



UNIVERSITY OF NOVI SAD

FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6

Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics



STUDY PROGRAMME ACCREDITATION MATERIAL:

GEODESY AND GEOMATICS

MASTER ACADEMIC STUDIES

Novi Sad

2012.

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Geodesy and Geomatics

Programme name	Geodesy and Geomatics
Independent higher education institution where the programme is being executed	University of Novi Sad
Higher education institution where the programme is being executed	Faculty of Technical Sciences
Educational-scientific/educational-art field	Technical-Technological Science
Scientific, professional or art field	Geodesy Engineering
Type of studies	Master Academic Studies
Study scope, expressed in ECTS	60
Academic degree, abbreviation	Master in Geodesy, M.Geod.
Study length	1
Programme implementation starting year	2010
Future course implementation starting year (for new programme)	
Number of students attending this programme	9
Planned number of students to be enrolled in this programme	32
Programme approval date (state the approval issuer)	14.11.2012 - Science Education Council 29.11.2012 - University of Novi Sad Senate
Programme language	Serbian, English
Programme accreditation year	2008
Web address containing programme information	http://www.ftn.uns.ac.rs



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MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 00. Introduction

The study programme for the Graduate Academic Studies in Geodesy and Geomatics, presents a continuation of the study programme for the Bachelor Academic Studies in Geodesy and Geomatics. The study programme is realized within the Computing and Control Department and the Department for Civil Engineering at the Faculty of Technical Sciences, University of Novi Sad.

The study programme in Geodesy and Geomatics has been developed within two fundamental technical fields: geodesy and geoinformatics. The programme is designed to educate graduate engineers to receive enough practical knowledge for work, and also to enable further education at adequate specialization or doctoral studies.

The active development in the field of Geodesy and Geomatics has imposed the structure and the content of the study programme, i.e. the demand to perform specialization in the field of interest. During studies, a special emphasis is on individual work, in encouraging the participation in concrete professional and developmental projects within individual laboratories, and in emphasising and developing possibilities for problem-solving situations. New and contemporary laboratories have been developed in the cooperation with well-known worldwide companies: HEXAGON, ORACLE, IBM, Cisco Systems, Allied Telesyn, Micronas, ABB, Philips, Sagem, OpenWave, AOL, Cirrus Logic, Danfoss, Nivelco, Feedback, Siemens, Leica, Trimble, Schneider Electric. Through all the activities, apart from the essential theoretical and practical knowledge, students obtain a necessary feeling of personal security and fulfilment necessary for the successful integration into the professional environment.



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Standard 01. Programme Structure

The name of the study programme of these Master academic studies is Geodesy and Geomatics. The academic title awarded is Master in Geodesy (MSc. (Geod.)). The structure of the study programme is to obtain valuable knowledge in the selected field of interest, i.e. to obtain the knowledge that enables students to use professional literature, to apply that knowledge in solving problems occurring in profession, and, in the case of students' wishes, to enable them to continue their studies.

The prerequisites for enrolling the study programme are the completed undergraduate studies with at least 240 ECTS and passed qualification examination.

Master studies in Geodesy and Geomatics, lasting for one year, have compulsory and elective courses, in two fields: geodesy and geoinformatics.

Within the courses in field of geodesy, the emphasis is placed on the technical terrain surveying and the concepts in geodesy, design, development and application of the contemporary hardware and software solutions in the terrain surveying.

Within the courses in field of geoinformatics, the emphasis is on obtaining profound knowledge necessary for designing, developing and applying contemporary software technologies and systems, as well as geoinformation technologies and systems.

Courses are one-semesteral.

Teaching is performed in lecturing and practice. During the educational process, the emphasis is on the individual and research work of students, as well as their increased personal participation into the educational process. At lectures, with the usage of adequate didactic means, the course material is presented, and students are also introduced to research trends in that area. At practice classes that follow the lectures, concrete tasks are solved and examples are presented for additional explanations of the course content. Practice classes also serve to obtain supplementary explanations for the material presented at lectures. Practice can be auditory, laboratory, computer, field and computing. A part of practice classes can be held in factories and other institutions.

Elective courses are chosen from the group of proposed courses, though the students have the possibility, related to their own abilities and demands and in agreement with the Head of the study programme, to choose a certain number of courses from the Faculty of Technical Sciences, University of Novi Sad, or some other university in the country or abroad. In doing so, the preconditions set for attending the elected course have to be fulfilled.

Number of students in a group is determined in dependence on the character of practice classes. Students' obligations at practice can also include the elaboration of seminar papers and homework, project tasks, semester and graphic papers, where each activity by students during the teaching process is monitored and graded according to the regulations adopted at the Faculty level. The number of obtained points is presented in accordance with the unique methodology and represents students' performances.

Each course has a certain number of ECTS credits, and the entire studies are considered to be completed when the student fulfils their obligations described in the study programme and in the process obtains at least 60 ECTS credits.



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Geodesy and Geomatics

Standard 02. Programme Objectives

The aim of the study programme is the education of students for the profession of a graduate engineer, a master in geodesy in the field of geodesy and geoinformatics, in accordance to the needs of the society and the individuals.

The study programme Master studies in Geodesy and geomatics is designed in such a manner as to provide the acquisition of competencies that are socially justifiable and useful. The Faculty of Technical Sciences has defined graduate tasks and aims in educating highly competent professionals in the field of engineering. The aim of the study programme in Geodesy and geomatics is completely in accordance with the graduate tasks and aims of the Faculty of Technical Sciences.

The realization of a designed study programme provides education for masters in geodesy who have competence in European and worldwide frameworks.



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Geodesy and Geomatics

Standard 03. Programme Goals

The objectives of the study programme can be grouped in several categories:

Technical knowledge. The programme provides a profound knowledge on at least one of the specialized fields: geodesy and geoinformatics.

Practical knowledge. To obtain necessary knowledge for presenting problems and projects, as well as the plan for their solutions by utilizing diverse technical knowledge and skills. Apart from everything else, it also includes the development of creative abilities to observe problems and the ability for critical thinking.

Communication and teamwork. To obtain necessary knowledge for active usage of at least one world language, with the development of the ability to present personal results to professional and other public, as well as the development of teamwork skills.

Preparations for further studies. To obtain necessary knowledge that can enable further education in graduate, specialization and doctoral studies. One of special objectives, in accordance with the goal of educating experts at the Faculty of Technical Sciences, is to develop the awareness in students for the demand for continual education, the development of the society in its entity and the protection of environment.

Preparation for professional engagement. To obtain necessary knowledge and to present awareness on the wide range of problems and tasks occurring in professional practice: safety, ethics, ecology and economics.



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Geodesy and Geomatics

Standard 04. Graduates` Competencies

Graduate students of geodesy, who complete the study programme of Master studies in Geodesy and Geomatics, are competent to solve real and complex problems in practise, as well as to continue their education if wanted. The competencies include, first and foremost, the development of the ability of critical thinking and the ability to analyse problems, synthesise problems, and predict the behaviour of the selected solution with the clear presentation of advantages and drawbacks of the selected solution.

On completing the study programme, students obtain a profound knowledge on at least one of the specialized fields: geodesy and geoinformatics. The study programme educates students to solve concrete problems with the usage of professional and scientific methods and procedures.

Graduate students in geodesy and geomatics are capable to adequately write and present the results of their work.

Graduate students at this level of studies possess competencies for applying knowledge in practice and for monitoring and applying novelties in their profession, as well as for cooperating with local social and international environment.

Graduate students in geodesy and geomatics have the ability for teamwork and the development of professional ethics.

As a rule, the students` competencies are verified through at least one paper in journal or at domestic conferences in the field of graduation (Master) thesis.



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Geodesy and Geomatics

Standard 05. Curriculum

The curriculum of the Master academic studies in Geodesy and Geomatics is formed in a manner to satisfy all set objectives. The structure of the study programme provides that the optional courses are presented with at least 30% ECTS credits.

At Master academic studies, students concretise problems in geodesy and geomatics. Selecting elective courses, students satisfy their affinities having emerged during the undergraduate academic studies.

All courses are one-semester long and have an adequate number of ECTS credits, where one credit equals approximately 30 hours of students' activities.

Curriculum defines the description of each course with name, type, year and semester of studies, number of ECTS credits, teacher's name, course outcome with expected results, knowledge and competencies, prerequisites for course attendance, course content, recommended literature, lecturing methods, knowledge evaluation and other data.

A part of the curriculum at geodesy and geomatics is a professional practice and practice work lasting for 45 hours, realized in an adequate scientific and research institutions, organizations for performing innovation activities, organizations for providing infrastructure support to innovation activities, and in industrial associations and public institutions.

Students complete studies by elaborating a Master thesis comprising of a theoretical and methodological preparation necessary for deepened understanding of the field in which a Master thesis is elaborated, and the elaboration itself.

Before the elaborating Master thesis, the candidate passes theoretical and methodological fundamentals usually in front of a committee determined. The final grade of the Master thesis is based on the grade for the passed theoretical and methodological preparation and the grade for elaborating and defending the thesis. Final thesis is elaborated in front of the committee comprised of at least three teachers where at least one has to be from another department or faculty.

As a rule, it is expected that students have at least one paper in journal or at domestic conferences in the field of graduation (Master) thesis.

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Table 5.2 Course specification

Course:		Methods for Precise Geodetic Measurements and Data Processing				
Course id:	GI403					
Number of ECTS:	6					
Teachers:	Bulatović S. Vladimir, Ninkov Đ. Toša					
Course status:	Mandatory					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
3	1	1	0	0		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of Precise Geodetic Measurements.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving engineering problems.						
3. Course content/structure:						
Lecture content: Introduction to precise measurements. Global boundaries of measuring inaccuracies of linear and angle values. Methods for precise geodetic measurements. Methods for precise measurements of linear values (length and elevation differences). Methods for precise measurements of angle values. Deviation sources with the methods for precise geodetic measurements of linear and angle values with the evaluation of measuring insecurity, repeatability, renewability, and reliability. Description and theoretical fundamentals of instruments and equipment for precise geodetic measurements of linear and angle values. Investigation, rectification and comparison of instruments and equipment for precise geodetic measurements of linear and angle values according to international ISO standards. Analysis of measured data obtained by comparison. Area of applying precise geodetic measurements in practice – real examples.						
Practice content: Practical application of presented concepts from lectures.						
4. Teaching methods:						
Prerequisites: partial examinations and obligatory tasks, during the teaching process. Examination: final examination – theory in oral form and tasks in written form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Project		Yes	30.00	Coloquium exam	No	20.00
				Coloquium exam	No	20.00
				Oral part of the exam	Yes	30.00
				Practical part of the exam - tasks	Yes	40.00
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Gligorije Perović	Priručnik za praktičnu nastavu iz Geodezije II		Građevinski fakultet, Beograd	1979	
2,	Gligorije Perović	Račun izravnjanja, knjiga I- Teorija grešaka merenja		Naučna knjiga, Beograd	1989	
3,	G. Zlatanov, C. H. Weir, J. Holsen	Survey Instruments and Methods		International Federation of Surveyors	1981	
4,	A.V. Zaccarinnji	Avtomatizacija Visokotočnih inženerno-geodezičkih izmerenii		Nedra, Moskva	1976	
5,	Grupa autora	Metodi i pribori visokotočnih geodezičkih izmerenii v stroiteljstve		Nedra, Moskva	1976	

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Table 5.2 Course specification

Course:		Engineering Geodesy 3				
Course id:	GI514					
Number of ECTS:	6					
Teachers:	Ninkov Đ. Toša, Bulatović S. Vladimir					
Course status:	Mandatory					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
3	1	1	0	1		
Precondition courses None						
1. Educational goal: To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of Engineering Geodesy.						
2. Educational outcomes (acquired knowledge): Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure: Lecture content: - Route elements in positional and height sense. - Circles as route elements. - Transit curves. - Complex curves. - Route locationing. - Analytic calculations of routes. - Application of photogrammetry in traffic route design. - Surveying of longitudinal and transverse route profile. - Staking of designed transverse profiles. - Curved vertical alignments. - Surveying works for individual design phases and traffic route building. Practice content: Analytic calculation of the part of the route approximately 3 km long. Calculating elements for staking the route from operational polygon. Models of geodetic • Tunnels triangulation networks • The control of facilities verticality • Solving concrete examples from practice • The problems of defining datum of geodetic networks						
4. Teaching methods: Prerequisites: obligatory tasks, during the teaching process. Examination: Knowledge evaluation: guided and individual elaboration of obligatory tasks; The practical part of the examination – tasks, final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Exercise attendance		Yes	5.00	Oral part of the exam	Yes	40.00
Lecture attendance		Yes	5.00	Practical part of the exam - tasks	Yes	30.00
Term paper		Yes	20.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Hennecke, Muller, Werner	Handbuch Ingenieurvermessung, Band 1		Grundlagen	1995	
2,	T.A. Larina, E.A. Task, A.K. Zaicev	Inženernie rešenja geodezičkih zadač dla stroitelstva		Stroiizdat	1982	
3,	Aleksandar Begović	Primenjena Geodezija		Građevinski fakultet Beograd	1979	
4,	Georgi Kostov Milev	Praktikum po inženerna geodezija za stroitelnite tehnikumi specialnost geodezija, fotogrametria i kartografija		Državno izdatelstvo „Tehnika“, Sofia	1984	
5,	B.S. Heifec, B.B. Danilevič	Praktikum po inženernoi geodezii		Nedra, Moskva	1979	
6,	N. N. Lebedev, V.E. Novak, G.P. Levčuk	Prikladnaja geode		Nedra, Moskva	1983	
7,	Schofield, W., Breach, M.	Engineering Surveying		Elseiver Ltd.	2007	

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Table 5.2 Course specification

