



NATRISK SYLLABI

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1. University of Nis (UNI - GAF)

1.1 Description of the study program

Name of study program and title

Master Academic Studies - ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK

Title: Master Engineer for Management

The purpose of the study program

The purpose of the study program Engineering Management for Natural Disasters Risk is to educate master engineers for work in accordance with the needs of the society and for further academic development in line with the contemporary requirements of natural disasters risk management. The curriculum is designed to provide competencies and the development of academic skills in the field of natural disasters risk management. Bearing in mind the social, economic and wider social significance of the security of people, natural and material assets related to the natural disasters risk management, experts in this profile have social and useful competences.

Scientific disciplines and professional subjects at this level of study allow students to master specific theoretical knowledge and applied skills in natural disasters risk management, developing critical thinking, teamwork and co-operative skills, while the variety of elective subjects encourages autonomy and creativity in creating study, both and innovative and multidisciplinary approaches to natural disasters risk management. Master study program provides opportunities for acquiring basic competences of scientific research work and development of professional and methodological culture for continuing education at the doctoral studies.

Objectives of the study program

The basic goal of the study program Engineering Management for Natural Disasters Risk is to educate students for the application of scientific and professional achievements in solving the problems of the safety of people, natural and material goods and developing a system of natural disasters risk management.

The specific objectives of the study program are acquiring the necessary knowledge and skills for:

- the implementation and development of the concept of integrated natural disasters risk management;

- determination of the structure and content of the rehabilitation plans with an overview of the construction measures for the rehabilitation of terrains, facilities and infrastructure;
- building resistance to natural disasters;
- development of strategic and tactical plans for intervention and rescue in emergency situations;
- mastering methods for preventing, mitigating and remedying the onset of instability of terrain and damaging geotechnical structures in different geotechnical conditions;
- assessment of seismic hazard, reduction of seismic risk, and management of such risk;
- mastering methods for preventing, mitigating and remedying the emergence of hydrological hazards such as droughts and floods;
- management of water resources in condition of natural disasters;
- the legal regulation of emergency situations caused by natural disasters and the legal regime of human rights during emergencies;
- innovation activities and team work in emergency management;
- permanent education and development of the knowledge system in the area of natural disasters risk management.

Competencies of graduated students

By mastering the study program of master academic studies Engineering Management for Natural Disasters Risk students acquire competences for applying scientific and professional distortions in natural disasters risk management.

Upon completion of the study program, students acquire general skills for:

- solving complex multidisciplinary problems;
- identification and analysis of problems in the area of risk management;
- critical thinking and strategic thinking;
- developing of communication skills with immediate and wider environments;
- creativity and initiative,
- forecasting solutions and consequences;
- monitoring technology development and improving their knowledge;
- working in a team composed of professionals of different profiles (multidisciplinary team);
- development of professional ethics and professional responsibility.

Upon completion of the study program, the student acquires subject-specific skills, i.e. professional competence for:

- understanding climate change and natural disasters;
- awareness of the complexity of the nature of disasters;

- understanding the causes and consequences of natural disasters;
- mastering methods, procedures and processes of risk identification;
- developing strategies and methodologies and natural disasters risk management methods,
- optimization and management of available resources in the system of natural disasters risk management;
- project management and innovation in the natural disasters risk management system;
- processing statistical data for the purpose of defining and making appropriate conclusions;
- integrated management in situations of natural disasters;
- understanding the civil protection mechanism and the institutional framework for managing natural disasters;
- analysis of natural disasters and risk assessment;
- application of IT in the natural disasters risk management;
- the application of specialized construction areas in the natural disasters risk management;
- protection of critical infrastructure in situations of natural disasters;
- assessment of potential for major and worse natural disasters and needs with a proactive approach to manage natural disasters.

By completing the study program of Master Academic Studies, students acquire the competency for inclusion in specialist academic and doctoral academic study programs in the same or related fields of study.

Quality, contemporary and international compatibility of the study program

The proposed study program Engineering Management for Natural Disasters Risk is based on internationally accepted standards and recommendations for higher education and appreciates contemporary scientific and professional programs in this field at higher education institutions in Europe and the world.

The study program, respecting the specifics of the educational space and the needs for university education in the Republic of Serbia, is harmonized with the European standards regarding the enrollment conditions, the duration of studies, the conditions for transition to next year, the acquisition of a diploma and the manner of studying, especially with the outcome of study programs, with the competencies of master students.

