Kostov
2	Autumn	131103	Mineralogy and petrography	E	3	3	84	6	ENG	Assist. Prof. Tzankova
2	Spring	131104	Metamorphic Petrology	E	2	2	56	5	ENG	Assoc. Prof. Pristavova
1	Spring	131144	Petrology	E	3	3	84	8	ENG	Assoc. Prof. Pristavova
2	Autumn	121153	Paleontology and Stratigraphy	E	28	28	56	5	ENG	Assoc. Prof. Dr. B. Valchev
2	Spring	121155	Cartography	E	28	28	56	4	ENG	Assist. Prof. Dr. Valentina Nikolova

Year*	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)	Language of instruction	Course leader
					Lectures per week	Exercises / Seminars per week				
2	Spring	121154	Structural geology and geotectonics	E	3	3	84	6	ENG	Assoc. Prof. Dr. Ivan Dimitrov
3	Autumn	371168	CAD systems in geology	CA	1	3	56	4	ENG	Assist. Prof. Dr. Dimitar Sachkov
3	Autumn	121105	Geomorphology and quaternary geology	E	2	2	56	5	ENG	Assist. Prof. Dr. Valentina Nikolova
3	Autumn	121158	GIS and spatial analyses	CA	1	3	56	5	ENG	Assist. Prof. Dr. Valentina Nikolova
3	Autumn	121157	Historical and regional geology	E	3	3	84	5	ENG	Assist. Prof. Dr. B. Valchev
3	Spring	121108	Field geology	E	2	4	84	10	ENG	Assoc. Prof. Dr. Ivan Dimitrov
3	Spring	121163	GIS documenting of linear infrastructural objects	CA	1	3	56	5	ENG	Assist. Prof. Dr. Dimitar Sachkov
4	Autumn	121160	GIS processing of geological information	CA	1	4	70	7	ENG	Assist. Prof. Dr. Dimitar Sachkov
4	Spring	111145	3D geological modelling	CA		3	42	3	ENG	Assoc. Prof. Dr. Ivan Dimitrov
4	Spring	121164	Geological heritage	E	2	2	56	4	ENG	Assist. Prof. Dr. B.Valchev
4	Spring	111253	Statistical analysis of geological information	E	2	2	56	4	ENG	Assoc. Prof. Dr. Kalin Ruskov

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### Practical trainings at Bachelor level

Year*	Course unit code	Full name of the course unit	Form of assessment	Workload Overall hours	Credits (ECTS)	Language of instruction	Course leader
2	121135	Geological computer graphics	CA	5 days	30	ENG	Assist. Prof. Dr. Dimitar Sachkov
2	121128	Paleontology and Stratigraphy	CA	3 days	18	ENG	Assist. Prof. Dr. B.Valchev
2	121129	Structural geology	CA	3 days	18	ENG	Assoc. Prof. Dr. Ivan Dimitrov
3	121130	Field geology	CA	10 days	60	ENG	Assoc. Prof. Dr. Ivan Dimitrov
3	121144	Regional geology and geological phenomena	CA	8 days	48	ENG	Assist. Prof. Dr. B. Valchev

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## **MASTER PROGRAMS THAT CAN BE TAUGHT IN ENGLISH**

**Name of the program:** *ECOTECHNOLOGY AND ENVIRONMENTAL PROTECTION*

**EQF Level of the program:** 7

**The ISCED 2013 field of education:** 052

**Qualification awarded:** *ECOLOGIST*

### **Description of the program:**

*The Master's Programme in "Ecotechnologies and Environmental Protection" prepares for future career highly qualified specialists ready to meet the contemporary challenges of the industry and society. In addition to the solid academic knowledge, the programme allows to the students to develop a variety of practical skills outside of the university thanks to our close partnerships with authoritative and international companies in the branch. The senior graduate students who chose this specialty will be trained in the environmental impact of the energy and mineral industry sectors on the environment as well as in the implementation of efficient and environmental friendly ecotechnological solutions, adapted to the local social conditions for sustainable industrial development and economic growth. The programme covers varied aspects of the latest methods of the sustainable engineering that can reduce the damage on the ecosystems, remediate the polluted water and soil, manage the wastes and ensure conservation of the biodiversity. All kinds of manufactures wish to hire such specialists, because all of these manufactures must satisfy strict environmental regulations and be sure that they deal with the best eco-friendly practices. The educational approach is multidisciplinary, involving close cooperation between European and world-famous scientists with high reputation, together with a numerous experts and representatives of the business society. Graduates of this specialty can find jobs as experts-ecologist in various industries, at the market for ecotechnology and environmental innovations, in the scientific and governmental institutions in the member countries of European Union as well as in the whole world.*