Course:		Geospatial data visualization				
Course id:	GI700					
Number of ECTS:	6					
Teachers:	Govedarica J. Miro, Borisov A. Mirko					
Course status:	Mandatory					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
3	0	2	0	0		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of Virtual GIS atlases. 2D and 3D visualization of gespatial data						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
Lectures: Basics of geospatial data visualization; Data models and data formats; Standardization; KML, VRML, GEOVRML, CITYGML; Acquisition of geospatial data, street mapper, pictometry, satellite platforms - technology basis; 3d acquisition systems in geodesy: Virtual models and atlases; Visualization in geodesy; 3d cadastral systems; Rendering algorithms; Animation; SLD ; Dynamic web maps - results of GIS analyses; 3d web presentation. Practice content: Practical application of presented concepts from lectures. Virtual atlases; Dynamic web maps; Spatial queries and analyses: 3D modeling; Animation						
4. Teaching methods:						
Teaching methods include lectures, computer practice, consultations, independent and guided work on obligatory assignments. Prerequisites: obligatory tasks, during the teaching process. Final examination in oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer excersise defence		Yes	30.00	Coloquium exam	No	20.00
Term paper		Yes	20.00	Oral part of the exam	Yes	50.00
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Zhong-Ren Peng, Ming-Hsiang Tsou	Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Network		John Wiley & Sons	2003	
2,	Bernie Szukalski, Derek Law	Web mapping applications with ArcGIS		Esri Petroleum User Group Conference	2011	
3,	Michael Miller	Using Google Maps™ and Google Earth™		Que	2011	
4,	Mirza Ponjavić	Osnovi geoinformacija		Univerzitet u Sarajevu, Građevinski fakultet	2011	
5,	Galić Z.	Geoprostorne baze podataka		Golden Marketing - Tehnička knjiga	2006	

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Table 5.2 Course specification

Course:		Geoportals and Geospatial Services				
Course id:	GI501					
Number of ECTS:	6					
Teachers:	Govedarica J. Miro, Borisov A. Mirko					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of application of IT, Portals and Geoportals in Geoinformatics and Geodesy.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
Lecture content: Mechanisms for data exchange in space. XML, GML, LandXML. Scheme of geometry, scheme of topology, scheme of topography. Exchange documents. Standards for metadata – ISO 19115 - SDI – spatial infrastructure. Geoportals. Architecture of geoportals. Practice content: Practical application of presented concepts from lectures. Implementation of geoportal. Customization of geoportal and implementation of custom client web applications.						
4. Teaching methods:						
Teaching forms: lectures, computer practice, consultations, individual elaboration of obligatory tasks. Knowledge evaluation: guided and individual elaboration of obligatory tasks; seminar paper; written partial exam; final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise defence		Yes	10.00	Coloquium exam	No	20.00
Computer exercise defence		Yes	10.00	Theoretical part of the exam	Yes	50.00
Computer exercise defence		Yes	10.00			
Term paper		Yes	20.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	C. Jones	Geographical Information Systems and Computer Cartography		Pearson Education Inc	1997	
2,	R. Lake, D.Burggraf, M Trinic, L Rae	Geography Mark-up Language GML		John Wiley&Sons, Ltd	2004	
3,	Mirza Ponjavić	Osnovi geoinformacija		Univerzitet u Sarajevu, Građevinski fakultet	2011	
4,	Galić Z.	Geoprostorne baze podataka		Golden Marketing - Tehnička knjiga	2006	

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Table 5.2 Course specification

Course:		Location Based Services				
Course id:	GI502					
Number of ECTS:	6					
Teachers:	Govedarica J. Miro, Bulatović S. Vladimir					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
The acquisition of basic and applied knowledge in the field of geodesy, geomatics, and geoinformatics. The acquisition of basic and applied knowledge in the field of position based services in geodesy and geoinformatics.						
2. Educational outcomes (acquired knowledge):						
The acquired knowledge is used for professional purposes, students are able to formulate and solve engineering problems.						
3. Course content/structure:						
An introduction to position services. The classification of services. The architecture of position based services. Technological fundamentals. The position based query processing. Privacy. Object movement monitoring. Position-sensitive sensor networks. Position and data mining. Mobile peer-to-peer systems. The content of practice classes: the practical application of concepts discussed in lectures.						
4. Teaching methods:						
Teaching forms: lectures, computer practice, consultations, individual elaboration of obligatory tasks. Knowledge evaluation: The examination consists of a colloquium in written form, guided and independent completion of obligatory tasks, and the final part of the examination which is in oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise defence		Yes	10.00	Coloquium exam	No	20.00
Computer exercise defence		Yes	10.00	Coloquium exam	No	20.00
Computer exercise defence		Yes	10.00	Oral part of the exam	Yes	70.00
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Keith R. McCloy	Resource Management Information Systems Remote Sensing , GIS and Modelling		Taylor & Francis	2006	
2,	Shashi Shekhar, Sanjay Chawla	Spatial Databases: A Tour		Prentice Hall	2003	
3,	George Taylor, Geoff Blewitt	Intelligent Positioning – GIS – GPS Unification		Wiley	2006	
4,	Mirza Ponjavić	Osnovi geoinformacija		Univerzitet u Sarajevu, Građevinski fakultet	2011	
5,	Galić Z.	Geoprostorne baze podataka		Golden Marketing - Tehnička knjiga	2006	

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Table 5.2 Course specification

Course:		Multimedia Cartography				
Course id:	GI512					
Number of ECTS:	6					
Teacher:	Borisov A. Mirko					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of cartography and multimedia cartography. Web presentation of cartographic material.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems. The importance of multimedia in cartographz						
3. Course content/structure:						
Lecture content: Purpose and manners for map usage. Interpretation of map content: waters, relief, roads, settlements, vegetation, spatial diversity. Development of multimedia. Fundamentals in multimedia cartography. Formations of multimedia cartography products. Cartographic information systems and the Internet. Map formation on the Internet: resolution, colours, legibility of text and signs, database sizes and downloading time. Modelling the content of the Internet maps. Data storage and management. Spatial questionnaires. Cartographic databases. Interactive Internet maps. Possibilities and limitations of the Internet maps. Animation in cartography. Practice content: Practical evaluation of the concepts from lectures.						
4. Teaching methods:						
Teaching forms: lectures, computer practice, consultations, individual elaboration of obligatory tasks. Knowledge evaluation: The examination consists of guided and independent completion of obligatory tasks; seminar paper; the final part of the examination which is in oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise defence		Yes	40.00	Oral part of the exam	Yes	30.00
Exercise attendance		Yes	5.00			
Lecture attendance		Yes	5.00			
Term paper		Yes	20.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Cartwright, W., Peterson, M. P., Gartner, G.	Multimedia Cartography		Springer	2007	
2,	Christopher Jones	Geographical Information Systems and Computer Cartography		Longman	1997	
3,	Grupa autora	Specialization Surveying and Cartography		Faculty of Civil Engineering Prague	1984	

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Table 5.2 Course specification

Course:		Digital Photogrammetry			
Course id:	GI517				
Number of ECTS:	6				
Teachers:	Govedarica J. Miro, Borisov A. Mirko				
Course status:	Elective				
Number of active teaching classes (weekly)					
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:	
2	0	2	0	1	
Precondition courses		None			
1. Educational goal:					
To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of Photogrammetry.					
2. Educational outcomes (acquired knowledge):					
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.					
3. Course content/structure:					
Lecture content: - Photogrammetric scanners. Structure. Geometric radiometric quality. Geometric and radiometric rectification of images. Software. - Digital photogrammetric systems. Principles. Components. Photogrammetric functions. Software. - Automatic digital aerotriangulation. - Automated measurements of the digital elevation model. - 3D structure extraction. - Orthophoto production. Practice content: Practical application of the presented concepts from lectures.					
4. Teaching methods:					
Teaching methods include lectures, computer practice, consultations. Evaluation: guided and independently developed 3 obligatory assignments and 4 written tests; final examination is oral.					
Knowledge evaluation (maximum 100 points)					
Pre-examination obligations		Mandatory	Points	Final exam	
					Mandatory
Computer exercise defence		Yes	10.00	Oral part of the exam	
Computer exercise defence		Yes	10.00		
Computer exercise defence		Yes	10.00		
Test		Yes	10.00		
Test		Yes	10.00		
Test		Yes	10.00		
Test		Yes	10.00		
Literature					
Ord.	Author	Title		Publisher	Year
1,	Keith R. McCloy	Resource Management Information Systems Remote Sensing , GIS and Modelling		Taylor & Francis	2006
2,	Christopher Jones	Geographical Information Systems and Computer Cartography		Longman	1997
3,	M. Dražić	Fotogrametrija 2		Građevinska knjiga, Beograd	1965
4,	Dušan Joksić	Fotogrametrija I		Naučna knjiga, Beograd	1983
5,	V.I. Pav	Matematičeskaja obrabotka fotogrammetričeskikh izmerenii		Nedra, Moskva	1976
6,	V.M. Serdjukov	Fotogrametrija V promišlennom i graždanskom stroiteljstve		Nedra, Moskva	1977
7,	Grupa autora	Geodezija i aerofotosjemka		Izdanie moskovskogo ordena lenina instituta..., Moskva	1984
8,	K. Kraus	Photogrammetry: Geometry from Images and Laser Scans		Walter de Gruyter	2007
9,	Yves Egels, Michel Kasser	Digital Photogrammetry		CRC Press	2001
10,	Miroslav Marčeta	Osnovi fotogrametrije		Visoka građevinsko - geodetska škola, Beograd	2007
11,	Miroslav Marčeta	Fotogrametrija i daljinska detekcija		Visoka građevinsko - geodetska škola, Beograd	2007

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Table 5.2 Course specification

Course:		Geodesy in City Planning			
Course id:	GI518				
Number of ECTS:	6				
Teachers:	Borisov A. Mirko, Bulatović S. Vladimir, Govedarica J. Miro, Ninkov Đ. Toša				
Course status:	Elective				
Number of active teaching classes (weekly)					
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:	
2	2	0	0	1	
Precondition courses					
1. Educational goal: To obtain knowledge on the role of geodesy in urban environment, as well as on the importance of cadastre updating.					
2. Educational outcomes (acquired knowledge): Ability to apply the experiences from examinations onto concrete cases when solving geodetic problems in urban areas.					
3. Course content/structure: Role and significance of urban areas. Accuracy of geodetic data. Conflict of interest in cities. Geodetic referential framework in cities. Cadastre policies and land management in cities.					
4. Teaching methods: Teaching forms: lectures, computer practice, consultations, individual elaboration of obligatory tasks. Knowledge evaluation: guided and individual elaboration of obligatory tasks; seminar paper; written partial exam; final examination – oral form.					
Knowledge evaluation (maximum 100 points)					
Pre-examination obligations		Mandatory	Points	Final exam	
Exercise attendance		Yes	5.00	Coloquium exam	
Lecture attendance		Yes	5.00	Oral part of the exam	
Term paper		Yes	20.00	Mandatory	Points
				Yes	70.00
Literature					
Ord.	Author	Title		Publisher	Year
1,	M. TRIFKOVIĆ	Geodezija u uređenju naselja		-skripta	2006
2,	Hall, P	Urban and Regional Planning		Routledge, London, New York	2002

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Table 5.2 Course specification

Course:		Real Estate Cadastre				
Course id:	GI519					
Number of ECTS:	6					
Teacher:	Trifković N. Milan					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	2	0	0	1		
Precondition courses		None				
1. Educational goal:						
The objective is to learn the modes of ownership in European countries and its application in our conditions. Special emphasis is on the significance of cadastre for GIS researches.						
2. Educational outcomes (acquired knowledge):						
To use the acquired knowledge in geodetic practice, especially in practical assignments related to cadastre as an institution.						
3. Course content/structure:						
Cadastre updating in Europe. Three-dimensional cadastre. Cadastre as a basis for creating geoinformation systems. Contemporary methods in cadastre updating.						
4. Teaching methods:						
Lectures and Presentations						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Exercise attendance		Yes	5.00	Coloquium exam	No	20.00
Lecture attendance		Yes	5.00	Oral part of the exam	Yes	50.00
Term paper		Yes	20.00			
Test		Yes	10.00			
Test		Yes	10.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	M.Miladinovic	Katastar nepokretnosti		Geokarta	2004	

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Table 5.2 Course specification

Course:		<h2 style="margin: 0;">Applied Geophysics in Geomatics</h2>			
Course id:	GI600				
Number of ECTS:	6				
Teachers:	Ristić V. Aleksandar, Bulatović S. Vladimir				
Course status:	Elective				
Number of active teaching classes (weekly)					
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:	
2	0	2	0	1	
Precondition courses		None			
1. Educational goal:					
Acquiring basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. Acquiring general and applied knowledge in the field of geodynamics.					
2. Educational outcomes (acquired knowledge):					
Acquired knowledge is used in professional courses, in the recognition and in solving the engineering problems.					
3. Course content/structure:					
Fundamentals in geodynamics. Engineering and geological processes. The basic concept of researching the action of exogenic and endogenic forces. Gravimetry. The collecting of geophysical data and their interpretation. Methods of seismic surveys.					
4. Teaching methods:					
Prerequisites: seminar paper. Examination: final examination – oral form 70%.					
Knowledge evaluation (maximum 100 points)					
Pre-examination obligations		Mandatory	Points	Final exam	
Exercise attendance		Yes	5.00	Oral part of the exam	
Lecture attendance		Yes	5.00		
Term paper		Yes	20.00		
Literature					
Ord.	Author	Title		Publisher	Year
1,	Donald L. Turcotte, Gerald Schubert	Geodynamics		Cambridge	2002

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Table 5.2 Course specification

Course:		Geodetic astronomy				
Course id:	GI602					
Number of ECTS:	6					
Teacher:	Borisov A. Mirko					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
Mastering the theoretical and practical fundamentals of astronomy and mathematical models of geodetic astronomy.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge can be used in solving the specific geodetic problems, and it also represents the basis for taking other professional courses.						
3. Course content/structure:						
<p>Lectures: Mathematical models of geodetic astronomy. Spherical coordinates transformation using matrix rotation. Horizontal to local equatorial system transformation. Celestial equatorial to ecliptic system transformation and vice versa. Parallaxical triangle differential formulas. Horizontal coordinates differential changes. Basic astronomical triangle differential changes. Celestial bodies movement under gravitation influence. The main tasks of theoretical astronomy. Orbital motion of two bodies. Kepler's equations for a closed orbit. Equalization centre problem. The components of planet's speed. Ephemeris computation. Planets mass. Moon's orbit. Osculating elements computation. A preliminary orbit determination. Time and weather systems. Modern dynamical time scales. UT time variants. The Earth's rotation observation and determination of its parameters. Current pole and medium pole. Methods for determining the vertical direction. Performance of uneven earth's rotation and the pole coordinates on the basis of astronomical measurements using the way of BIH.</p> <p>• Practice content: Practical application of presented concepts from lectures.</p>						
4. Teaching methods:						
Prerequisites: 45% of points should be provided through the partial examination and obligatory tasks, during the teaching process. Examination: Knowledge evaluation: guided and individual elaboration of obligatory tasks; partial examinations – written form, final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Exercise attendance		Yes	5.00	Oral part of the exam	Yes	40.00
Lecture attendance		Yes	5.00	Practical part of the exam - tasks	Yes	30.00
Test		Yes	10.00			
Test		Yes	10.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Milovanović Vladeta	Matematički modeli geodetske astronomije		Materijali - pisana predavanja	1992	
2,	Schodlbauer, A.	Geodatische Astronomie, Grundlagen und Konzepte		Walter de Gruyter, Berlin	2000	
3,	Green, M. R.	Spherical astronomy		Cambridge University Press, Cambridge	1998	