The study program is comparable and harmonized with the study programs of the following scientific and educational institutions:

- The University of Manchester, MSc International Disaster Management <http://www.manchester.ac.uk/study/masters/courses/list/09910/msc-international-disaster-management/course-details/>
- Kingston University London, Hazards & Disaster Management Masters (MSc) <http://www.kingston.ac.uk/postgraduate-course/hazards-disaster-management-msc/>
- Bauhaus-Universität Weimar, Natural Hazards and Risks and Structural Engineering (MSc) <https://www.uni-weimar.de/en/civil-engineering/studies/master-degree-programmes/natural-hazards-and-risks-in-structural-engineering-master-of-science/>
- University of Twente, Netherlands, MSc Applied Earth Sciences- Natural Hazards, Risk and Engineering <https://www.utwente.nl/en/education/master/programmes/geo-information-science-earth-observation/specialization/applied-earth-sciences-natural-hazards-risk-engineering/#spatial-information-for-effective-disaster-risk-management>
- University of Copenhagen, Master of Disaster Management http://www.mdma.ku.dk/programme_layout/

The proposed study program Engineering Management for Natural Disasters Risk is compatible and comparable with the mentioned study programs plans and programs that are studied in a certain degree. Differences in the thematic and program units of particular subjects have been targeted for the up-to-date, modern and complete education of students from areas that are considered basic, while later direction of students achieves profiling of specific risk management issues from natural disasters through elective subjects.

1.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Integrated natural disasters risk management	2+2+0	5
2.	M	Building resistance to natural disasters	2+2+0	5
3.	M	Protection and rescue system	2+2+0	5
4.	E	Elective subject 1	2+2+0	5
5.	E	Elective subject 2	2+2+0	5
6.	E	Elective subject 3	2+2+0	5
		Risk management in geotechnical engineering		
		Seismic risk management		
		Drought and flood risk management		
		Sustainable development of settlements and natural disasters		
		Application of geographic information systems in risk management		
SECOND SEMESTER				

7.		Practice		2
8.		Research work	0+0+20	16
9.		Master thesis		12
Total			12+6+26	60

1.3 Subject specification

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK				
Level: Master Academic Studies				
The name of the course: Integrated natural disasters risk management				
Lecturer (Name, middle name, last name): Milorad S. Zlatanović				
Course status: mandatory				
Number of ECTS: 5				
Prerequisites: no				
Course objective				
Acquire theoretical and practical knowledge in the field of risk management from natural disasters. Specifically determine the structure and content of rehabilitation plans with inspection of construction remediation of terrain, facilities and infrastructure.				
Learning outcomes				
Students are trained to identify and manage risk from natural disasters while optimizing the use of available resources with appropriate software support.				
Content				
Theoretical teaching				
Introduction to Natural Disaster Management, importance of natural disaster management. Methodology of Identification and Risk Assessment, Existing Measures for Risk Prevention of Natural Disasters. Techniques used in integrated risk management from catastrophic events. Structure and content of rehabilitation plans with inspection of construction measures of remediation of terrain and facilities. Technology of performing works on the repair and repair of damaged structures and infrastructure. Planning, Planning Methods, Software Support. Organizational structure and organization of work on cleansing and rehabilitation. Management by implementing planned measures.				
Practical teaching				
Designing a project for Risk Management from Natural Disasters; or create seminar work in the field of risk management from natural disasters (student choice).				
Literature				
1. Birkmann, J., Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societes, UNU press, 2004.				
2. S.N. Ghosh, Flood Control and Drainage Engineering, CRC Press, New York.				
3. Larry E. Keesen, The Complete Irrigation Workbook: Design, Installation, Maintenance and Water Management, CreateSpace Independent Publishing Platform, New York, 2013.				
Number of classes of active teaching 60				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods				
Lectures, exercises, research work, consultations, project or seminar work.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		5	written exam	30