### **Key learning outcomes:**

This Master's degree expands students' knowledge and this is facilitated by the opportunity to obtain specialised training in some of the above subjects by selecting the respective set of optional course units. The graduates of this degree are able to design and organise environmental protection activities and to exert administrative control in this direction, as well as to perform as engineers and ecologists in various branches of industry and agriculture, as experts in state institutions, non-governmental organisations, and commercial entities acting in the area of ecology and environmental protection, and also as research workers in the field of ecology and environmental protection. Training in this degrees is carried out along curricula that comply with those of the leading universities of EU member states.

The graduates of this course of studies can be successfully employed on positions connected with environmental protection activities in the geoexploration, mining, and energy branches of industry, in the chemical and pharmaceutical industries and in agriculture, as well as such in the field of mineral processing. They can also find occupational fulfilment as ecologists in district authorities and municipalities, in the Regional Inspectorate of the Environment and Water (RIEWs), or as state employees in institutions whose scope of power is ecology.

**Leading department:** *Department Engineering Geoecology*

**Program director:** *Assoc. Prof. A. Angelov, PhD*

**Contacts:** *University of Mining and Geology "St. Ivan Rilski"*  
*Studentski Grad, "Prof. Boyan Kamenov" Street, Sofia 1700, [tonyagev@mgu.bg](mailto:tonyagev@mgu.bg)*

## Program components, workload, assessment methods, credits allocation

Year	Semester	Code of the discipline	Full name of the discipline	Form of assessment	Weekly workload		Overall hours	Credits (ECTS)	
					Lectures	Exercises /Seminars			
First	Autumn	172127	<u>Compulsory:</u> 1. Environmental chemistry	Exam	3	3	90	6,0	
		292115	2. Impact of mining and mineral processing on natural water bodies	Exam	3	3	90	6,0	
		121159	3. Environmental Geology	Exam	2	2	60	5,0	
		142145	4. Environmental Geophysics	Exam	3	3	90	6,0	
			<u>5. Elective (one of the two):</u>						
		272172	5.1. Management of environmental impacts	Exam	3	1	60	5,0	
		271162	5.2. Economic assessment of environmental impacts	Exam	3	1	60	5,0	
			<i>Total for the first semester:</i>			14	12	390	28
	Spring			<u>Compulsory :</u>					
		172173	6. Waste management	Exam	3	3	90	6,0	
		172174	7. Biotechnological systems for environmental protection	Exam	3	3	90	6,0	
		112161	8. Environmental Geochemistry	Exam	3	3	90	6,0	
		362117	9. Modeling of ecological processes	Exam	3	3	90	6,0	
			<u>10. Elective (one of the two):</u>						
172158		10.1. Biosensors and bioindicators	Exam	3	3	90	6,0		
172168	10.2. Ecotoxicology	Exam	3	3	90	6,0			
		<i>Total for the second semester:</i>			15	15	450	36	
Second	Autumn		Pre-graduate practice and Master Thesis defence				30	15	
			<i>Total number of hours and credits for the entire training course:</i>				870	85	



**Name of the program: GEOLOGY AND GEOINFORMATICS**

**EQF Level of the program: 7**

**The ISCED 2013 field of education: 0532**

**Qualification awarded: Master in geoinformatics**

**Description of the programme:**

*This master's program is centered around the use of geoinformatics in earth science fields. It is particularly relevant to the subject of environmental geology. The programme prepares students to become experts in geological prospecting and ecological research with emphasis on soil and water management. The courses are designed to teach, complex geological and geomorphological analyses using software tools, documentation of infrastructure sites, mapping of the geochemical and geophysical parameters of the environment, computer modeling of natural processes, forecasting and monitoring of natural risks and procedures for management of protected areas, such as national parks, geoparks and etc. They are designed to develop abilities, useful for doctoral studies, and/or professional career in the industry. Since the main tool used is GIS software, upon completion of the program, the candidates will be most sought of as GIS specialists in mining and prospecting companies and as variety of GIS related technicians in environment related business enterprises.*