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Table 5.2 Course specification

Course:		<h2 style="margin: 0;">Application of GNSS systems</h2>				
Course id:	GI531					
Number of ECTS:	6					
Teachers:	Bulatović S. Vladimir, Čirović S. Goran, Govedarica J. Miro, Ninkov Đ. Toša					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire knowledge in GNSS technologies, and to get introduced to the fields of their application.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in further education.						
3. Course content/structure:						
<p>Lecture content: - Concept and characteristics of GNSS - Short fundamentals on satellite geodesy, referential systems related to GNSS, survey and characteristics of observed values, measuring methods and mathematical positioning methods - Performing GNSS measuring and data processing, short overview on geodetic dates and data transformation among them, survey on GNSS application - Basic principles in working with DGNS - Mathematical models, coordinate systems in function, practical problems - Navigation using GNSS - Methods for determining and techniques for searching ambiguities both for phase data and the combination of code and phase data - GNSS application in: geodesy, geodynamics, tectonic plate movement with time alternating coordinates, navigation, Space - Diverse systems for global positioning: TRANST, DORIS, GLONASS, GPS, GALILEO. Location-based services Practice content: Practical application of presented concepts from lectures.</p>						
4. Teaching methods:						
Prerequisites: obligatory tasks, during the teaching process. Examination: Knowledge evaluation: partial examination – written form, final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Exercise attendance		Yes	5.00	Coloquium exam	No	20.00
Homework		Yes	5.00	Coloquium exam	No	20.00
Homework		Yes	5.00	Oral part of the exam	Yes	30.00
Homework		Yes	5.00	Practical part of the exam - tasks	Yes	40.00
Homework		Yes	5.00			
Lecture attendance		Yes	5.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	C. Jones	Geographical Information Systems and Computer Cartography		Pearson Education Inc.	1997	
2,	C. Rizos	Introduction to GPS		University of New South Wales	1999	

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Table 5.2 Course specification

Course:		<h2 style="margin: 0;">Advanced Remote Sensing Technologies</h2>				
Course id:	GI532					
Number of ECTS:	6					
Teachers:	Govedarica J. Miro, Ristić V. Aleksandar					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of geodesy, geomatics and geoinformatics. To acquire basic and applied knowledge in the field of remote detection and computer image processing.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
Introduction to remote detection. Technological bases. Sensor platforms. Interpretation of sensor records. Image pre-processing. Image transformations. Filtering. Interpretation methods in remote researching. Subjective interpretation, properties and limitations. Interactive interpretation with partially automated functions. Image modification. Highlighting, ranking and reducing the amount of marks. Classification. Segmentation. Algorithms for classification and segmentation. Automated classification. Supervised classification. Registration and geocoding. Image merging. Standard patterns and algorithms. Quality control and accuracy assessment. Programme tools for remote detection.						
4. Teaching methods:						
Teaching forms: lectures, computer practice, consultations, individual elaboration of obligatory tasks. Knowledge evaluation: guided and individual elaboration of 2 obligatory tasks and 4 tests, final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise defence		Yes	15.00	Oral part of the exam	Yes	30.00
Computer exercise defence		Yes	15.00			
Test		Yes	10.00			
Test		Yes	10.00			
Test		Yes	10.00			
Test		Yes	10.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	P. Mather	Computer Processing of Remotly-Sensed Images: An Introduction		John Wiley&Sons, Ltd	2004	
2,	Keith R. McCloy	Resource Management Information System:Remote Sensing, GIS and Modelling		Taylor&Francis	2006	
3,	M. Dražić	Fotogrametrija 2		Građevinska knjiga, Beograd	1965	
4,	Dušan Joksić	Fotogrametrija I		Naučna knjiga, Beograd	1983	
5,	V.M. Serdjukov	Fotogrametrija V promišlenom i građanskom stroiteljstve		Nedra, Moskva	1977	
6,	grupa autora	Geodezija i aerofotosjemka		Izdanie moskovskogo ordena lenina instituta..., Moskva	1984	

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Table 5.2 Course specification

Course:		Valuation of real estate				
Course id:	GI540					
Number of ECTS:	6					
Teachers:	Borisov A. Mirko, Ćirović S. Goran, Govedarica J. Miro, Ninkov Đ. Toša					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	0		
Precondition courses		None				
1. Educational goal: Adoption of theoretical basis and introduction to the methodology of appraisal						
2. Educational outcomes (acquired knowledge): that the acquired knowledge can be used in practice, especially in the practical tasks related to appraisal.						
3. Course content/structure: Real estate and estimation. Evaluation basis. The estimation process. Concept and types of building land. Procedures for determining the value of land. Analysis of the cost (cost approach). Analysis of the sales comparison (market access). Analysis of capitalization (income). The concept of land rent. The zonal and point system. The model of building land valuation estimates. The principle of conclusionig based on cases. Role and tasks of institutions and individuals (appraiser) in the assessment procedure.						
4. Teaching methods: Lectures and Presentations						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Exercise attendance		Yes	5.00	Oral part of the exam	Yes	70.00
Lecture attendance		Yes	5.00			
Term paper		Yes	20.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	M.Miladinović	Procena vrednosti nepokretnosti, Beograd			2008	

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Table 5.2 Course specification

Course:		Professional Practice - Project				
Course id:	GISPM					
Number of ECTS:	3					
Teachers:						
Course status:	Mandatory					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
0	0	0	0	3		
Precondition courses		None				
1. Educational goal:						
Acquiring direct knowledge on the functioning and organization of companies and institutions dealing with jobs within the profession for which students are being educated, as well as the possibilities for applying previously acquired knowledge in practice.						
2. Educational outcomes (acquired knowledge):						
Enabling students to apply previously acquired theoretical and professional knowledge for solving the specific engineering problems within the selected company or institution. Introducing students to the activities of the selected company or institution, their business manners, management, and the importance and role of engineers in their organizational structures.						
3. Course content/structure:						
It is made individually for each candidate, in agreement with the board of the company or institution in which the professional practice is held, and in accordance with the demands of the profession for which the students is being educated						
4. Teaching methods:						
Consultations and writing a professional practice diary in which the student describes the activities and jobs performed during the professional practice.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam		
				Mandatory	Points	
Literature						
Ord.	Author	Title		Publisher	Year	

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Table 5.2 Course specification

Course:		Study-research work based on theoretical basis of master thesis				
Course id:	GIM01					
Number of ECTS:	9					
Teachers:						
Course status:		Mandatory				
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
0	0	0	9	0		
Precondition courses		None				
1. Educational goal:						
<p>The application of basic theoretical, methodological, scientific, technical and professional knowledge and application of methods to solve specific problems. In the second part of this master thesis, students research the problem and the complexity of its structure and on the basis of the analysis draws conclusions on the possible ways of solving it. Student acquire experience in solving complex problems, tasks and possibilities for the application of previously acquired knowledge into practice.</p>						
2. Educational outcomes (acquired knowledge):						
<p>Teaching students to independently apply previously acquired knowledge in various areas that have been previously studied, in order to review the structure of the given problem and its system analysis in order to draw conclusions on possible directions for its resolution. Through the use of literature independently, students expand their knowledge of the chosen area and research of different methods and papers relating to similar topics. In this way, the students develop the ability to conduct analysis and identify problems within the given topic. Practical application of acquired knowledge in different areas, students develop the ability to look at the place and role of engineers in the chosen field, and the need to cooperate with other professions and teamwork.</p>						
3. Course content/structure:						
<p>Content is formed in accordance with the individual needs of master thesis, its complexity and structure. Students study literature, graduate and master student projects that deal with similar topics, makes analyzes in order to find solutions specific task which is defined task master work. Independent study research. Study work includes active monitoring of the primary knowledge in specific theme, organization and conduct experiments, numerical simulation and statistical analysis of data, writing and/or elaborating paper in the conference from the narrow field of science teaching which belongs to the master theme of work.</p>						
4. Teaching methods:						
<p>A mentor complies the task and submits it to the student. The student is required to work within the framework of the development of a given topic, which is defined by the task, using literature. A mentor can give students additional guidance, referring to specific literature and further direct student to the production of quality master thesis. In the research study, the student consults with the supervisor, if necessary, with other teachers who are dealing with the topics of the field work. Within a given topic, the student, if necessary perform certain measurements, tests, counts, surveys and other research, statistical data, if provided task master work.</p>						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Term paper		Yes	50.00	Oral part of the exam	Yes	50.00
Literature						
Ord.	Author	Title		Publisher	Year	
1,	grupa autora	časopisi sa KObson liste			sve	
2,	grupa autora	stručni časopisi i diplomski i master radovi			se	

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Table 5.2 Course specification

Course:		<h2 style="margin: 0;">Master Thesis – Elaboration and Defence</h2>				
Course id:	GI5ZR					
Number of ECTS:	8					
Teachers:						
Course status:	Mandatory					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
0	0	0	0	8		
Precondition courses		None				
<p>1. Educational goal:</p> <p>Obtaining knowledge on the manner, structure and form of writing a report after the performed analyses and other activities within the set topic of the Master thesis. On elaborating the Master thesis, students obtain the experience for writing papers in which it is necessary to describe problems, used methods and procedures, and obtained results. Furthermore, the objective of the elaboration and defence of the Master thesis is to develop the ability of the students to prepare the results of their individual work in the form appropriate for public presentation, as well as to answer any suggestions or questions related to the set topic.</p>						
<p>2. Educational outcomes (acquired knowledge):</p> <p>Enabling students for systematic approach in solving set problems, performing analyses, applying the acquired knowledge and accepting knowledge from other fields in order to find a solution to the given problem. By individually researching and solving tasks in the field of the set topic, students obtain knowledge on the complexity and wideness of the problems in the field of their profession. By elaborating a Master thesis students acquire certain experience that can be applied in practice while solving problems in the field of their profession. By preparing results for a public defence, by the public defence and answering the questions and suggestions by the committee, students obtain necessary experience on the manner to present the results of an individual or collective work in practice.</p>						
<p>3. Course content/structure:</p> <p>It is formed individually in accordance with the demands and fields enclosed in the set topic of the Master thesis. A student in an agreement with the supervisor elaborates the Master thesis in the written form in accordance with the set procedure at the Faculty of Technical Sciences. A student prepares and defends the Master thesis publicly in agreement with the supervisor and in accordance to the set regulations and procedures.</p>						
<p>4. Teaching methods:</p> <p>During the elaboration of the Master thesis, a student consults the supervisor, and if needed, other professors dealing with the field that is a topic of the Master thesis. A student completes the Master thesis and on receiving the agreement from the committee for evaluation and defence, delivers bounded copies to the committee. The defence of the Master thesis is public, and a student is obliged to orally answer any questions or suggestions after the presentation.</p>						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam		
		Mandatory	Points			

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Table 5.2 Course specification

Course:		Mathematical cartography				
Course id:	GI535					
Number of ECTS:	5					
Teacher:	Borisov A. Mirko					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of geodesy, geomatics and geoinformatics. To acquire basic and applied knowledge in the field of mathematical cartography.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
1. Introduction. 2. Elements projection of Earth surface. Diferencial geometry and theory of surface. The main quations of cartographic projections in diferent coordinate systems. 3. The main and local scale. General equation of linear scale. Ellipsa of deformation and main directions. Deformation of distance, area and ungle. 4. Conditions of conformal, equivalent and equidistance projection. Classification of cartographic projections. 5. Division of projections. Cones projections. Cylindrical projections. Azimuth projections. Poly-pseudo projections. 6. Choise of projections. Coordinate system in Serbia. UTM.						
4. Teaching methods:						
Prerequisites: obligatory tasks, during the teaching process. Knowledge evaluation: final examination – theoretical part.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer excersise defence		Yes	30.00	Coloquium exam	No	20.00
Computer exercise attendance		Yes	5.00	Theoretical part of the exam	Yes	50.00
Project task		Yes	15.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Jovanović, V.	Matematička kartografija		VGI, Beograd	1983	
2,	Lev Bugayevsky and John Snyder	Map Projections		Taylor and Francis group	1995	

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Table 5.2 Course specification

Course:		Spatial and temporal databases				
Course id:	GI536					
Number of ECTS:	5					
Teachers:	Govedarica J. Miro, Galić P. Zdravko					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of geodesy, geomatics and geoinformatics. To acquire basic and applied knowledge in the field of databases and geospatial databases.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
Lecture content: Modelling spatial entities and databases. Raster and vector models, geometry, spatial topology and topography. Data models. Systems for database control and spatial expansions. Relational databases. Relational databases with object extensions. Object databases. XML databases. Spatial extensions of databases. Temporal models and standards. Temporal databases. Architecture of spatial databases. Spatial database management systems. SQL and spatial entities. Query spatial languages. Spatial operators. 9IM matrix. Realization of spatial queries. Optimization and adjustment of performances. Distributed databases with spatial expansion and entities. Place and role of databases in GIS and service oriented GIS. Practice content: Practical application of presented concepts from lectures.						
4. Teaching methods:						
Forms of teaching: lectures, computer practice, consultations, individual work on obligatory tasks. Knowledge evaluation: Guided and independent work on 3 obligatory tasks; final examination is oral.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise defence		Yes	10.00	Coloquium exam	No	20.00
Computer exercise defence		Yes	10.00	Coloquium exam	No	20.00
Computer exercise defence		Yes	10.00	Oral part of the exam	Yes	70.00
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Shekhar S., Chawla S.	Spatial Databases: A Tour		Pearson Education Inc.	2003	
2,	Galić Z.	Geoprostorne baze podataka		Golden Marketing - Tehnička knjiga	2006	
3,	Worboys M.F., Duckham, M.	GIS: A Computing Perspective		CRC Press	2004	
4,	Pavle Mogin, Ivan Luković, Miro Govedarica	Principi projektovanja baza podataka		Fakultet tehničkih nauka, Novi Sad	2004	
5,	Peter A. Burrough, Rachael A. McDonnell	Principi geografskih informacionih sistema		Građevinski fakultet Beograd	2006	

