

MAJOR FIELD OF STUDY “EARTH SCIENCES” PROGRAM MASTER OF SCIENCE „GEOGRAPHIC INFORMATION SYSTEMS”

SPECIALITY: GEOGRAPHIC INFORMATION SYSTEMS

EDUCATIONAL AND QUALIFICATION DEGREE: MASTER

PROFESSIONAL QUALIFICATION: MASTER OF GEOGRAPHIC INFORMATION SYSTEMS (GIS)

COURSE PERIOD: 1YEAR (2 SEMESTERS)

FORM OF EDUCATION: REGULAR

QUALIFICATION CHARACTERISTICS

Purpose of the program

This program is designed for graduates who majored in "Geography", "Ecology and Environmental Protection" and for those who have studied GIS technology with more than 4 credits according to Ministry of Education and Science Ordinance № 21 of 2004 for accumulation and transfer of credits. This program is based mainly on the informational technology which makes it suitable for graduates with major field of study 4.6 "Informatics". This program is part of major field of study "4.4 Earth Sciences." The main objective of the program is to train professionals on theoretical and practical skills for the use of GIS technology in their professional field. Students who have earned good knowledge in this area will have the opportunity to create, manage and analyze spatial data.

Knowledge, skills and competences

As a result of theoretical and practical knowledge earned the students will be qualified to take part in the development of future GIS projects for management of a determined territory. The master program develops personal and professional competencies as:

- Independence, responsibility and teamwork skills;
- Expanding and updating their professional knowledge;
- Communication and social skills;
- Professional skills to collect, to classify, to evaluate, to analyze and to interpret data in order to solve specific problems; skills for making important management decisions related to the implementation of modern GIS.

Professional career

Graduates can find realization in different ministries and regional structures, municipal and district administrations, different departments, which use GIS technology to visualize, process and analyze spatial information. The qualification characteristics of the speciality "Geographic Information Systems" for educational qualification degree "Master" in major field of study "Master of Geographic

Information Systems" is the main document that defines the development of the curriculum and syllabuses. It is in accordance to the Higher Education Act (SG. 112 / 27.12.1995. Amend. And suppl. from 1995 up to SG 83/2005) and the Regulation on state requirements for acquiring higher education and educational degree "bachelor", "master" and "professional", approved by Decree 162 of 23.07.2002 (SG 76/2002) and regulations of the SWU "Neofit Rilski"

CURRICULUM

of Master Program "Geographical Information Systems»
Course period: 1 year (2 semesters)

First semester	ECTS кредити	Second semester	ECTS кредити
Compulsory Courses		Compulsory Courses	
Spatial databases and programming in a GIS environment	4	Spatial GIS and 3D modeling	4
Geostatistical analysis	4	Cartographic modeling and analysis of risk processes	4
Geodetic methods for spatial data	4	GIS Organization and Project management	4
Photogrammetry and Remote Sensing for spatial information	4	Practicum in an institution	3
Geographical analysis	4	Development and defense of a graduation thesis	15
Data sources	4		
Optional course 1 (from Group I)			
Optional course 2 (from Group II)			
Elective Courses (students have to choose one course of each group)			
First group			
Application of GIS in natural geography	3		
Application of GIS in socio-economic geography	3		
Application of GIS in ecology and environmental protection	3		
Application of GIS in spatial planning	3		
Second group			
GIS modelling of land cover	3		
GIS and nature conservation	3		
Medicogeographical mapping Introduction to GNSS (Global Navigation Satellite System) and navigation mapping	3		
GIS soil resources	3		
	Total 30		Total 30

TOTAL FOR BOTH SEMESTERS: 60 credits

Spatial databases and programming in a GIS environment

ECTS credits: 4

Weekly workload: 1l+0cy+0ly+2pe

Form for verification of knowledge: exam

Type of exam: written

Semester: I

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Assoc prof.