practical teaching	5	oral exam	40
colloquia			
seminar paper	20		

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK			
Level: Master Academic Studies			
The name of the course: Building resistance to natural disasters			
Lecturer (Name, middle name, last name): Slaviša R. Trajković, Milan Lj. Gocić			
Course status: mandatory			
Number of ECTS: 5			
Prerequisites: no			
Course objective Getting acquainted with the causes of the consequences and consequences of all kinds of natural disasters. Analysis of their impact on the environment. Acquire theoretical and practical knowledge in the field of building resistance to natural disasters.			
Learning outcomes Understanding and Critical Risk and Resistance Analysis. Interpretation and evaluation of different approaches to the problem of building resistance to natural disasters. Evaluation of the cost and use of measures to increase the resistance to natural disasters.			
Content <i>Theoretical teaching</i> Concept and division of natural disasters. Earthquakes, earthquake formation, earthquake types. Measures of Earthquake Protection. Climates, causes of landslides. Protection measures against landslides. Floods, flooding, flooding. Flood protection measures. Dry, split dry, dripping patterns, dew indicators. Dust protection measures. Extreme rainfall and temperature. Protection measures. Forest fires .. Measures of forest fire protection. Biological Natural Disasters - Epidemics. Preventive-medical protection measures. Natural disasters that are not characterized by Serbia (volcanoes, tsunamis, ...). Protection measures. Building capacity to reduce the consequences of disaster. Management of disaster recovery projects. Reducing the risk of natural disasters. Community engagement and participation in reconstruction. Protecting and empowering women and other vulnerable groups. Social renewal effects. <i>Practical teaching</i> Designing a project for Risk Management from Natural Disasters; or create seminar work in the field of risk management from natural disasters (student choice).			
Literature 1. Nathan Marz, James Warren, Big Data: Principles and best practices of scalable realtime data systems, Manning Publications, New York, 2015. 2. Jaynal Abedin, Kishor Kumar Das, Data Manipulation with R - Second Edition, Packt Publishing, New York, 2015. 3. A.R. Rao, E.-C. Hsu, Hilbert-Huang Transform Analysis of Hydrological and Environmental Time Series, Springer, London, 2008.			
Number of classes of active teaching 60			Other
Lectures: 30	Exercises: 30	Other form of lectures:	
Study and research work:			
Teaching methods Lectures, exercises, research work, consultations, project or seminar work.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam*	40
practical teaching	5	oral exam	30

colloquia			
seminar paper	20		

* Students take a written exam if they have not passed the colloquiums.

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK			
Level: Master Academic Studies			
The name of the course: Protection and rescue system			
Lecturer (Name, middle name, last name): Milorad S. Zlatanović			
Course status: mandatory			
Number of ECTS: 5			
Prerequisites: no			
Course objective The object of the course is gaining knowledge about the system of protection and rescue of people under natural disaster conditions. As well as acquiring knowledge about planning methods and ways of organizing, as well as preventative measures.			
Learning outcomes Ability to plan preventative measures to reduce the risk of natural disasters, develop plans to mitigate the consequences of natural disasters, elaborate organizational charts and ways to mitigate the consequences of natural disasters (life and survival aid, cleansing and reconstruction of facilities and rehabilitation of facilities and infrastructure - Establishing a reliable construction organization on the reconstruction of the demolished area, starting with the selection of adequate locations, choice of construction materials and mechanization, quality designers, contractors and supervisors).			
Content <i>Theoretical teaching</i> Conceptual design, mission, goals, tasks of protection and rescue system. Entities, forces and means of protection and rescue system (state, local self-government, business and other legal entities, citizens and their associations). Organization and structure of protection and rescue system. Management, coordination and integration of forces of protection and rescue in natural disasters. Sector for Emergency Situations of the MUP. Civil protection system. Emergency staffs. Planning measures to eliminate the consequences of natural disasters. Organization and coordination of the actions of the forces and resources of the protection and rescue system. Organization, strengths and means for carrying out search and rescue operations in various natural disasters. Evacuation and disposal system. Structure and content of rehabilitation plans according to current regulations with inspection of construction measures for remediation of terrain and facilities. Prederm and calculation of works. Construction machinery and its application. Price of construction work mechanization hours. Technique of purging works (depending on possible catastrophic events) and repair of damage to buildings and infrastructure. Planning Methods (CPMs, Ganttters) .Traveling and Remediation Works. Temporary facilities. Organizational structure and organization of work on cleansing and rehabilitation. Management by implementing planned measures.			
<i>Practical teaching</i> Creating an elaborate or drawing up a seminar (optional student).			
Literature 1. Lucien G. Canton, Emergency Management: Concepts and Strategies for Effective Programs, 2006, Wiley-Interscience, London 2. NASAR USA, Fundamentals of Search and Rescue, 2005, Jones&Bartlett Learning 3. M. Zlatanović, B. Matejević: Tehnologija i organizacija građenja, Građevinsko-arhitektonski fakultet, Niš, 2013.			
Number of classes of active teaching 60			Other
Lectures: 30	Exercises: 30	Other form of lectures:	
Study and research work:			