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Table 5.2 Course specification

Course:		Geosensor networks				
Course id:	GI537					
Number of ECTS:	5					
Teacher:	Ristić V. Aleksandar					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal: Students learn about theoretical and practical facts about geosensor networks						
2. Educational outcomes (acquired knowledge): This knowledge used for solution of practical engineering problems						
3. Course content/structure: Geosensor networks types. Characteristics of geosensor networks (wireless communication protocols, network topology, data acquisition and processing). Types of geosensors and characteristics. Distributed data acquisition and processing, centralized and decentralized algorithms. Applications of geosensor networks, offline and online work, data protection.						
4. Teaching methods: Lectures, calculation, laboratory and computer-laboratory practice. Consultation. Final exam in oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Complex exercises		Yes	40.00	Theoretical part of the exam	Yes	50.00
Exercise attendance		Yes	5.00			
Lecture attendance		Yes	5.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Anthony Stefanidis, Silvia Nittel (editors)	"GeoSensor Networks"		CRC Press, USA	2004	
2,	C. S. Raghavendra, K. M. Sivalingam, T. Znati	Wireless sensor networks		Kluwer academic publishers	2004	
3,	Lj. Gavrilovska, S. Krco, V. Milutinović, I. Stojmenović, R. Trobec	Application and Multidisciplinary Aspects of Wireless Sensor Networks		Springer-Verlag, London	2011	
4,	I. Stojmenović (editor)	Handbook of Sensor Networks - Algorithms and Architectures		Wiley and Sons, New Jersey	2005	
5,	D. Wagner, R. Wattenhofer (editors)	Algorithms for Sensor and Ad Hoc Networks		Springer-Verlag, Berlin	2007	
6,	C. Cordeiro, D. Agrawal	Ad Hoc and Sensor Networks		World Scientific Publishing, Singapore	2006	

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Table 5.2 Course specification

Course:		Advanced Techniques of Laser Scanning				
Course id:	GI504					
Number of ECTS:	5					
Teachers:	Govedarica J. Miro, Pribičević I. Boško					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
The acquisition of basic and applied knowledge in the field of geodesy, geomatics, and geoinformatics. The acquisition of basic and applied knowledge in the field of laser scanning of objects and terrain.						
2. Educational outcomes (acquired knowledge):						
The acquired knowledge is used for professional purposes, students are able to formulate and solve engineering problems.						
3. Course content/structure:						
The fundamentals of 3D digitalization of objects and terrain. The basics of laser technology. Technological fundamentals. The classification of laser scanning devices. Terrestrial 3D scanners. The basic components of 3D laser scanners. Mobile platform scanners. The application of laser scanning technologies in geodetic measurement, the terrain scanning, object scanning techniques, geo-coding, post- processing. The scanning outcome processing. The presentation of results. The assessment of the result precision and quality control. The integration with other sensors. The content of practice classes: : the practical application of concepts discussed in lectures.						
4. Teaching methods:						
Teaching forms: lectures, computer practice, consultations. Knowledge evaluation: guided and individual elaboration of 5 obligatory tasks and, 2 written tests, final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise defence		Yes	10.00	Theoretical part of the exam	Yes	30.00
Computer exercise defence		Yes	10.00			
Computer exercise defence		Yes	10.00			
Computer exercise defence		Yes	10.00			
Computer exercise defence		Yes	10.00			
Test		Yes	10.00			
Test		Yes	10.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Keith R. McCloy	Resource Management Information Systems Remote Sensing , GIS and Modelling		Taylor & Francis	2006	
2,	Grupa autora	ISPRS Journal of Photogrammetry and Remote Sensing, Volume 54, Number 2, July 1999		Elsevier	1999	
3,	K. Kraus	Photogrammetry: Geometry from Images and Laser Scans		Walter de Gruyter	2007	
4,	Jie Shan, Charles K. Toth	Topographic Laser Ranging and Scanning: Principles and Processing		CRC Press	2008	
5,	Lerma García, J.L., Van Genechten, B., Heine, E., Santana Quintero, M.	Theory and practice on Terrestrial Laser Scanning		Editorial de la Universidad Politécnica de Valencia	2008	

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Table 5.2 Course specification

Course:		Deformation analysis and measurements				
Course id:	GI516					
Number of ECTS:	5					
Teacher:	Ninkov Đ. Toša					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	1	1	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. To acquire basic and applied knowledge in the field of Deformation Analysis.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
Lecture content: - Fundamental measuring procedures in displacement monitoring. - Organization of the deformation research programme. - Project on homogenous observation system and the selection of measuring points. - Measuring plan and programme. - Optimal accuracy and economy of measurement. - Monitoring displacement and deformations using automated measuring systems. - Deformation analysis. - Statistic parameters, test and divisions – introduction to deformation analysis. - Histograms and frequency polygons of measuring errors. Deformation models (schools). - Hanover model. - Karlsruhe model. - Functional and stochastic equality models. - Data Snooping method. Variation homogeneity. - Global analysis. - Displacement localization. - Interpretation of the measuring results. - Movement approximation of individual measuring points of a structure. - Correlation between displacements between individual points in a structure. - Total structure deformation. - Research result presentation. - Technical report. Practice content: Practical application of presented concepts from lectures.						
4. Teaching methods:						
Lectures. Exercises. Prerequisites: 50% of points should be provided through project, during the teaching process. Examination: final examination – oral form 50%.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Project		Yes	50.00	Oral part of the exam	Yes	50.00
Literature						
Ord.	Author	Title		Publisher	Year	
1,	G. Milev	Geodatischen Methoden zur Untersuchung von Deformationen		Konrad Wittwer Stuttgart	1985	
2,	Caspary, W. F	Concept of network and deformation analysis		The university of New South Wales, Kensington, Aus	1996	
3,	grupa autora	Analiza i interpretacija wynikow geodezyjnych pomiarow deformacji		Polanica Zdroj	1987	
4,	G. Milev	Svremenni geodezičeski metodi za izsledvane na deformacii		Tehnika, Sofia	1978	
5,	Angela C. Rauhut	Integrated Deformation Analysis of the Olympic Oval, Calgary		The University of Calgary	1987	

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Table 5.2 Course specification

Course:		<h2 style="margin: 0;">Optimization in geodetic surveying</h2>				
Course id:	GI533					
Number of ECTS:	5					
Teacher:	Aleksić R. Ivan					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
To acquire basic and applied knowledge in the field of geodesy, geomatics and geoinformatics. To acquire basic and applied knowledge in the field of measuring data processing and the accuracy assessment of measured values.						
2. Educational outcomes (acquired knowledge):						
Acquired knowledge is used in professional courses, as well as in the recognition and in solving the engineering problems.						
3. Course content/structure:						
Lecture content: - Mathematical definition of optimization - Classification of optimal design of geodetic networks - Project zero, first, second and third order - Quality criteria of geodetic networks - Criteria of accuracy and reliability - Mathematical models for optimization Practice content: Practical application of the presented concepts from lectures.						
4. Teaching methods:						
Prerequisites: obligatory tasks, during the teaching process.						
Examination:						
Knowledge evaluation: guided and individual elaboration of obligatory tasks; final examination – oral form.						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Exercise attendance		Yes	5.00	Oral part of the exam	Yes	40.00
Homework		Yes	10.00	Practical part of the exam - tasks	Yes	30.00
Homework		Yes	10.00			
Lecture attendance		Yes	5.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	Krunislav Mihailović, Ivan R. Aleksić	Koncepti mreža u geodetskom premeru		"GEOKARTA" d.o.o. Beograd	2008	
2,	Tosa Ninkov	Optimizacija projektovanja geodetskih mreža		Naučna knjiga, Beograd	1989	
3,	Gligorije Perović	Metod najmanjih kvadrata		autor, Beograd	2005	
4,	Krunislav Mihailović, Ivan R. Aleksić	Deformaciona analiza geodetskih mreža		Građevinski fakultet Beograd	1994	
5,	Serafim Opricovic	Optimizacija sistema		Nauka, Beograd	1992	
6,	Gligorije Perović	Račun izravnjanja i teorija grešaka merenja		Naučna knjiga, Beograd	1984	

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Table 5.2 Course specification

Course:		Geodynamics					
Course id:	GI601						
Number of ECTS:	5						
Teacher:	Ninkov Đ. Toša						
Course status:	Elective						
Number of active teaching classes (weekly)							
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:			
2	0	2	0	1			
Precondition courses		None					
1. Educational goal:							
Acquiring basic and applied knowledge in the field of Geodesy, Geomatics and Geoinformatics. Acquiring general and applied knowledge in the field of geodynamics.							
2. Educational outcomes (acquired knowledge):							
Acquired knowledge is used in professional courses, in the recognition and in solving the engineering problems.							
3. Course content/structure:							
Fundamentals in geodynamics. Engineering and geological processes. Researching the action of exogenic and endogenic forces. Global geodynamic processes. The methodology of determining the global displacement of the Earth's crust. Geodetic methods of local and regional geodynamic analysis. Analysis of the displacement of the Earth's crust on the basis of repeated terrestrial and GPS observations.							
4. Teaching methods:							
Lectures. Exercises. Prerequisites: 50% of points should be provided through seminar paper, during the teaching process. Examination: final examination – oral form 50%.							
Knowledge evaluation (maximum 100 points)							
Pre-examination obligations		Mandatory	Points	Final exam		Mandatory	Points
Project		Yes	50.00	Oral part of the exam		Yes	50.00
Literature							
Ord.	Author	Title		Publisher		Year	
1,	Donald L. Turcotte, Gerald Schubert	Geodynamics		Cambridge		2002	

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Table 5.2 Course specification

Course:		<h2 style="margin: 0;">Service oriented architecture in GIS</h2>				
Course id:	GI534					
Number of ECTS:	5					
Teachers:	Govedarica J. Miro, Borisov A. Mirko					
Course status:	Elective					
Number of active teaching classes (weekly)						
Lectures:	Practical classes:	Other teaching types:	Study research work:	Other classes:		
2	0	2	0	1		
Precondition courses		None				
1. Educational goal:						
<p>The main objective of the subject is to educate students in the field of application of service oriented architecture in geographic information systems, as well as introducing technologies for service implementation in this area. Additional objective of subject is mastering the skills necessary to implement simple web services that provide spatial data management.</p>						
2. Educational outcomes (acquired knowledge):						
<p>Students will acquire the necessary knowledge about the basic concepts of service-oriented architecture, service identification and modeling techniques, and service-oriented architecture application in GIS. Students will gain the skills necessary to note the service model and implement web services using the selected development environment.</p>						
3. Course content/structure:						
<p>Lectures: The place and role of service oriented geoinformation systems. Introduction to SOA. Basic concepts and terminology. The architecture of SOA system. Standardization in the field of SOA and geoinformation systems and technologies. Application of standards in the implementation of SOA GIS system. SOA application of GIS in various fields. Geoservices classification. Exercises: SOA GIS tools application for geospatial data visualization and spatial analysis. The implementation of a three-layered architecture of SOA through GIS database implementation, the middle tier, the geoservices and client applications. Introduction to standards.</p>						
4. Teaching methods:						
<p>Forms of teaching: lectures, computer practice, consultations, individual work on obligatory tasks. Knowledge evaluation: Guided and independent work on obligatory tasks and a seminar paper; final examination is oral.</p>						
Knowledge evaluation (maximum 100 points)						
Pre-examination obligations		Mandatory	Points	Final exam	Mandatory	Points
Computer exercise attendance		Yes	5.00	Theoretical part of the exam	Yes	30.00
Lecture attendance		Yes	5.00			
Project		Yes	40.00			
Term paper		Yes	20.00			
Literature						
Ord.	Author	Title		Publisher	Year	
1,	C. Jones	Geographical Information Systems and Computer Cartography		Pearson Education Inc.	1997	
2,	S. Shekhar, S. Chawla	Spatial Databases: A Tour		Pearson Education Inc.	2003	
3,	Peter A. Burrough, Rachael A. McDonnell	Principi geografskih informacionih sistema		Građevinski fakultet Beograd	2006	
4,	Thomas Erl	Service-Oriented Architecture (SOA): Concepts, Technology, and Design		The Prentice Hall	2005	



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Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 06. Programme Quality, Contemporaneity and International Compliance

The study programme is coordinated with contemporary trends and situation in profession and it is compatible with similar programmes in international higher education institutions.

The study programme in Geodesy and Geomatics, designed in this manner, is omniscient and provides students with the latest scientific and professional knowledge in this field.

The study programme Master studies in Geodesy and Geomatics is comparable and compatible with:

1. <http://www.vermessung.uni-hannover.de/>

2. <http://www.tfh-berlin.de/>

3. <http://www.tudelft.nl/live/pagina.jsp?id=b226846d-f19f-4c34-97ed-165fecc5ad8f&lang=nl>

4. <http://www.uu.nl/uupublish/homeuu/1main.html>

5. http://portal.tugraz.at/portal/page?_pageid=433,1&_dad=portal&_schema=PORTAL



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Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 07. Student Enrollment

The Faculty of Technical Sciences, in accordance with the social demands and its own resources, enrolls at the Master studies in Geodesy and Geomatics, at the budget financing and self-financing, a certain number of students that is every year defined by the special Decision of the NNVTN. The selection of the students and their enrolment is performed among the applied candidates based on their success during the previous education (bachelor degree with at least 240 ESPB), as defined by the Statute on the enrolment of students to the study programmes.

Students from other study programmes, as well as those with already completed studies, can enrol this study programme. In these cases the Evaluation committee (made by the head of the study programme and all heads of the chairs participating in the realization of the study programme) evaluate all passed activities by the candidates and based on the acknowledged number of points determine whether the candidate can enrol Master studies. The passed activities can be accepted entirely, can be accepted partially (the committee can ask for additional work) or need not be accepted.