E-mail:

Annotation:

The course "Spatial databases and programming in a GIS environment" is compulsory. The lectures present the general concepts for programming and the basics of programming in GIS environment. Programming languages as HTML, Java Script, VBA and other object - oriented programming models which are popular for writing GIS applications are considered.

The practical exercises are intended to provide specific knowledge and skills to improve the productivity of ArcGIS, for example, create new toolbars, add scripts and more.

Content of the course:

The content of the course is divided into three sections:

Section I. Spatial databases

Basic concepts related to the spatial data that are the essence of the maps are discussed, as types of models, structure, format and more.

Section II. Introduction to Programming

The students will gain the necessary theoretical and practical knowledge of the concepts of objects and object-oriented programming. Some languages that are used for programming in GIS are discussed.

Section III. Using custom applications

The students will learn how to download scripts and other applications compatible with ArcGIS, written in different programming languages. They learn also how to use them.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection“. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS, Erdas Imagine Professional), additional materials (tables, diagrams and maps), some of which have been developed as students' course and diploma works.

For the practical exercises is used a multimedia computer lab. For the normal conduct of the exercises the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks or tests. The tasks are fully related to digital work environment with specialized software for mapping and using of maps.

The students are admitted to the exam with a minimal note of 3 which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department's developed and adopted system for control of the students' knowledge and skills.

Geostatistical analysis

ECTS credits: 4

Form for verification of knowledge: exam

Semester: I

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Assoc prof. Elena Karashtranova, Phd

E-mail: helen@swu.bg

Weekly workload: 1l+0cy+0ly+2pe

Type of exam: written

Annotation:

The course "Geostatistical analysis" is compulsory. The lectures present the general concepts for executing and processing of geostatistical measurement and processing of data on the earth surface.

The practical exercises are intended to provide specific knowledge and skills for obtaining and interpreting various statistics when processing data in the GIS environment.

Content of the course:

The content of the course is divided into three sections:

Section I. Introduction in Statistics

The concept statistics, its tasks and connection with the cartography and GIS are given. Brief explanations of the most important statistics (average, minimum and maximum, standard deviation, etc.) and their application are given.

Section II. Statistical measurement, errors, accuracy and data processing

The students will gain the necessary theoretical and practical knowledge on the statistical methods and tools for measurements processing and assess the accuracy of these measurements.

Section III. Creating surface models

Students will gain an overview of: 1) Calculation and modeling of the surfaces with ArcGIS Spatial Analyst and ArcGIS 3D Analyst tools; 2) Model for surface prediction and assessment of results.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection”. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS, Erdas Imagine Professional), additional materials (tables, diagrams and maps), some of which have been developed as students' course and diploma works.

For the practical exercises is used a multimedia computer lab. For the normal conduct of the exercises the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks or tests. The tasks are fully related to digital work environment with specialized software for mapping and using of maps.

The students are admitted to the exam with a minimal note of 3 which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department's developed and adopted system for control of the students' knowledge and skills.

Geodetic methods for spatial data

ECTS credits: 4

Weekly workload: 1l+0cy+0ly+2pe

Form for verification of knowledge: exam

Type of exam: written

Semester: I

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Assoc prof. Penka Kastreva, PhD, Assist. Eng. Galina Bezinska

E-mail: penkakastreva@swu.bg, galinabezinska@swu.bg

Annotation:

The course "Geodetic methods for spatial data" is compulsory. The lectures present the general concepts for executing and processing of geodetic measurements on the earth surface.

The practical exercises are intended to provide specific knowledge and skills for obtaining the coordinates and elevations of points of geodetic measurements, which are a source of GIS data.

Content of the course:

The content of the course is divided into four sections:

Section I. Introduction in Geodesy

Brief explanations of geodesy, its tasks and connection with the cartography and GIS are given. The importance of surveying for GIS as a science that provides and distributes the coordinate system on the Earth's surface through a system of geodetic points is pointed out.