**Key learning outcomes:**

By the end of this Master programme graduates will be able to:

- Define and comprehend fundamental concepts, practices and advances in geoinformatics;
- Acquire, process and visualize spatial data in the field of geology, environmental protection and geotourism;
- Know and analyse spatial and functional dependencies between objects and phenomena (particularly related to geological prospecting; geodynamic events; geological-geomorphological hazards and protected areas) and to interpret the results of the analysis;
- Do individual researches for solving different tasks in geology, environmental protection and landscapes;
- Know main remote sensing systems and apply remote sensing methods;
- Apply techniques of spatial analyses, 3D modelling and mapping;
- Demonstrate confidence in working with GIS and in solving of different software problems by using software help or information in the websites;
- Show advanced skills in using computer technology for input and analysis of spatial data;
- Demonstrate organizational skills in file and database management;
- Effectively communicate the results of their research and master's theses

**Leading department:**

***Geology and geoinformatics***

**Program director**

***Assoc. Prof. Ivan Dimitrov Ivanov***

**Contacts: University of Mining and Geology "St. Ivan Rilski"  
Studentski Grad, "Prof. Boyan Kamenov" Street, Sofia 1700,  
[ldim68@abv.bg](mailto:ldim68@abv.bg), Assoc. Prof. Ivan Dimitrov Ivanov**

## Program components, workload, assessment methods, credits allocation

Year	Semester	Course unit code	Full name of the course unit	Form of assessment	Workload		Overall hours	Credits (ECTS)
					Lectures	Exercises /Seminars		
FIRST	Autumn	122267	Application of GIS in landscape studies	Exam	15	60	75	7
		171126	Ecology and environmental protection	Exam	30	45	75	7
		122169	GIS analysis in geological prospecting	Exam	30	45	75	7
		122170	GIS documenting and management of protected areas	Exam	30	45	75	7
		122266	Programming in GIS environment	Exam	15	60	75	7
		122268	Spatial data infrastructure	Exam	15	60	75	7
		122165	Special methods of 3D geological analysis	Exam	30	45	75	7
	Spring	142232	Digital images processing	Exam	15	60	75	7
		122171	Geodynamic processes and events	Exam	30	45	75	7
		122172	Geological maps compilation in GIS	Exam	15	60	75	7
		112124	Remote sensing in geology	Exam	30	45	75	7
	SECOND	Autumn		Pre-thesis practical work (summer)	Ongoing evaluation	4 weeks		12
			Thesis preparation and defense		13 weeks		15	

## PhD PROGRAMS THAT CAN BE TAUGHT IN ENGLISH

**Name of the program: SYSTEMS AND DEVICES FOR ENVIRONMENTAL PROTECTION**

**EQF Level of the program: 8**

**The ISCED 2013 field of education: 052 Environment**

**Qualification awarded: PhD**

**Description of the program:**

*The international PhD course in „Systems and devices for environmental protection“ at the University of Mining and Geology „St. Ivan Rilski“-Sofia, Bulgaria prepares for future careers motivated specialists in ecology and ecological biotechnology, who are interested particularly in the modern environmental challenges of the industry and society. In addition to the solid professional knowledge, the program training allows to develop a variety of practical skills for the searching of best and applicable engineering solutions of various problems related to the environmental protection and conservation. The PhD fellows involved in this specialty will be educated in the impact of the energy and mineral industries on the environment, the biosensors technology and analytical tools for ecological monitoring and assessment, as well as the preparation of scientific reports and set of efficient strategies for sustainable industrial growth and economic development.*

**Key learning outcomes:**

The general key learning outcomes of the course program are the possibilities for management of numerous types of system and devices, which are widely used to improve and keep in good health the natural ecosystems in conditions of industrialization, where the processes are conducted with high risk of potential release of wastes and toxicants. Thus, the graduates have a broad scopes for finding jobs, as highly qualified experts in many industrial branches, researchers in academic or scientific institutions, non-profit organizations, advisors in governmental institutions, mainly in European Union but also in the other countries, which require high standarts for environmental protection and control.