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 08. Student Evaluation and Progress

The final grade at each individual course in this programme is formed by continual monitoring of students' accomplishments and the results obtained during the academic year and on final examinations. Students master the study programme by taking examinations and thus obtaining a certain number of ECTS credits, in accordance with the study programme. Each course at the study programme has a set number of ECTS credits which students obtain on successfully passing the examination. The number of ECTS credits is determined on the basis of working activities of students in taking a certain course and by applying the unique methodology at the Faculty of Technical Sciences for all study programmes. Students' success in mastering a certain course is constantly monitored during classes and is presented in points. Maximum number of points obtained in a course is 100. Students obtain points from a course through their work during classes, fulfilment of their prerequisites and taking the examination. The minimal number of points that can be obtained by a student after fulfilling prerequisites during the teaching process is 30, and the maximal one is 70. Each course at the study programme has a clear and publicly known mode of obtaining points. The manner of obtaining points during classes includes a number of points given to a student on the basis of each individual type of activities during classes, or by fulfilling prerequisites and taking examinations. A student's final achievement at a course is presented using grades from 5 (fail) to 10 (excellent). A student's grade is based on the overall number of points obtained on fulfilling prerequisites and taking the examination, and in accordance with the quality of acquired knowledge and skills. A student can be able to take the examination from a given course if they have done all prerequisites. Additional conditions for taking the examination are defined individually for each course. Student's advancement during education is defined in the Regulations for Students at Master Studies. The change in the curriculum in the academic year 2002/2003 introduced this mode of evaluation; according to our data, it provided the passing rate of more than 70%.



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 09. Teaching Staff

For the realization of the study programme in Geodesy and Geomatics, there is the faculty staff with necessary scientific and professional qualifications.

Total number of lecturers is adequate to the demands of the study programme and depends on the number of courses performed and the number of classes per course. The total number of lecturers is adequate to cover the total number of classes at the study programme, so that each lecturer has in average 180 classes of active teaching (lectures, tutorials, practice, practical work,...) annually, i.e. 6 classes per week. The number of assistants is adequate for the demands of the study programme. The total number of assistants at the study programme is adequate to cover the entire number of classes at the programme, so that assistants have the average of 300 classes of active classes annually, i.e. 10 classes per week.

Scientific and professional qualifications of the teaching staff are adequate to educational scientific field and the level of their obligations. Each teacher has at least five references from the narrow professional and scientific field in which they hold lectures at the study programme.

The number of students in a group for lectures is up to 180, practice groups have up to 60 students and laboratory practice groups have up to 20 students.

No teacher has more than 12 classes per week. All data on lecturers and assistants (CV, title appointed, references) are available to the public.

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Science, arts and professional qualifications

Name and last name:		Aleksić R. Ivan	
Academic title:		Full Professor	
Name of the institution where the teacher works full time and starting date:		Faculty of Civil Engineering - Beograd 01.05.1982	
Scientific or art field:		Geodetic Engineering	
Academic carier	Year	Institution	Field
Academic title election:	2012	Faculty of Civil Engineering - Beograd	Geodetic Engineering
PhD thesis	1992	Faculty of Civil Engineering - Beograd	Geodesy
Magister thesis	1988	Faculty of Civil Engineering - Beograd	Geodesy
Bachelor's thesis	1982	Faculty of Civil Engineering - Beograd	Geodetic Engineering
List of courses being held by the teacher in the accredited study programmes			
ID	Course name	Study programme name, study type	
1.	GI010A Active Geodetic Reference Networks	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies	
2.	GI533 Optimization in geodetic surveying	(GI0) Geodesy and Geomatics, Master Academic Studies	
Representative references (minimum 5, not more than 10)			
1.	Koncepti mreža u geodetskom premeru – Monografija / K. Mihailović, I. R. Aleksić. - Beograd: Privredno društvo za kartografiju "GEOKARTA" d.o.o., 2008. - 725 s. (ISBN 978-86-459-0337-5).		
2.	State survey and real estate cadastre in Serbia development and maintenance strategy / I. R. Alekšić, O. R. Ođalović and D. M. Blagojević // Survey Review 42, No. 318, pp. 388-396 October 2010, (ISSN-0039-6265). University of the West of England, United Kingdom. (http://www.surveyreview.org)		
3.	The establishment of a new gravity reference frame for Serbia / O. R. Ođalović, M. Starcević, S. Grekulović, M. Burazer, I. R. Aleksić // Survey Review 44, No. 327, pp. 272-281 October 2012, (ISSN-0039-6265). University of the West of England, United Kingdom. (http://www.surveyreview.org)		
4.	Real estate cadastre development in Serbia / J. Kaufmann, I. R. Alekšić and O. R. Ođalović // Geodetski list, 3 (2009), pp. 243-254 (ISSN-0016-710). Glasilo Hrvatskog geodetskog društva. Zagreb. (http://hrcak.srce.hr/geodetski-list)		
5.	On Computational Aspects of Data Processing of Geodetic Networks with Large Number of Unknown Parameters/ I. R. Alekšić, N. Dj. Perin, J. M. Popović // Geodetski list, 4 (2011), pp. 323-334 (ISSN-0016-710). Glasilo Hrvatskog geodetskog društva. Zagreb. (http://hrcak.srce.hr/geodetski-list)		
6.	Analysis of vertical deflection differences obtained by astrogeodetic and gravimetric methods/ O. Ođalović, J. Gučević, V. Ogrizović, I. R. Aleksić // Proceedings of the XIII National Conference of Yugoslav Astronomers. Belgrade, 2003. vol. br. 75, pp. 217-220. ISI/Web of Science ili (http://publications.aob.rs/75/pdf/217-220.pdf)		
7.	Optimization of geodetic networks with stochastic observations / I. R. Aleksić // The 8-th International Symposium on Geodetic Computation. Wuhan, 1990. International Association of Geodesy - IAG-International Union of Geodesy and Geophysics. pp. 200-212.		
8.	NetExpert - Software Package / I. R. Aleksić, N. Perin, J. Popović // International Symposium "Modern technologies of Cadastre". Sofia, 1997. FIG/ISPRS/ICA. pp. 151-156.		
9.	Establishment of active geodetic network in Serbia / O. Ođalović, I. R. Aleksić // InterGEO East - Conference for Landmanagement, Geoinformation, Building Industry, Environment and Third Croatian congress on cadastre with international participation. Zagreb, 2005. Proceedings: ISBN 953-97081-5-X, Croatian geodetic society, Zagreb, pp. 375-381.		
10.	Active Geodetic Network of Serbia / O. Ođalović, I. R. Aleksić // XXIII International FIG Congress and INTERGEO. International Federation of Surveyors (FIG), German Association of Surveying-Society for Geodesy, Geo-Information and Land Management (DVW). Munich, Germany, 2006. Proceedings: ISBN 87-90907-52-3, FIG Office Proceedings. Lindevangs Alle 4, DK-2000 Frederiksberg, Denmark, pp. TS3-CORS 1-5.		
Summary data for teacher's scientific or art and professional activity:			
Quotation total :		0	
Total of SCI(SSCI) list papers :		5	
Current projects :		Domestic :	1
		International :	1

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:	Borisov A. Mirko		
Academic title:	Assistant Professor		
Name of the institution where the teacher works full time and starting date:	Faculty of Technical Sciences - Novi Sad 01.10.2011		
Scientific or art field:	Automatic Control and System Engineering - Geoinformatics		
Academic carier	Year	Institution	Field
Academic title election:	2011	Faculty of Technical Sciences - Novi Sad	Automatic Control and System Engineering - Geoinformatics
PhD thesis	2004	Faculty of Civil Engineering - Beograd	Geodesy
Magister thesis	1997	Faculty of Civil Engineering - Beograd	Geodesy
Bachelor's thesis	1991	Faculty of Civil Engineering - Beograd	Geodesy

List of courses being held by the teacher in the accredited study programmes

	ID	Course name	Study programme name, study type
1.	GI013	Gravimetry	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
2.	GI019	Bathymetry	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
3.	GI301A	Advanced Geodesy	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
4.	GI404A	Digital Terrain Models	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
5.	GG99	Geospatial technologies - basics	(ZP0) Disaster Risk Management and Fire Safety, Undergraduate Academic Studies
6.	GI025C	Bases of mathematical cartography	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
7.	GI204A	Basic cartography	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
8.	GI209	Photogrammetry	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
9.	GI406A	Fundamentals of Remote Sensing and Image Processing	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies (SE0) Software Engineering and Information Technologies, Undergraduate Academic Studies
10.	GI501	Geoportals and Geospatial Services	(GI0) Geodesy and Geomatics, Master Academic Studies
11.	GI512	Multimedia Cartography	(GI0) Geodesy and Geomatics, Master Academic Studies
12.	GI517	Digital Photogrammetry	(GI0) Geodesy and Geomatics, Master Academic Studies
13.	GI518	Geodesy in City Planning	(GI0) Geodesy and Geomatics, Master Academic Studies
14.	GI602	Geodetic astronomy	(GI0) Geodesy and Geomatics, Master Academic Studies
15.	GI534	Service oriented architecture in GIS	(GI0) Geodesy and Geomatics, Master Academic Studies
16.	GI535	Mathematical cartography	(GI0) Geodesy and Geomatics, Master Academic Studies
17.	GI540	Valuation of real estate	(GI0) Geodesy and Geomatics, Master Academic Studies
18.	GI700	Geospatial data visualization	(GI0) Geodesy and Geomatics, Master Academic Studies
19.	GIAU03	Remote Sensing and Computer Image Processing	(E20) Computing and Control Engineering, Master Academic Studies
20.	SDGI01	Selected topics in geoinformation systems	(GI0) Geodesy and Geomatics, Specialised Academic Studies
21.	SDGI06	Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Specialised Academic Studies
22.	SDGI10	Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Specialised Academic Studies
23.	SDGI1B	Selected Chapters in Cartography Projections	(GI0) Geodesy and Geomatics, Specialised Academic Studies
24.	SDGI1C	Selected topics in geospatial data visualization	(GI0) Geodesy and Geomatics, Specialised Academic Studies
25.	SDGI1F	Selected topics in photogrammetry	(GI0) Geodesy and Geomatics, Specialised Academic Studies



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

List of courses being held by the teacher in the accredited study programmes

ID	Course name	Study programme name, study type
26.	SDGI2F Selected Chapters in Digital Terrain Models	(GI0) Geodesy and Geomatics, Specialised Academic Studies
27.	SDGI3B Selected Chapters of Thematic Cartography	(GI0) Geodesy and Geomatics, Specialised Academic Studies
28.	SDGI5B Selected Chapters in Multimedia Cartography	(GI0) Geodesy and Geomatics, Specialised Academic Studies
29.	SDGI5D Selected Chapters in the Mass Appraisal of Real Estate	(GI0) Geodesy and Geomatics, Specialised Academic Studies
30.	SDGI5F Basic topics in remote sensing and image processing	(GI0) Geodesy and Geomatics, Specialised Academic Studies
31.	SDGI6A Selected Chapters in Appraisal	(GI0) Geodesy and Geomatics, Specialised Academic Studies
32.	DGI005 Selected Chapters in Contemporary Cartography	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
33.	DGI007 Selected Chapters in Advanced Geodesy	(GI0) Geodesy and Geomatics, Doctoral Academic Studies

Representative references (minimum 5, not more than 10)

1.	Mirko Borisov; Problems of the Scale and Building of Topographical Data Infrastructure; Geodetski list, Vol.64 (87) No.2 June 2010
2.	Govedarica M., Borisov M.: THE ANALYSIS OF DATA QUALITY OF TOPOGRAPHIC MAPS (IF 2010=0.215), Geodetski vestnik, 2011, Vol. 55, No 4, pp. 713-725, ISSN 0351-0271, UDK: 528=863
3.	The Modern architecture of GIS and Cartographic key at the environment of Web Map Server
4.	The national cartographic project in Serbia
5.	Topographic map at the scale 1:250 000 - The first map in army of Serbia produced according to NATO standards
6.	Borisov M.: The concept GIS web portal of the Military Geographical Institute, 4. International Scientific Conference on Defensive Technologies - OTEH, Beograd, 6-7 Oktobar, 2011
7.	Borisov M.: Digitalizovane mape prostora u sistemu upravljanja hemijskim udesima, 2. Međunarodni simpozijum "Zaštita životne sredine u industrijskim područjima", Kosovska Mitrovica, 24-29 April, 2009, pp. 489-495, ISBN 978-86-80893-23-5
8.	Borisov M.: The development and perspectives of GIS at the scale of 1:300 000, 3. InterGEO East Conference, Beograd, 22-24 Februar, 2006
9.	Dr Mirko Borisov, dipl. inž.- Razvoj GIS 2006, monografija , Zadužbina Andrejević, Beograd 86 str.
10.	Borisov M.: Geodetska delatnost u Srbiji 1837.-2012. godina, Beograd, Republički geodetski zavod, 2012, str. 98-113, ISBN 978-86-459-0422-8

Summary data for teacher's scientific or art and professional activity:

Quotation total :	0
Total of SCI(SSCI) list papers :	2
Current projects :	Domestic : 0 International : 0

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:	Bulatović S. Vladimir		
Academic title:	Assistant Professor		
Name of the institution where the teacher works full time and starting date:	Faculty of Technical Sciences - Novi Sad 01.03.2003		
Scientific or art field:	Geodesy		
Academic career	Year	Institution	Field
Academic title election:	2011	Faculty of Technical Sciences - Novi Sad	Geodesy
PhD thesis	2011	Faculty of Technical Sciences - Novi Sad	Geodesy
Magister thesis	2007	Faculty of Organizational Sciences - Beograd	Information-Communication Systems
Bachelor's thesis	2001	Faculty of Civil Engineering - Beograd	Geodesy