Section II. Geodetic surveys, errors, accuracy measures and data processing

The students will gain the necessary theoretical and practical knowledge on the geodetic methods and instruments for measurement of angles, distances and elevations, as well as on errors in measurements with different instruments; they will be able to process and assess the accuracy of these measurements.

Section III. Geodetic networks for horizontal and vertical measurements

The national geodetic networks introduce a unified coordinate system for geodetic measurements, geographic information systems and Earth's surface mapping. They solve scientific and applied problems. The students obtain theoretical knowledge on the study, design, construction, measurement and the processing of measurements for different geodetic network classes and types.

Section IV. Coordinate calculations and geodetic surveys

The students will acquire general notion on how the surveyors calculate coordinates and elevation of geodetic points as well as on how coordinates and elevations are calculated. Knowledge is obtained on terrain modelling when carrying out geodetic measurements and their processing in order to generate Digital Terrain Model (DTM). The students will be able to understand how the topographic plans and maps are obtained and how to use them. Once a map or a model is available, methods for calculation of areas and volumes are studied.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection”. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS, Erdas Imagine Professional), additional materials (tables, diagrams and maps), some of which have been developed as students' course and diploma works.

For the practical exercises is used a multimedia computer lab. For the normal conduct of the exercises the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks or tests. The tasks are fully related to digital work environment with specialized software for mapping and using of maps.

The students are admitted to the exam with a minimal note of 3 which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department's developed and adopted system for control of the students' knowledge and skills.

Geographical analysis

ECTScredits: 5

Form for verification of knowledge: exam

Semester: I

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Assistant Professor, Dr.rer.nat. Emilia Tcherkezova

E-mail: et@geophys.bas.bg

Weekly workload: 1 l + 2 ex

Type of exam: written

Annotation:

The course “ **Geographical analysis**” aims to introduce the students with of analytical techniques and functions using Geographic Information Systems (GIS).

The practical exercises are intended to elaborate usefull knowledge and skills covering the main methods of geospatial analysis and their applications fields.

Course content:

Section I. Theoretical background: The course consists of the following main topics:

- Geospatial analysis concepts
- Methods and methodological approaches of geospatial analysis and modelling
- Core components of GIS-based spatial analysis of vector and raster data
- Main methods of geostatistical analysis, e.g. spatial autocorrelation and spatial regression
- Geomorphometry and visibility analysis
- Network analysis, shortest path calculation, travelling salesman etc.

Section II. Seminars and praxis include active students participation in lerning the main methods of GIS-based spatial analyses and their application.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection”. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS), free and open GIS software (e.g. GRASS GIS, QGIS), additional materials (tables, diagrams and maps), some of which have been developed as students’ course and diploma works. For the practical exercises is used a multimedia computer lab. For the normal conduct of the exercises the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks and team work. The tasks are fully related to digital work environment with specialized software for mapping and using of maps. The students are admitted to the exam with a minimal note of 3, which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department’s developed and adopted system for control of the students’ knowledge and skills.

Cartographic Modeling and Analysis of Risk Processes

ECTS credits: 4

Hours/week: 2l+0se+2,5pe for 10 weeks

Assessment: Continual assessment and written exam

Course Start: Sem 2

Department of Geography, Ecology and Environmental Protection

Faculty of Mathematics and Natural Sciences

Lecturers: Associate Prof. Dr. Krasimir Stoyanov

Junior Lecturer Galina Bezinska

E-mail: krasi_sto@swu.bg

E-mail: galinabezinska@swu.bg

Course details

Objectives/Learning Outcomes

The course "Cartographic Modeling and Analysis of Risk Processes" aims to familiarize students with the causes, the occurrence and the nature of natural disasters. It also aims to introduce students to the possibilities of mapping these phenomena. Finally, this course provides strong information about geographical distribution of the natural disasters and their negative effects on the environment as well as on the human's economical activity.