**Leading department: Department Engineering Geoecology**

**Program director: Assoc. Prof. A. Angelov, PhD**

**Contacts: University of Mining and Geology “St. Ivan Rilski”, Studentski Grad, “Prof. Boyan Kamenov” Street, Sofia 1700, [tonyagev@mgu.bg](mailto:tonyagev@mgu.bg)**

**Name of the program: METHODS AND TECHNIQUE OF GEOLOGICAL STUDIES**

**EQF Level of the program: 8**

**The ISCED 2013 field of education: 0532 Earth Sciences**

**Qualification awarded: PhD**

**Description of the program:**

*The PhD program in the scientific specialty “Methods and Technique of Geological Studies” at the Department of Applied Geophysics is designed to prepare highly qualified specialists in the field of structural geological-geophysical studies related to the prospecting, exploration and exploitation of mineral resources. At the University of Mining and Geology “St. Ivan Rilski”, unlike other PhD programs that are related to fundamental geophysical and geological subjects, the efforts are mainly focused on solving problems directly related to the implementation of state and/or corporate projects, focusing the specifics in preparation and training of PhD students, first and foremost, in practical terms. Particular attention is paid to the near-surface geophysical studies in industrial, civil and mining construction.*

*The PhD students receive the necessary theoretical and practical training, perfecting and concentrating their knowledge in the possibilities for application of field, borehole and remote geophysical methods in all stages of prospecting, exploration and exploitation of mineral resources, as well as in solving engineering, hydrogeological and environmental problems.*

*Graduates of the PhD program in the scientific specialty "Methods and Technique of Geological Studies" at the Department of Applied Geophysics find professional realization in the design and conduct of geophysical research in the mentioned fields, as well as in fields with close or similar activity. They can work in scientific and scientific-designing institutes and laboratories, in universities as lecturers and associates. They can apply for leading positions as executives or experts in proper state and economic structures, or successfully implement themselves through their knowledge in modern computer technology.*

**Key learning outcomes:**

The PhD candidate acquires problem solving ability and ability to work in a team environment, comprising specialists of various expertise.

This is achieved by solving real problems of both scientific and practical importance, related to some geological or environmental procedure, which reflects societal needs, such as mineral prospecting and mitigation of environmental damage, water management or soil management. The problem solving is projected in a time frame that is sufficient to accomplish extensive literatures review, data acquisition, analysis and presentation of the results. The presentation of the results is achieved by paper writing and thesis completion and defense.

The main problem, solved in the PhD program, is selected to be of multidisciplinary nature so interaction with specialists of different field is needed on every step of the work flow.

These specialists, acting as consultants, are selected from the pool of the University of Mining and Geology - Sofia, the Sofia University and the institutes of the Bulgarian Academy of Sciences. Training courses, workshops and laboratory time in relevant European universities are also envisaged. Acquaintance with and industry executives from relevant fields will most likely be made as some point in the program.

As an obligatory outcome at least three scientific papers have to be published as in one of them the candidate should be the sole author.

In addition to the problem-solving, adequate skills in scientific presentation of the results are also specifically targeted in the learning program. The presentation will encompass oral, writing and graphic presentation skills. The graphic presentation usually includes high level 3D visualization using GIS or CAD software, coupled with geometry methods from the fields of geodesy, structural geology and other earth sciences.

As a rule the PhD program has three obligatory exams as the number of exams can be increased depending on the topic and the needs of the candidate. One of these exams is in technical English, for nonnative English speakers, and the rest are on topics strictly related to the topic of the thesis.

Socialization in the Bulgarian environment is usually achieved by using accommodation on the student's town in Sofia, where other students and young people live.