List of courses being held by the teacher in the accredited study programmes

	ID	Course name	Study programme name, study type
1.	GG08	Geodesy	(G00) Civil Engineering, Undergraduate Academic Studies
2.	GI019	Bathymetry	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
3.	GI025B	Geodetic Metrology	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
4.	GI029	Utility Information Systems and their Application	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
5.	GI210	Mean Value Calculation	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
6.	GI307A	Engineering Geodesy	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
7.	GI207	GNSS basics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
8.	GI401A	Integrated Systems of Surveying	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
9.	GI403	Methods for Precise Geodetic Measurements and Data Processing	(GI0) Geodesy and Geomatics, Master Academic Studies
10.	GI502	Location Based Services	(GI0) Geodesy and Geomatics, Master Academic Studies
11.	GI514	Engineering Geodesy 3	(GI0) Geodesy and Geomatics, Master Academic Studies
12.	GI518	Geodesy in City Planning	(GI0) Geodesy and Geomatics, Master Academic Studies
13.	GI600	Applied Geophysics in Geomatics	(GI0) Geodesy and Geomatics, Master Academic Studies
14.	URZP65	Geodetic methods for the determination of geodynamic movements	(ZP1) Disaster Risk Management and Fire Safety, Master Academic Studies
15.	GI531	Application of GNSS systems	(GI0) Geodesy and Geomatics, Master Academic Studies
16.	GIAU02	Position Based Services	(E20) Computing and Control Engineering, Master Academic Studies
17.	SDGI02	Selected topics in engineering geodesy	(GI0) Geodesy and Geomatics, Specialised Academic Studies
18.	SDGI06	Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Specialised Academic Studies
19.	SDGI10	Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Specialised Academic Studies
20.	SDGI12	Selected topics in Integrated Systems of Surveying	(GI0) Geodesy and Geomatics, Specialised Academic Studies
21.	SDGI19	Utility Information Systems and their Application	(GI0) Geodesy and Geomatics, Specialised Academic Studies
22.	SDGI20	Selected topics in Geodynamics	(GI0) Geodesy and Geomatics, Specialised Academic Studies
23.	SDGI5D	Selected Chapters in the Mass Appraisal of Real Estate	(GI0) Geodesy and Geomatics, Specialised Academic Studies
24.	SDGI6A	Selected Chapters in Appraisal	(GI0) Geodesy and Geomatics, Specialised Academic Studies
25.	DGI002	Selected Chapters in Engineering Geodesy	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
26.	DGI006	Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Doctoral Academic Studies



UNIVERSITY OF NOVI SAD

FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6

**Study Programme Accreditation**

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

List of courses being held by the teacher in the accredited study programmes

ID	Course name	Study programme name, study type
27.	DGI009 Selected Chapters in GNSS Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
28.	DGI010 Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
29.	DGI019 Selected Chapters in Municipal Information Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies

Representative references (minimum 5, not more than 10)

1.	Bulatović V., Sušić Z., Ninkov T.: Estimate of the ASTER-GDEM regional systematic errors and their removal, INT J REMOTE SENS, 2012, Vol. 33, No 18, pp. 5915-5926, ISSN 0143-1161
2.	Bulatović V., Ninkov T., Malenković V., Vulić M.: Contemporary Methods of Determining Energy Losses in Structures, TTEM. Tehnics technologies education management, 2012, Vol. 7, No 2, pp. 687-692, ISSN 1840-1503
3.	Bulatović V., Sušić Z., Ninkov T.: Open Geospatial Consortium Web Services in Complex Distribution Systems, Geodetski list, 2010, Vol. 64, No 1, pp. 13-29, ISSN 0016-710X
4.	*****Autori: T. Ninkov, V. Bulatović, Z. Sušić Naziv: Primena laserskog skeniranja kod projektovanja linijskih struktura i objekata Naziv skupa: GNP 2008
5.	*****Autori: Ninkov T., Bulatović, V. Naziv: Neke praktične primene AGROS-a Naziv skupa: Konferencija o uvođenju novog geodetskog referentnog sistema
6.	*****Autori: Ninkov T., Bulatović, V. Naziv: Primena naprednih tehnologija u projektima čišćenja reke Dunav od neeksplozivnih ubojitih sredstava na području Novog Sada Naziv skupa: GNP 2006
7.	*****Autori: Ninkov T., Bulatović, V. Naziv: Savremene metode izrade digitalnih topografskih podloga Naziv skupa: GNP 2006
8.	*****Autori: Benka P., Bulatović, V. Naziv: GIS in irrigation system management Naziv skupa: VIIIth International symposium interdisciplinary regional research
9.	Benka P., Bulatović V.: Geographic Information System in Irrigation System Management, 7. ISIRR 2003, Hunedoara, 1 Januar, 2010, pp. 614-619
10.	*****Autori: Z. Sušić, D. Vasić, V. Bulatović, T. Ninkov Naziv: Geodetski monitoring građevinskih objekata korišćenjem konvencionalnih i savremenih tehnologija Naziv skupa: GNP 2008

Summary data for teacher's scientific or art and professional activity:

Quotation total :	0			
Total of SCI(SSCI) list papers :	3			
Current projects :	Domestic :	2	International :	1

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:		Ćirović S. Goran	
Academic title:		Guest Professor	
Name of the institution where the teacher works full time and starting date:		-	
Scientific or art field:		Organization, Construction Technology and Management	
Academic career	Year	Institution	Field
Academic title election:	2009		Organization, Construction Technology and Management
PhD thesis	1994	Faculty of Civil Engineering - Beograd	Organization, Construction Technology and Management
Magister thesis	1987	Faculty of Civil Engineering - Beograd	Organization, Construction Technology and Management
Bachelor's thesis	1982	Faculty of Civil Engineering - Beograd	Organization, Construction Technology and Management

List of courses being held by the teacher in the accredited study programmes

	ID	Course name	Study programme name, study type
1.	GG519	Building Management	(G00) Civil Engineering, Master Academic Studies
2.	GI531	Application of GNSS systems	(GI0) Geodesy and Geomatics, Master Academic Studies
3.	GI540	Valuation of real estate	(GI0) Geodesy and Geomatics, Master Academic Studies
4.	SDGI3A	Selected topics in the valuation of buildings	(GI0) Geodesy and Geomatics, Specialised Academic Studies
5.	SDGI4A	Selected chapters of Land Management	(GI0) Geodesy and Geomatics, Specialised Academic Studies
6.	SDGI6A	Selected Chapters in Appraisal	(GI0) Geodesy and Geomatics, Specialised Academic Studies
7.	GD021	Selected Chapters in Process Modelling in Construction	(G00) Civil Engineering, Doctoral Academic Studies (OM1) Mathematics in Engineering, Doctoral Academic Studies

Representative references (minimum 5, not more than 10)

1.	Ćirović, G., editor in chief, International congress Sport Facilities / Standardizations and Trends SPOFA 2011, University of Belgrade, Faculty of Sport and Physical and Education Serbia, ISBN: 9788680855774 Belgrade 2011, pp. 195.
2.	Ćirović, G., editor in chief, International congress Sport Facilities / Current Position and Perspectives SPOFA 2009, University of Belgrade, Faculty of Sport and Physical and Education Serbia, ISBN: 9788680255576 Belgrade, 2009, pp. 215.
3.	Ćirović, G., Pamučar, D.: Decision support model for prioritizing railway level crossings for safety improvements: Application of the adaptive neuro-fuzzy system, Expert Systems with Applications, ISSN: 0957-4174, http://dx.doi.org/10.1016/j.eswa.2012.10.041 , In press
4.	Ćirović, G., Radonjanin, N., Trivunic, M., Nikolić, D., Optimization of uhpfr beams subjected to bending using genetic algorithms, Journal of Civil Engineering and Management, to be appear 2013
5.	Ćirović G, Pamučar D., Đorović B., Sekulovic D., "Optimizing a multi-product and multi-supplier the economic production quantity model using genetic algorithm ", International Journal of the Physical Sciences, ISSN 1992 - 1950, vol 7(2), pp. 262-272, 2012 godina.
6.	Peško, I., Trivunić, M., Ćirović, G., Mučenski, V., A preliminary estimate of time and cost in urban road construction using neural networks, Tehnički vjesnik, to be appear 2013.
7.	Regodić, M., Sekulović, D., Ćirović, G., Tadić, V., Drobnjak, S., Comparative analysis of pixel-based and object-oriented classification by using multi-spectral spot 5 images, Technics Technologies Education Management - TTEM, Vol. 8., No. 1., 2013.
8.	Ćirović, G., Sekulović, D., Pamučar, D., Regodić, M., Application of fuzzy logic in the process of vehicle routing optimization in logistic support, Technics Technologies Education Management - TTEM, Vol. 8., No. 2., 2013.
9.	Pamučar D., Đorović B., Božanić D., Ćirović G., "Modification of the dynamic scale of marks in analytic hierarchy process (ahp) and analytic network approach (anp) through application of fuzzy approach", Scientific Research and Essays, ISSN 1992 - 2248, vol 7(1), pp. 24 - 37, 2012 godina.
10.	Bakrac, S., Anđelić, S., Ćirović G., Pamučar, D., Sekulovic D., "Using a method of decoding aerial photographs in analyzing the accuracy of determining the orientation of medieval churches in Serbia ", Metalurgia international, ISSN 582-2214, vol. 17 br. 11, str. 224-231, 2012.

Summary data for teacher's scientific or art and professional activity:

Quotation total :	18		
Total of SCI(SSCI) list papers :	2		
Current projects :	Domestic :	1	International : 1

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:		Galić P. Zdravko	
Academic title:		Guest Professor	
Name of the institution where the teacher works full time and starting date:		-	
Scientific or art field:		Electrical and Computer Engineering	
Academic career	Year	Institution	Field
Academic title election:	2011	Fakultet elektrotehnike i računarstva - Zagreb - Zagreb	Electrical and Computer Engineering
PhD thesis	1991	Faculty of Civil Engineering - Sarajevo	Geodetic Engineering
Magister thesis	1988	School of Electrical Engineering - Beograd	Applied Computer Science and Informatics
Bachelor's thesis	1979	Faculty of Civil Engineering - Sarajevo	Geodetic Engineering
List of courses being held by the teacher in the accredited study programmes			
	ID	Course name	Study programme name, study type
1.	GI003	Geospatial Data Infrastructure	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
2.	GI211	Geoinformatics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
3.	GI408A	Geospatial Databases	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
4.	GI536	Spatial and temporal databases	(GI0) Geodesy and Geomatics, Master Academic Studies
5.	GIAU04	Geospatial data visualization	(E20) Computing and Control Engineering, Master Academic Studies
6.	SDGI01	Selected topics in geoinformation systems	(GI0) Geodesy and Geomatics, Specialised Academic Studies
7.	SDGI1C	Selected topics in geospatial data visualization	(GI0) Geodesy and Geomatics, Specialised Academic Studies
8.	SDGI3C	Selected topics in Geoportals	(GI0) Geodesy and Geomatics, Specialised Academic Studies
Representative references (minimum 5, not more than 10)			
1.	Geoprostorne baze podataka		
2.	An Interoperable Cartographic Database		
3.	Temporal GIS for Cadastre		
4.	Razvoj GIS-orijentiranih aplikacija u 4GL programskom okolišu - objektni pristup		
5.	Distribuiranje geoprostornih informacija Internet tehnologijom		
6.	Object-Oriented Geo-Information Processing in Modulex		
7.	Advanced Database Programming Languages: A Geo-Information Processing Prospective		
8.	Spatio-Temporal Data Streams: An Approach to Managing Moving Objects		
9.	Data Types and Operations for Spatio-Tempora Data Streams		
10.	OCEANUS: A Spatio-Temporal Data Stream System Prototype		
Summary data for teacher's scientific or art and professional activity:			
Quotation total :		0	
Total of SCI(SSCI) list papers :		0	
Current projects :		Domestic :	International :
		1	1

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:	Govedarica J. Miro		
Academic title:	Full Professor		
Name of the institution where the teacher works full time and starting date:	Faculty of Technical Sciences - Novi Sad 22.02.1994		
Scientific or art field:	Geodesy and Geomatics Engineering		
Academic career	Year	Institution	Field
Academic title election:	2012	Faculty of Technical Sciences - Novi Sad	Geodesy and Geomatics Engineering
PhD thesis	2001	Faculty of Technical Sciences - Novi Sad	Geoinformatics
Magister thesis	1998	Faculty of Technical Sciences - Novi Sad	Applied Computer Science and Informatics
Bachelor's thesis	1987	Faculty of Civil Engineering - Sarajevo	Geodesy

List of courses being held by the teacher in the accredited study programmes

	ID	Course name	Study programme name, study type
1.	AU54	Geoinformation Systems	(E20) Computing and Control Engineering, Undergraduate Academic Studies (GI0) Geodesy and Geomatics, Undergraduate Academic Studies
2.	E241	Geospatial Technologies	(E20) Computing and Control Engineering, Undergraduate Academic Studies
3.	F114	Graphic applications	(F00) Graphic Engineering and Design, Undergraduate Academic Studies
4.	GI003	Geospatial Data Infrastructure	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
5.	GI020	Laser Scanning of Terrain and Objects	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
6.	GI025B	Geodetic Metrology	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
7.	GI211	Geoinformatics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
8.	GI408A	Geospatial Databases	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
9.	URZP44	Application of geoinformation technology in risk management	(ZP0) Disaster Risk Management and Fire Safety, Undergraduate Academic Studies
10.	Z410A	Geospatial technologies and systems	(Z20) Environmental Engineering, Undergraduate Academic Studies
11.	Z410	Geoinformacione tehnologije i sistemi(uneti naziv na engleskom)	(Z20) Environmental Engineering, Undergraduate Academic Studies
12.	BM119A	The application of geoinformation technologies and systems in medicine	(BM0) Biomedical Engineering, Undergraduate Academic Studies
13.	GG99	Geospatial technologies - basics	(ZP0) Disaster Risk Management and Fire Safety, Undergraduate Academic Studies
14.	GI207	GNSS basics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
15.	GI209	Photogrammetry	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
16.	GI406A	Fundamentals of Remote Sensing and Image Processing	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies (SE0) Software Engineering and Information Technologies, Undergraduate Academic Studies
17.	ZC028	Geospatial technologies and systems	(ZC0) Clean Energy Technologies, Undergraduate Academic Studies
18.	GI501	Geoportals and Geospatial Services	(GI0) Geodesy and Geomatics, Master Academic Studies
19.	GI502	Location Based Services	(GI0) Geodesy and Geomatics, Master Academic Studies
20.	GI504	Advanced Techniques of Laser Scanning	(GI0) Geodesy and Geomatics, Master Academic Studies
21.	GI517	Digital Photogrammetry	(GI0) Geodesy and Geomatics, Master Academic Studies
22.	GI518	Geodesy in City Planning	(GI0) Geodesy and Geomatics, Master Academic Studies
23.	GIAU05	Geoportals and Geoservices	(E20) Computing and Control Engineering, Master Academic Studies