Description

The content of the course is divided into two parts. The first part provides some basic concepts used in the assessment and the management of the natural risk. We discuss the basic natural disasters, focusing on those which pose a threat to our country. The second part details all major aspects concerning the application of GIS in the field of the natural risk processes. More precisely, we discuss the ways to acquire initial information and its implementation in GIS, as well as those to create and develop vector and raster GIS layers. Practical exercises focus on different methods and techniques used for the visualization of the results and for the generating of thematic maps as well.

Learning and Assessment

The course "Cartographic modeling and risk analysis processes" follows the official curriculum, adopted for students enrolled in the specialties "Geography", (Master degree) and "GIS" (Master degree).

The continual assessment is based on an individual GIS project that each student must achieve. The final assessment for this course comprises an oral defense of the individual GIS project (70% of the final grade) and a written exam on some practical questions consistent with the theme of the conducted project (30% of the final grade).

References:

Бручев, Ил. (ред.) (1994) Геоложката опасност в България. Обяснителен текст към карта в М 1:500000, изд. БАН, С., 117с.

Мардироян, Г. (2007) Природни бедствия и екологични катастрофи, изучаване, превенция, защита. АИ „Проф. М. Дринов“, С., 358с.

Кастрева, П. (2011) Географски информационни системи и компютърна картография, УИ „Неофит Рилски“, Благоевград, 456с.

Николова, М., С. Недков (2012) Рискът от наводнения, изд. Терарт, С., 219с.

<http://bsdi.asde-bg.org/risk.php>

Българска инфраструктура за пространствени данни (БИПД)

Organization and Managing Geographic Information Systems Projects

ECTScredits: 3

Weekly workload: 1L+2ex

Form for verification of knowledge: exam

Type of exam: written

Semester: I

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Assistant Professor, Dr.rer.nat. Emilia Tcherkezova

E-mail: et@geophys.bas.bg

Annotation:

The course “**Organization and Managing Geographic Information Systems Projects**” introduces theoretical and practical foundations for organization, management and successful implementation of GIS projects. It aims to introduce the students and to make them familiar with the processes of planning, elaboration, testing and implementation of GIS projects, geodata interoperability and geodata sharing.

Course content:

Section I. Theoretical background:

- GIS and Geographic Information Science in the modern world
- Planning a GIS project
- Geospatial data and information and the need of their interoperability
- Core components of a GIS project
- Managing GIS projects and implementation.

Section II. Seminars and praxis: Planning and elaboration of a common GIS project.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection”. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS), additional materials (tables, diagrams and maps), some of which have been developed as students’ course and diploma works.

For the practical exercises is used a multimedia computer lab. For the normal conduct of the seminars the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks and team work. The tasks are fully related to digital work environment with specialized software for mapping and using of maps.

The students are admitted to the exam with a minimal note of 3, which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department’s developed and adopted system for control of the students’ knowledge and skills.

APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEMS IN PHYSICAL GEOGRAPHY

ECTS credits: 3

Weekly hours: 1 lessons + 1 seminars

Control of study: in-term control and examination

Examination type: written

Semester: I

Methodical guidance:

Department of Geography, Ecology and Environmental Protection

Faculty of Mathematics and Natural Sciences

Lectors: Assistant Prof. Emil Gachev, PhD

e-mail: emil.gachev@swu.bg;

Annotation:

The discipline "Application of Geographical Information Systems in Physical Geography" is an optional discipline, which provides students with knowledge about the main approaches and methods of application of Geographical Information Systems (GIS) in Physical geography: from the creation of initial database of original information, through creation and development of vector and raster layers, to the performance of GIS analytical functions to obtain scientific results, and the visualization of these results. The discipline comes to upgrade the knowledge obtained in the basic disciplines "Spatial database and programming in GIS" and „Geographical Analyses“. This discipline provides students with qualifications and skills to fully apply GIS in their possible future work as physical geographers and environmentalists.

Contents of the discipline:

The discipline "Application of Geographical Information Systems in Physical Geography" is divided into several parts. The first part accentuates on the types of original information sources and the techniques of their incorporation in GIS. The second presents approaches and methods for the development of thematic layers on the basis of the incorporated original information. The third part presents the analytical abilities of GIS software in the various fields of Physical geography. The fourth focuses on the techniques for a best visualization of the results obtained.