**Leading department**  
***Geology and geoinformatics***

**Program director**  
***Ass. Prof. Ivan Dimitrov Ivanov***

**Contacts: *University of Mining and Geology "St. Ivan Rilski", Studentski Grad, "Prof. Boyan Kamenov" Street, Sofia 1700, [dim68@abv.bg](mailto:dim68@abv.bg), Assoc. Prof. Ivan Dimitrov Ivanov***

**Name of the program: COMPUTER TECHNOLOGY IN ENGINEERING**

**EQF Level of the program: 8**

**The ISCED 2013 field of education: 06 Information and Communication Technologies**

**Qualification awarded: PhD**

**Description of the program:**

*The doctoral program develops skills that allow students to become experts with integrated technical, information and management training for mining and other industries, combining knowledge and skills in the following main areas of application of information and computer technology: development strategy, innovation, information service and implementation of modern computer systems for monitoring and management in the industry.*

*Successfully defended doctoral students can solve a wide range of information and management tasks in a globalizing market economy, characterized by a dynamically changing environment, significant risk in the implementation of complex information systems, the constant movement of raw material prices and limited resources, developed competition: wide application of computer and information technologies and the urgent need for restructuring and integration of the economy in the international economic space.*

**Key learning outcomes:**

The intellectual qualities and practical skills that are acquired during the training of doctoral students are related to:

- deepening the knowledge related to the modern theoretical and methodological principles for research in the scientific fields, related to the application and finding of specific computer technological and technical solutions and information management technologies in the organization and management of processes;
- study, introduction and optimization of new and constantly evolving technologies, methods, techniques and tools in computer, communication and information technologies and their application in specific business organizations;
- study and introduction of new, more progressive and sophisticated approaches, techniques and tools and introduction of innovative technological computerized solutions;
- formation of initiative, innovation, competence and complex skills for conducting independent research and experimental activities, as well as knowledge and skills for independent research and teaching activities;
- Achieving very good theoretical and applied preparation for participation in national, international and regional scientific forums, competitions and projects.

In the process of training doctoral students master not only the specific approaches, methods, principles and techniques in information and computer technology, but also can choose the best ones for solving specific problems in the respective business organizations.

**Leading department: Department of Informatics**

**Program director**

**Assoc. Prof. PhD Nikolay Ivanov Yanev**

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## INFORMATION ON THE GRADING SYSTEM USED IN BULGARIA

### Grading scale:

EXCELLENT (5.50 - 6.00) - outstanding performance with only minor errors

VERY GOOD (4.50 - 5.49) - above the average standard but with some errors

GOOD (3.50 - 4.49) - generally sound work with a number of notable errors

FAIR (3.00 - 3.50) - performance meets the minimum criteria

FAIL (2.00) - considerable further work is required

### ECTS grading scale:

Bulgarian - ECTS	Bulgarian - ECTS	Bulgarian - ECTS	Bulgarian - ECTS	Bulgarian - ECTS	Bulgarian - ECTS
<b>6.00 - A100</b>	<b>5.50 - A90</b>	<b>5.00 - B80</b>	<b>4.50 - B70</b>	<b>4.00 - C60</b>	<b>3.50 - C50</b>
5.95 - A 99	5.45 - B89	4.95- - B79	4.45 - C69	3.95 - C59	3.45 - D49
5.90 - A98	5.40 - B88	4.90 - B78	4.40 - C68	3..90- C58	3.40 - D48
5.85 - A97	5.35 - B87	4.85- B77	4.35 - C67	3.85 - C57	3.35 - D47
5.80 - A96	5.30 - B86	4.80- B76	4.30 - C66	3.80 - C56	3.30 - D46
5.75 - A95	5.25 - B85	4.75- B75	4.25 - C65	3.75 C55	3.25 - D45
5.70 - A94	5.20 - B84	4.70- B74	4.20 - C64	3.70 - C54	3.20 - D44
5.65 - A93	5.15 - B83	4.65- B73	4.15 - C63	3.65 - C53	3.15 - D43
5.60- A92	5.10 - B82	4.60- B72	4.10 - C62	3.60 - C52	3.10 - D42
5.55 - A91	5.05 - B81	4.55- B71	4.05 - C61	3.55 - C51	3.05 - D41
					<b>3.00 - E40</b>

## PROGRAMS AND COURSES THAT ARE TAUGHT IN BULGARIAN

### EQF Level 6 "Bachelor"

<http://www.mgu.bg/new/main.php?menu=3&submenu=10>

### EQF Level 7 "Master"

<http://www.mgu.bg/new/main.php?menu=3&submenu=39>

### EQF Level 8 "Doctorate or equivalent third cycle"

<http://www.mgu.bg/new/main.php?menu=3&submenu=70>