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

List of courses being held by the teacher in the accredited study programmes

ID	Course name	Study programme name, study type
24.	GI531 Application of GNSS systems	(GI0) Geodesy and Geomatics, Master Academic Studies
25.	GI532 Advanced Remote Sensing Technologies	(GI0) Geodesy and Geomatics, Master Academic Studies
26.	GI534 Service oriented architecture in GIS	(GI0) Geodesy and Geomatics, Master Academic Studies
27.	GI536 Spatial and temporal databases	(GI0) Geodesy and Geomatics, Master Academic Studies
28.	GI540 Valuation of real estate	(GI0) Geodesy and Geomatics, Master Academic Studies
29.	GI700 Geospatial data visualization	(GI0) Geodesy and Geomatics, Master Academic Studies
30.	GIAU02 Position Based Services	(E20) Computing and Control Engineering, Master Academic Studies
31.	GIAU03 Remote Sensing and Computer Image Processing	(E20) Computing and Control Engineering, Master Academic Studies
32.	GIAU04 Geospatial data visualization	(E20) Computing and Control Engineering, Master Academic Studies
33.	SDGI01 Selected topics in geoinformation systems	(GI0) Geodesy and Geomatics, Specialised Academic Studies
34.	SDGI06 Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Specialised Academic Studies
35.	SDGI08 Selected topics in laser scanning	(GI0) Geodesy and Geomatics, Specialised Academic Studies
36.	SDGI10 Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Specialised Academic Studies
37.	SDGI13 Selected topics in spatial data infrastructure	(GI0) Geodesy and Geomatics, Specialised Academic Studies
38.	SDGI1C Selected topics in geospatial data visualization	(GI0) Geodesy and Geomatics, Specialised Academic Studies
39.	SDGI1F Selected topics in photogrammetry	(GI0) Geodesy and Geomatics, Specialised Academic Studies
40.	SDGI3C Selected topics in Geoportals	(GI0) Geodesy and Geomatics, Specialised Academic Studies
41.	SDGI5D Selected Chapters in the Mass Appraisal of Real Estate	(GI0) Geodesy and Geomatics, Specialised Academic Studies
42.	SDGI5F Basic topics in remote sensing and image processing	(GI0) Geodesy and Geomatics, Specialised Academic Studies
43.	SDGI6A Selected Chapters in Appraisal	(GI0) Geodesy and Geomatics, Specialised Academic Studies
44.	DAU011 Selected Chapters in Geographic Information Systems and Technologies	(E20) Computing and Control Engineering, Doctoral Academic Studies
45.	DGI001 Selected Chapters in Geoinformation Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
46.	DGI003 Selected Chapters in Photogrammetry and Remote Sensing	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
47.	DGI006 Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
48.	DGI008 Selected Chapters in Laser Scanning	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
49.	DGI009 Selected Chapters in GNSS Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
50.	DGI010 Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
51.	DGI013 Selected Chapters in Spatial Data Infrastructure and Standardization	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
52.	DGI019 Selected Chapters in Municipal Information Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
Representative references (minimum 5, not more than 10)		
1.	Ristić, A., Petrovački, D., Govedarica, M.: A New Method to Simultaneously Estimate the Radius of a Cylindrical Object and the Wave Propagation Velocity from GPR Data, Computers & Geosciences, 2009, Vol. 35, Broj 8, str. 1620-1630, ISSN 0098-3004	
2.	Mogin P, Luković I, Govedarica M, "Principi projektovanja baza podataka", II izdanje, Univerzitet u Novom Sadu, Fakultet tehničkih nauka, Novi Sad, 2004, ISBN: 86-80249-81-5, 700 str.	
3.	Govedarica Miro, Borisov Mirko, THE ANALYSIS OF DATA QUALITY OF TOPOGRAPHIC MAPS, JOURNAL GEODETSKI VESTNIK (IF 2010 0.215) ISSN 0351-0271	



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Representative references (minimum 5, not more than 10)

4.	Miro Govedarica, Dušan Petrovački, Dubravka Sladić, Aleksandra Ristić, Dušan Jovanović, Vladimir Pajić, Milan Vrtunski, Aleksandar Ristic ENVIRONMENTAL DATA IN SERBIAN SPATIAL DATA INFRASTRUCTURE - GEOPORTAL OF ECOLOGY Journal of Environmental Protection and Ecology JEPE 2011 (IF 2010 0.178)
5.	Govedarica Miro, Boskovic Dubravka, Petrovacki Dusan, Ninkov Tosa, Ristic Aleksandar Metadata Catalogues in Spatial Information Systems (Review) GEODETSKI LIST, (2010), vol. 64 br. 4, str. 313-334 (IF 2009 0.167)
6.	Jasmina Nedeljković Ostojić, Miro Govedarica, Toša Ninkov, Analysis of Structure Surveying Method by 3D Laser Scanners Geodetski list:glasilo Hrvatskoga geodetskog društva 65(88); 1; (2011) (IF 2010 0.038)
7.	Ristić A., Abolmasov B., Govedarica M., Petrovački D., Ristić A.: Shallow-landslide spatial structure interpretation using a multi-geophysical approach, Acta Geotechnica Slovenica, 2012, Vol. 9, No 1/2012, pp. 47-59, ISSN 1854-0171
8.	Tosa Ninkov, Miro Govedarica, Milan Trifkovic, One Method of Renewal of Stereographics Survey Data in Coka Municipality Geodetski list : glasilo Hrvatskoga geodetskog društva 66(89) (2012), 4;
9.	Luković I, Mogin P, Govedarica M, Ristić S, "The Structure of A Subschema and Its XML Specification", Journal of Information and Organizational Sciences (JIOS), Varaždin, Croatia, ISSN: 0351-1804, Vol. 26, No. 1-2, 2002, pp. 69-85..
10.	Govedarica M, Miladinović M: Informacioni sistema katastarsa nepokretnosti – Terrasoft, Geodetska služba, 2002, Vol. XXXI, No. 92, str. 16- 27, ISSN 0350-7971
Summary data for teacher's scientific or art and professional activity:	
Quotation total :	8
Total of SCI(SSCI) list papers :	6
Current projects :	Domestic : 5 International : 1

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:	Ninkov Đ. Toša		
Academic title:	Full Professor		
Name of the institution where the teacher works full time and starting date:	Faculty of Technical Sciences - Novi Sad 15.02.1994		
Scientific or art field:	Geodesy		
Academic carieer	Year	Institution	Field
Academic title election:	2002	Faculty of Technical Sciences - Novi Sad	Geodesy
PhD thesis	1982	Faculty of Civil Engineering - Beograd	Geodesy
Magister thesis	1979	Faculty of Civil Engineering - Beograd	Geodesy
Bachelor's thesis	1972	Faculty of Civil Engineering - Beograd	Geodesy

List of courses being held by the teacher in the accredited study programmes

	ID	Course name	Study programme name, study type
1.	GI019	Bathymetry	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
2.	GI025B	Geodetic Metrology	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
3.	GI029	Utility Information Systems and their Application	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
4.	GI307A	Engineering Geodesy	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
5.	GI402	Engineering Geodesy 2	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
6.	GI505	Advanced Techniques in Geodetic Design and Monitoring	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
7.	GI009	Introduction to deformation measurement and analysis	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
8.	GH507	Engineering Geodesy	(G00) Civil Engineering, Master Academic Studies
9.	GI403	Methods for Precise Geodetic Measurements and Data Processing	(GI0) Geodesy and Geomatics, Master Academic Studies
10.	GI514	Engineering Geodesy 3	(GI0) Geodesy and Geomatics, Master Academic Studies
11.	GI518	Geodesy in City Planning	(GI0) Geodesy and Geomatics, Master Academic Studies
12.	GI601	Geodynamics	(GI0) Geodesy and Geomatics, Master Academic Studies
13.	URZP65	Geodetic methods for the determination of geodynamic movements	(ZP1) Disaster Risk Management and Fire Safety, Master Academic Studies
14.	GS005	Contemporary recording methods of energy losses of buildings	(G10) Energy Efficiency in Buildings, Specialised Academic Studies
15.	GI516	Deformation analysis and measurements	(GI0) Geodesy and Geomatics, Master Academic Studies
16.	GI531	Application of GNSS systems	(GI0) Geodesy and Geomatics, Master Academic Studies
17.	GI540	Valuation of real estate	(GI0) Geodesy and Geomatics, Master Academic Studies
18.	GIAU02	Position Based Services	(E20) Computing and Control Engineering, Master Academic Studies
19.	SDGI02	Selected topics in engineering geodesy	(GI0) Geodesy and Geomatics, Specialised Academic Studies
20.	SDGI06	Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Specialised Academic Studies
21.	SDGI10	Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Specialised Academic Studies
22.	SDGI11	Selected topics in deformation measurements and analysis	(GI0) Geodesy and Geomatics, Specialised Academic Studies
23.	SDGI14	Selected topics in geodetic networks and their optimization	(GI0) Geodesy and Geomatics, Specialised Academic Studies
24.	SDGI5D	Selected Chapters in the Mass Appraisal of Real Estate	(GI0) Geodesy and Geomatics, Specialised Academic Studies
25.	SDGI6A	Selected Chapters in Appraisal	(GI0) Geodesy and Geomatics, Specialised Academic Studies
26.	DGI002	Selected Chapters in Engineering Geodesy	(GI0) Geodesy and Geomatics, Doctoral Academic Studies



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

List of courses being held by the teacher in the accredited study programmes

ID	Course name	Study programme name, study type
27.	DGI006 Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
28.	DGI009 Selected Chapters in GNSS Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
29.	DGI010 Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
30.	DGI011 Selected Chapters in Deformation Analysis and Measurements	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
31.	DGI014 Selected Chapters in Geodesic Networks and Their Optimization	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
32.	DGI019 Selected Chapters in Municipal Information Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
33.	DGI012 Selected topics in integrated systems of surveying	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
34.	DGI015 Selected topics in geophysics	(GI0) Geodesy and Geomatics, Doctoral Academic Studies

Representative references (minimum 5, not more than 10)

1.	Ninkov, T. (1988): "Optimizacija projektovanja geodetskih mreža" Naučna knjiga, Gradjevinski fakultet, Beograd 1989
2.	Ninkov, T. (1982): "A new method of land Surveying networks optimization". Meeting of Study Eroup 5 B. Survey Control Networks; Alborg, edited by K. Borre i W.M. Welsch Rep 7 Schriftenreihe Wissenschaftlicher Studiengang Wermessungswesen der Hochschule der Bundeswehr Munchen, pp. 293-300.
3.	Bulatović V., Sušić Z., Ninkov T.: Estimate of the ASTER-GDEM regional systematic errors and their removal, INT J REMOTE SENS, 2012, Vol. 33, No 18, pp. 5915-5926, ISSN 0143-1161
4.	Tosa Ninkov, Miro Govedarica, Milan Trifkovic: One Method of Renewal of Stereographics Survey Data in Coka Municipality, Geodetski list: glasilo Hrvatskoga geodetskog društva. 68(88), (2011), 4; (IF 2010 0.038)
5.	Govedarica Miro, Boskovic Dubravka, Petrovacki Dusan, Ninkov Tosa: Metadata Catalogues in Spatial Information Systems (Review) GEODETSKI LIST, (2010), vol. 64 br. 4, str. 313-334 (IF 2009 0.167)
6.	Vladimir Bulatović, Toša Ninkov, Zoran Sušić: Open Geospatial Consortium Web Services Complex Distribution Systems, Geodetski list, (2009), br 1, str.13-29, (IF 2009 0.167)
7.	Jasmina Nedeljковиć Ostojić, Miro Govedarica, Toša Ninkov: Analysis of Structure Surveying Method by 3D Laser Scanners Geodetski list:glasilo Hrvatskoga geodetskog društva 65(88), (2011), 1; (IF 2010 0.038)
8.	Bulatović V., Ninkov T., Malenković V., Vulić M.: Contemporary Methods of Determining Energy Losses in Structures, TTEM. Tehnics technologies education management, 2012, Vol. 7, No 2, pp. 687-692, ISSN 1840-1503
9.	- Projekat informacionog sistema postojeće kanalizacione mreže Beograda i 3D modela sadržaja na fizičkoj površini zemlje koristeći GPS merenja, satelitski snimak sistema IKONOS i postojeću dokumentaciju (Beograd 2006)
10.	- GIS projekat Naftnog i gasnog distributivnog sistema QGPC-a (Qatar General Petroleum Corporation)1999-2000 Šef projekta za GIS

Summary data for teacher's scientific or art and professional activity:

Quotation total :	86
Total of SCI(SSCI) list papers :	5
Current projects :	Domestic : 3 International : 2

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:		Pribičević I. Boško	
Academic title:		Guest Professor	
Name of the institution where the teacher works full time and starting date:		-	
Scientific or art field:		Geodesy	
Academic carieer	Year	Institution	Field
Academic title election:	2010		Geodesy
PhD thesis	2000		Geodesy
Magister thesis	1999		Geodesy
Bachelor's thesis	1986		Geodesy
List of courses being held by the teacher in the accredited study programmes			
ID	Course name	Study programme name, study type	
1.	E241 Geospatial Technologies	(E20) Computing and Control Engineering, Undergraduate Academic Studies	
2.	GI003 Geospatial Data Infrastructure	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies	
3.	GI014 Celestial Mechanics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies	
4.	GI016 Physical Geodesy	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies	
5.	GI020 Laser Scanning of Terrain and Objects	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies	
6.	GI504 Advanced Techniques of Laser Scanning	(GI0) Geodesy and Geomatics, Master Academic Studies	
7.	SDGI08 Selected topics in laser scanning	(GI0) Geodesy and Geomatics, Specialised Academic Studies	
8.	DGI006 Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Doctoral Academic Studies	
9.	DGI010 Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Doctoral Academic Studies	
10.	DGI011 Selected Chapters in Deformation Analysis and Measurements	(GI0) Geodesy and Geomatics, Doctoral Academic Studies	
11.	DGI012 Selected topics in integrated systems of surveying	(GI0) Geodesy and Geomatics, Doctoral Academic Studies	
12.	DGI015 Selected topics in geophysics	(GI0) Geodesy and Geomatics, Doctoral Academic Studies	
Representative references (minimum 5, not more than 10)			
1.	Precise geodetic and hydrographic measurements in karst areas. Reports on Geodesy. 2(83) (2007) ; 63-68 . article		
2.	Research on the International Geodynamic Test-Area Plitvice Lakes within CERGOP-2 Project.. Reports on Geodesy.Warsaw University of Technology, Institute of Geodesy and Geodetic Astronomy. 79 (2006) , 4; 165-172		
3.	Application of geographical information systems and hydrographic surveying in the international geodynamic test area Plitvice Lakes. Reports on Geodesy. 79 (2006) , 4; 181-186		
4.	Five years of EUREF-permanent GPS-stations in Croatia. Reports on Geodesy. 76 (2006) , 1; 91-98		
5.	Geodesy, tectonics and geodynamics of Dinnarides. REPORTS ON GEODESY 76 (2006) , 1; 85-90		
6.	Determination of the recent structural fabric in the Alps-Dinarides area by combination of geodetic and geologic methods. Raziskave s področja geodezije in geofizike 2002. Ljubljana : Fakulteta za gradbeništvo in geodezijo, Univerza v Ljubljani, 2002. 57-65		
7.	Medak Damir; Pribičević Boško; Krivoruchko Konstantin: Geostatistička analiza batimetrijskih mjerenja na primjeru jezera Kozjak Geodetski list : glasilo Hrvatskoga geodetskog društva 62(85), (2008), 3; 131-142		
8.	Pribičević Boško; Medak Damir; Đapo Almin: Progušćenje točaka Geodinamičke mreže Grada Zagreba u podsljemenskoj zoni. Geodetski list. 61(84), (2007), 4; 247-258		
9.	Using Trimble Scanning Technologies when Improving Technical Documentation of an Oil/Gas Facility, Las Vegas, Trimble Dimensions, 2009.		
10.	Application of Terrestrial Laser Scanning in Advanced Construction Survey, SPAR Conference, Houston, 05.03.2009.		
Summary data for teacher's scientific or art and professional activity:			
Quotation total :		0	
Total of SCI(SSCI) list papers :		6	
Current projects :		Domestic :	0
		International :	0