Education in the discipline is directly turned towards obtaining of practical skills of GIS application and of utilizing as much as possible the great potential of this software. The course is to a certain extent free of heavy theoretical loads. During all parts of the course each student creates and develops his/her own individual GIS project, which final quality determines the eventual mark to a great extent.

Technology of education and ranking

Education in the discipline Обучението по дисциплината "Application of Geographical Information Systems in Physical Geography" is done according to the regulations of the current study plan of the Masters course in Geographical Information Systems.

The course lessons are held in a computer hall. The lessons pay attention on the specifics of the various methods and the techniques of their application, while at seminars students apply what they have learned in their individual projects.

Based on the work on the individual project during the seminars an in-term mark is assigned to each student. Only those who have at least Average (3) are allowed for the final examination.

Examination procedure comprises a public defense of the finished individual project and an answer in a written form of several practical questions related to the project. The share of practical questions in the final mark is 30%, while the mark of the individual GIS project participates with 70%.

GIS APPLICATION IN THE SOCIO-ECONOMIC GEOGRAPHY

ECTS credit: 3

Form of exam: Exam

Semester: I

Departments involved:

The Department Geography, ecology and environmental protection

FMNS

Lecturers: Assoc. Prof. Em. Patarchanova, PhD

тел: 0885/938005, e-mail:epatarchanova@abv.bg, emilia_patarchanova@swu.bg

Weekly workload: 2 hours

Type of exam: written

Annotation:

The course attention is paid to the theoretical and practical issues related to planning, development and management of socio-economic processes with GIS technology. It builds on the knowledge and skills from the Bachelor's degree in GIS and socio-economic geography and provides specialization of future graduates in regional geographic studies of the socio-economic processes and systems in order to better planning and management of the territory.

The graduated students of this course will be able to analyze the digital information with GIS technology and to offer solutions to the socio-economic problems occurring at different levels - regional and local, to work in teams to create competitive options on specific problem or topic, to create text and cartographic product for the management bodies of the public administration and the business, to predict various aspects of the socio-economic development of territorial systems by offering various versions of solutions. The theoretical knowledge and practical skills in the field of GIS and the remote explorations will help future specialists to solve professional problems in the field of socio-economic researches.

Course content:

Lectures are structured in two sections. The first is dedicated to the social sphere, with two main focuses: demographic resources as its active side and social infrastructure and services. The second section deals with the issues of economic processes and subjects of their location, of the establishment of interactions occurring between the economic structures and the structuring of their territorial organization and forms of local, regional and national level.

The topics introduce students with the possibilities of new technologies, providing spatial information and its processing when examining the socio-economic processes and phenomena, in establishing their territorial manifestations and characteristics in determining the trends and interactions with the other spheres of public life etc. The practical exercises allow students to gain more practical knowledge and skills for presentation and analysis of digital information using GIS technology, for using different methods associated with other GIS technologies that provide spatial data on the socio-economic processes and their territorial expression.

Teaching and assessment and Measurement:

Upon the presentation of the lectures are used computer, multimedia, demonstrational software. The practical exercises are focused entirely on adoption and use of modern technologies (GIS and others) for processing, analysis and visualization of geospatial information. Used are the equipment of the department "GEEP" as well as different institutional and other departments related to the development of socio-economic processes in different territories.

The examination process includes a written examination - one topic from each section in a pre-defined syllabus corresponding to the content of the curriculum. The relative weight of the total test score is 60%. The assessment is carried out in six-point scale; under HEA and Ordinance № 21 of the Ministry / 30.09.2004. Credits are awarded only if the total score is equal to or higher than the average of 3, under the system of accumulation and transfer of credits.

During the semester students undertake a periodic review by the award of assignments (K) and / or abstracts (R). The final grade is based on 40% of the assessment of periodic checks and 60% of the assessment of semester examination.

GIS Application in Ecology and Environmental Protection

ECTScredits: 3

Form of control learning: examination

Term: I

Under methodical guidance of:

Department of Geography and Ecology and environmental protection

Faculty of Mathematics and Natural Science

Lecturers:

Assoc prof.

E-mail:

Weekly norm: 2 hours

Type of exam: written

Annotation:

The subject "Application of geographic information systems in environmental protection" is studied by the students in the discipline "Ecology and environmental protection" in order to be introduced to the increasing role of GIS in the area of planning, management and environmental protection. The lecture course supplements the knowledge of the main GIS course. All knowledge is directly oriented to the systems of mapping, management, analysis and supports the decision making in the management of geographical sites and areas that have local or regional distribution.

Contents of the subject:

Section I. Theoretical background: The course includes fundamental topics for development and implementation of GIS related environment. Various applications of remote sensing for mapping, monitoring and environmental research in GIS medium are considered (ecosystem modeling, the dynamics of the biosphere, wildlife, biodiversity, etc.).

Section II. Seminar lectures with student participation: The students are placed in a real situation presenting their vision for the creation of a future project for GIS management of pre-defined territory and its implementation. The end result is a presentation of the research topic of each student and discussion.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection“. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS), additional materials (tables, diagrams and maps), some of which have been developed as students' course and diploma works.

For the practical exercises is used a multimedia computer lab. For the normal conduct of the exercises the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks or tests. The tasks are fully related to digital work environment with specialized software for mapping and using of maps.

The students are admitted to the exam with a minimal note of 3, which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department's developed and adopted system for control of the students' knowledge and skills.

Application of GIS in the regional planning – 2 semester

ECTS credits: 3

Weekly workload: 2л+0cy+0лу+1пу

Form for verification of knowledge: exam

Type of exam: written

Semester: I

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Prof. Maria Shishmanova, PhD, Assist. Eng. Galina Bezinska

E-mail: valkova_chich@swu.bg, galinabezinska@swu.bg

Annotation:

The course "Application of GIS in the regional planning" is an elective course for master students majoring in Geographic Information Systems. It introduces students to scientific and theoretical territorial and urban planning and their analysis, planning and management through GIS.

The course "Application of GIS in spatial planning" aims to give students basic knowledge in this field and to provide scientific and practical training and competence for their involvement in territorial research and forecast developments as well as in programs for management of the territory in local and European projects.

The practical exercises aim to consolidate the acquired knowledge and expand experimental skills in practice and modern science. The application significance of lecture course "Application of GIS in spatial planning" consists in providing scientific training and competence of the Masters in analyzing, organizing the planning of the overall activity of non-populated area or villages from different categories, their management and solving urbanization and other territorial issues.

The course corresponds to the subject of study of disciplines Spatial databases and programming in Geographic Information Systems, Geostatistical analysis, Photogrammetry and remote sensing for spatial information, Geodetic methods of spatial data, Geographic analysis.

Course content:

The macrostructure of the course includes three sections:

The first module is dedicated to the subject, issues and objectives set for the territorial and urban development.

The second module introduces Masters of the non-populated area – urban, rural, forest, damaged areas and territories occupied by the technical infrastructure, etc. and their presentation, analysis, planning and management through GIS.

The third module combines topics explaining locational action device of occupation, landscaping, cultural heritage, sports and recreation, social service, technical infrastructure and facilities and environmentally placement center in the urban area and their submission, analysis, planning and management through GIS.

Teaching technology and assessment:

Lectures and workshops are conducted exclusively on the basis of material-technical means of the Department "GEOOS". To illustrate lectures taught are used computer with video-projector, educational videos, specialized GIS software (ArcGIS), visual aids (boards, charts and maps) from actual territorial and urban development plans and national documents.

For practical exercises using multimedia computer laboratory. For the normal conduct of exercises students are divided into groups, each student has a private computer.