Science, arts and professional qualifications

Name and last name:	Ristić V. Aleksandar		
Academic title:	Assistant Professor		
Name of the institution where the teacher works full time and starting date:	Faculty of Technical Sciences - Novi Sad 01.02.2000		
Scientific or art field:	Automatic Control and System Engineering		
Academic carier	Year	Institution	Field
Academic title election:	2009	Faculty of Technical Sciences - Novi Sad	Automatic Control and System Engineering
PhD thesis	2009	Faculty of Technical Sciences - Novi Sad	Automatic Control and System Engineering
Magister thesis	2001	Faculty of Technical Sciences - Novi Sad	Automatic Control and System Engineering
Bachelor's thesis	1999	Faculty of Technical Sciences - Novi Sad	Automatic Control and System Engineering

List of courses being held by the teacher in the accredited study programmes

	ID	Course name	Study programme name, study type
1.	E226	Automatic Control Systems	(E20) Computing and Control Engineering, Undergraduate Academic Studies (H00) Mechatronics, Undergraduate Academic Studies (MR0) Measurement and Control Engineering, Undergraduate Academic Studies (SEL) Software Engineering and Information Technologies - Loznica, Undergraduate Academic Studies
2.	GI014	Celestial Mechanics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
3.	GI016	Physical Geodesy	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
4.	GI025B	Geodetic Metrology	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
5.	GI404A	Digital Terrain Models	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
6.	GI409A	Underground Infrastructure Detection	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
7.	M3408	Automatic Control Systems	(M40) Technical Mechanics and Technical Design, Undergraduate Academic Studies
8.	BM119A	The application of geoinformation technologies and systems in medicine	(BM0) Biomedical Engineering, Undergraduate Academic Studies
9.	GG226	Automatic control systems in geomatics	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
10.	GG99	Geospatial technologies - basics	(ZP0) Disaster Risk Management and Fire Safety, Undergraduate Academic Studies
11.	M3409	Automatic control systems	(M30) Energy and Process Engineering, Undergraduate Academic Studies
12.	ZC037	Automation applied in the industry and buildings	(ZC0) Clean Energy Technologies, Undergraduate Academic Studies
13.	GI600	Applied Geophysics in Geomatics	(GI0) Geodesy and Geomatics, Master Academic Studies
14.	GI532	Advanced Remote Sensing Technologies	(GI0) Geodesy and Geomatics, Master Academic Studies
15.	GI537	Geosensor networks	(GI0) Geodesy and Geomatics, Master Academic Studies
16.	M3417	Applied industrial automatization	(M30) Energy and Process Engineering, Master Academic Studies
17.	SDGI01	Selected topics in geoinformation systems	(GI0) Geodesy and Geomatics, Specialised Academic Studies
18.	SDGI04	Selected Chapters in Underground Infrastructure Detection	(GI0) Geodesy and Geomatics, Specialised Academic Studies
19.	SDGI13	Selected topics in spatial data infrastructure	(GI0) Geodesy and Geomatics, Specialised Academic Studies
20.	DGI001	Selected Chapters in Geoinformation Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
21.	DGI004	Selected Chapters in Underground Infrastructure Utility Detection	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
22.	DGI006	Selected Chapters in Real Estate Cadastre	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
23.	DGI009	Selected Chapters in GNSS Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

List of courses being held by the teacher in the accredited study programmes

ID	Course name	Study programme name, study type
24.	DGI010 Selected Chapters in Landscape Arrangement	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
25.	DGI016 Selected Chapters in Systems and Signals	(GI0) Geodesy and Geomatics, Doctoral Academic Studies
26.	DGI018 Selected Chapters of Automatic Control Systems	(GI0) Geodesy and Geomatics, Doctoral Academic Studies

Representative references (minimum 5, not more than 10)

1.	Aleksandar Ristić, Dušan Petrovački, Miro Govedarica: A New Method to Simultaneously Estimate the Radius of a Cylindrical Object and the Wave Propagation Velocity from GPR Data, Computers & Geosciences, 2009, Vol. 35, Broj 8, str. 1620-1630, ISSN 0098-3004, (IF2010 1.416)
2.	Govedarica Miro, Boskovic Dubravka, Petrovacki Dusan, Ninkov Tosa, Ristic Aleksandar: Metadata Catalogues in Spatial Information Systems (Review), GEODETSKI LIST, (2010), vol. 64 br. 4, str. 313-334 (IF 2009 0.167)
3.	Aleksandar Ristić, Biljana Abolmasov, Miro Govedarica, Dušan Petrovački, Aleksandra Ristić: Shallow-landslide spatial structure interpretation using a multi-geophysical approach, Acta geotechnica slovenica, (2012), vol. 9, issue 1, pp 46-59, (IF 2011, 0.100)
4.	Miro Govedarica, Dušan Petrovački, Dubravka Sladić, Aleksandra Ristić, Dušan Jovanović, Vladimir Pajić, Milan Vrtunski, Aleksandar Ristic: ENVIRONMENTAL DATA IN SERBIAN SPATIAL DATA INFRASTRUCTURE - GEOPORTAL OF ECOLOGY, Journal of Environmental Protection and Ecology JEPE 2011 (IF 2010 0.178)
5.	Ristić Aleksandar, Govedarica Miro, Petrovački Dušan: GNSS status and perspective, Časopis za procesnu tehniku i energetiku u poljoprivredi (PTEP) 2010, ISSN: 1821-4487, Vol. 14, No. 1, Str. 6-10, UDK 63:004(497.11)
6.	Ristić Aleksandar, Petrovački Dušan, Govedarica Miro: Radar Remote Sensing Technologies - the Usage in Agriculture, Časopis za procesnu tehniku i energetiku u poljoprivredi (PTEP) 2010, ISSN: 1821-4487, Vol. 14, No. 2, Str. 76-80, UDK 621.396.96(075.8)
7.	Ristić A., Petrovački D., Govedarica M., Popov S.: Detekcija podzemnih voda i tokova Georadarom, Vodoprivreda, 2007, Vol. 39, Broj 229-230, str. 344-349, ISSN 0350-0519, UDK: 551.491.5
8.	Ristić A., Petrovački D., Govedarica M. : Flooding bank structure modelling using GPR, GNSS and airborne laser scanning technologies, 3. The International Symposium on Global Navigation Satellite Systems, Space-Based and Ground-Based Augmentation Systems and Applications, Berlin: Senate Department for Urban Development Berlin, 30-2 Novembar, 2009, str. 99-103, ISBN 978-3-938373-93-4
9.	Ristić A., Govedarica M., Petrovački D. : Landslide analysis using GPR, GNSS and terrestrial laser scanning technologies, 3. The International Symposium on Global Navigation Satellite Systems, Space- Based and Ground-Based Augmentation Systems and Applications, Berlin: Senate Department for Urban Development Berlin, 30-2 Novembar, 2009, str. 90-94, ISBN 978-3-938373-93-4
10.	Govedarica M., Petrovački D., Ristić A:GNSS - Based Ground Penetration Radar Applications, 2. The International Symposium on Global Navigation Satellite Systems, Space-Based and Ground-Based Augmentation Systems and Applications, Berlin: Senate Department for Urban Development Berlin, EUPOS ISC, UN OOSA, ICG, 11-14 Novembar, 2008, str. 93-94

Summary data for teacher's scientific or art and professional activity:

Quotation total :	2		
Total of SCI(SSCI) list papers :	3		
Current projects :	Domestic :	1	International : 1

	UNIVERSITY OF NOVI SAD FACULTY OF TECHNICAL SCIENCES 21000 NOVI SAD, TRG DOSITEJA OBRADOVIĆA 6	
	Study Programme Accreditation MASTER ACADEMIC STUDIES Geodesy and Geomatics	

Science, arts and professional qualifications

Name and last name:		Trifković N. Milan	
Academic title:		Associate Professor	
Name of the institution where the teacher works full time and starting date:		Faculty of Civil Engineering Subotica - Subotica 21.10.2005	
Scientific or art field:		Geodesy	
Academic carieer	Year	Institution	Field
Academic title election:	2010	Faculty of Civil Engineering Subotica - Subotica	Geodesy
PhD thesis	2000	Faculty of Civil Engineering - Beograd	Geodesy
Magister thesis	1993	Faculty of Civil Engineering - Beograd	Geodesy
Bachelor's thesis	1990	Faculty of Civil Engineering - Beograd	Geodesy
List of courses being held by the teacher in the accredited study programmes			
	ID	Course name	Study programme name, study type
1.	GI011A	Land Consolidation	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
2.	GI105	Introduction to Geodesy	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
3.	GI203	Geodesy 2	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
4.	GI309	Cadastre	(GI0) Geodesy and Geomatics, Undergraduate Academic Studies
5.	GI519	Real Estate Cadastre	(GI0) Geodesy and Geomatics, Master Academic Studies
Representative references (minimum 5, not more than 10)			
1.	Trifković,M. Kuburić,M.: Uloga katastra u planiranju i izgradnji gradskog područja, Međunarodna konferencija 2006, Savremeni problemi u građevinarstvu, Građevinski fakultet Subotica		
2.	Trifković,M Kostić-Milanović A.: Legalizacija bespravno izgrađenih objekata - geodetski aspekt, Simpozijum: Nadzor nad građenjem i tehnički pregled objekata, Aranđelovac, 1999.		
3.	Trifković,M. Krstajić,M. Simanović,M. Primena novih tehnologija u geodeziji kod projektovanja dalekovoda, Simpozijum elektroprivrede, Teslić, 2002		
4.	Trifković.M. Razvoj modernog katastra u Srbiji, Monografija: 100 godina građevinarstva u Srbiji, Beograd, 2002.		
5.	Trifković,M Kostić-Milanović A.: Uloga katastra u planiranju i izgradnji gradskog područja, Simpozijum: Nadzor nad građenjem i tehnički pregled objekata, Aranđelovac, 2002.		
6.	Trifković,M. Savanović,R. Trifković,M.:Aktuelno stanje u katastru Srbije - problemi legalizacije, Simpozijum: Procedure i problematike izgradnje objekata, Aranđelovac, 2003.		
7.	Trifković,M., Kuburić,M.:Održavanje katastra vodova u urbanim sredinama, Simpozijum: Procedure i problematike izgradnje objekata, Vrnjačka Banja,2006.		
8.	Zajedničko geodetsko osmatranje velikih brana i akumulacija, Časopis: Materijali i konstrukcije, Beograd, 2010, str 33 - 41, M51		
9.	Informatički menadžment geoinformacionih sistema, Časopis: Arhitektura i urbanizam, Beograd, 2010, M51		
10.	Primena geodezije za utvrđivanje seizmičkih pojava, Časopis: Izgradnja br. 3-4, Beograd, 2010, str 185 – 188, M51		
Summary data for teacher's scientific or art and professional activity:			
Quotation total :		12	
Total of SCI(SSCI) list papers :		1	
Current projects :		Domestic :	0
		International :	0



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 10. Organizational and Material Resources

To perform a study programme, the adequate human, spatial, technical and technological, library and other resources suitable to the study programme features and predicted students' number are to be provided.

Lectures are held in amphitheatres, classrooms and specialized laboratories. The library possesses more than 1000 library units relevant for the performance of the study programme Geodesy and Geomatics. All courses from the study programme Geodesy and Geomatics have adequate textbooks, devices and supplementary equipment available on time and in a satisfactory number for the normal teaching process. There is also adequate information support.

Faculty has the library and the study room and provides a seat for each student in amphitheatres, classrooms and laboratories.

Department for Computer and Control Engineering, which is the mother department for the study programme Geodesy and Geomatics, possesses laboratories provided in cooperation with well-known worldwide companies: HEXAGON, ORACLE, IBM, Cisco Systems, Allied Telesyn, Micronas, ABB, Philips, Sagem, OpenWave, AOL, Cirrus Logic, Danfoss, Nivelco, Feedback, Siemens, Laica, Trimble, Schneider Electric. There is also geodetic equipment for surveying.



Study Programme Accreditation

MASTER ACADEMIC STUDIES

Geodesy and Geomatics

Standard 11. Quality Control

The quality control of the study programme is performed regularly and systematically through self-evaluation and external quality control. One should place an emphasis on the multi-decade practice of students' surveys.

Study programme quality control is elaborated in the following manners:

- Surveying students at final lecture from the given course.
- Surveying students on the quality of the study programme and logistic support to the studies in the event of awarding the Diploma. Also, the studying comfort (classroom cleanness and tidiness) is evaluated there.
- Surveying the teaching and non-teaching staff on the quality of the study programme and the logistic support to the studies. This survey evaluates the work of the Dean's office, Registrar's office, library, and other services at the Faculty. Furthermore, the studying comfort (classroom cleanness and tidiness) is also evaluated.

To monitor the quality of the study programme, there is also a committee comprising of the head of the study programme, all heads of all Departments participating in the realization of the study programme, together with a student from each study group.



Study Programme Accreditation
MASTER ACADEMIC STUDIES Geodesy and Geomatics

Standard 12. Distance Education

Distance learning is not provided for this study programme.