During the semester periodically control by assigning individual tasks and a written test. The tasks are all linked to working in a digital environment with specialized software for mapping and using maps.

Students are allowed to take the exam with a minimum current evaluation medium 3, which is the average of all estimates received during the semester. The final mark is 40% of the periodic assessment and control and 60% of the evaluation of semester examination under developed and adopted at the Department control system for knowledge and skills of students.

Introduction to GNSS (Global Navigation Satellite System) and navigation mapping

ECTS credits: 3

Weekly workload: 1 l+0cy+0ly+1 pe

Form for verification of knowledge: exam

Type of exam: written

Semester: II

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Lecturers:

Assoc prof. Penka Kastreva, PhD, Assist. Eng. Galina Bezinska

E-mail: penkakastreva@swu.bg, galinabezinska@swu.bg

Annotation:

This course “Global Navigation Satellite Systems” is elective. The course aims to provide to the students the necessary skills and basic knowledge on GNSS, and particularly on the systems GPS, GLONASS and Galileo.

This practical training aims to expand the theoretical and practical knowledge of the students in the field of global navigation satellite systems, namely: working with GPS receivers, preparation and carrying out of measurements, methods of measuring and processing of results in order for students to obtain the necessary practical knowledge and skills.

Course content:

The discipline content has been structured in four sections:

Section I. Introduction in Satellite geodesy

Definitions and basic concepts. Coordinate systems - definitions and transformations; Global Navigation Satellite Systems – Satellite orbits and ephemerides.

Section II. Global Positioning System

Overview of GPS. Basic principle of positioning. GPS configuration – Space segment, Control segment, User segment. Observables. Data processing. Absolute and relative positioning. Sources of errors.

Section III. Other global systems

GLONASS, GALILEO, EGNOS, WAAS, LORAN C

Section IV. Navigation mapping

The course provides in-depth knowledge and skills for creation and usage of navigational technologies in geo-informational and cartographic aspect.

Teaching technology and assessment:

The lectures and exercises are conducted solely on the equipment basis of the Department „Geography Ecology and Environmental Protection”. To illustrate the lecture material are used: computer with video – projector, study videos, specialized software (ArcGIS), additional materials (tables, diagrams and maps), some of which have been developed as students’ course and diploma works.

For the practical exercises is used a multimedia computer lab. For the normal conduct of the exercises the students are divided into groups and each student has a separate computer.

During the semester periodically the students are assigned individual tasks or tests. The tasks are fully related to digital work environment with specialized software for mapping and using of maps.

The students are admitted to the exam with a minimal note of 3 which is formed as the average of all notes received during the semester. The final note is 40% of the periodic evaluation and 60% of the semester exam according to the department's developed and adopted system for control of the students' knowledge and skills.

Practicum in an institution

ECTS credits: 3

Weekly workload: 0l+3 pe

Form for verification of knowledge: exam

Type of exam: written

Semester: II

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Annotation

This practical training aims to expand the practical knowledge of the students in different application areas of GIS. The students will carry out their practice in an institution of their choice or in an institution with which the University has a contract. The students are obliged to fulfill the tasks set by the people responsible for their training, who will write the results of their work in a trainee's booklet. Verification of the obtained knowledge is carried out by a lecturer in the department, depending on the area in which the practice is conducted.

Diploma Thesis - development and defense

ECTS credits: 15

Weekly workload: 0I+3 pe

Form for verification of knowledge: defense of a thesis

Type of exam: presentation

Semester: II

Under methodical guidance of: Department of Geography and Ecology and Environmental Protection

Faculty of Mathematics and Natural Science

Annotation

Students are assigned an individual task for a specific topic and project, approved by the department. The following parameters of the task are specified: scope and content, information processing and approach for reaching the goal stated. In the course of their work on the task students receive the necessary consultations and advice with respect to processing, analysis and summary of results, as well as guidance for the oral presentation of the diploma project. The diploma project is presented and defended as per university rules.