Teaching methods			
Lectures, exercises, research work, consultations, project or seminar work.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam*	40
practical teaching	5	oral exam	30
colloquia			
seminar paper	20		

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK
Level: Master Academic Studies
The name of the course: Risk management in geotechnical engineering
Lecturer (Name, middle name, last name): Nebojša M. Davidović, Zoran D. Bonić, Elefterija M. Zlatanović
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective
Introduction to risks and risks in geotechnics, risk assessment methodologies and risk management strategies, and mastering methods for preventing, mitigating and remedying the occurrence of terrain instability and damage to geotechnical structures in different geotechnical conditions.
Learning outcomes
Enabling students to successfully apply acquired knowledge in risk management in geotechnics upon completion of studies and participate in preventing, mitigating and remedying the occurrence of terrain instability and damage to geotechnical structures.
Content
<i>Theoretical teaching</i>
Hazard and risk in geotechnics. Risk Assessment Components. Risk management in geotechnics. Risk management from the occurrence of terrain instability (landslides, slopes). Causes of instability of the terrain (landslides, slopes). Forms. Recognition. Activities to prevent or reduce the harmful effects of the onset of instability in the terrain (in the start-up phase or in the initial stage of development). Rehabilitation of the landslide. Emergency remediation measures. Making drainage. Solid and reinforced concrete walls. Gabion support walls. Retaining walls made of reinforced soils. Anchored support structures. Support structures on piles. Drainage repair. Steel protection nets. Protective barriers. Galleries. Risk management of earthquakes and effects on soil and geotechnical structures. Specificity of problems in risk management. The economic and social aspect of the consequences of the earthquake. Estimation of the potential of dynamic instability of the terrain. Classification by earthquake caused damage to geotechnical structures and estimation of losses. Geotechnical measures to reduce seismic risk. Rehabilitation measures of geotechnical structures.
<i>Practical teaching</i>
Preparation of computational examples from the field of theoretical lectures, field teaching, presentation of characteristic examples and application of new technologies in geotechnics.
Literature
1. Ibrahimović, A., Mandžić, K. (2003): Sanacija klizišta, Rudarsko-geološko-građevinski fakultet
2. Lukić, D., Anagnosti, P. (2010): Geotehnika saobraćajnica, Građevinski fakultet Subotica.
3. Čorić, S. (2006): Geostatički proračuni, Rudarsko-geološki fakultet Beograd.
4. Dervišević, R., Ferhatbegović, Z. (2014): Živeti na klizištu, TPO fondacija, Tuzla.
5. Nacionalna strategija zaštite i spasavanja u vanrednim situacijama, Sl. Glasnik RS, br. 86/2011.
Number of classes of active teaching 60
Other

Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods				
Lectures, practical lessons, colloquiums, field lessons, consultations, study research. Work.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		min 2,0 – max 5,0	written exam*	min 20 – max 40
practical teaching		min 2,0 – max 5,0	oral exam	max 30
colloquia		min 2×10=20 max 2×20=40	A student may take an oral exam if he has scored at least 36 points.	
seminar paper		min 2×6=12 max 2×10=20	The student passed the exam when he scored more than 50 points.	

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK
Level: Master Academic Studies
The name of the course: Seismic risk management
Lecturer (Name, middle name, last name): Dragan Zlatkov, Biljana Mladenović, Marija N. Spasojević Šurdilović
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective Acquiring knowledge necessary to assess seismic hazard, reduce seismic risk, and manage this risk.
Learning outcomes Competence for the practical application of acquired knowledge in the seismic risk management process.
Content <i>Theoretical teaching</i> <ul style="list-style-type: none"> - General about earthquakes: causes of earthquake and earthquakes, seismic waves, earthquake earthquake characteristics, earthquake registration, intensity of seismic activity and seismic scale, material damage and human casualties. - Assessment of seismic hazard and risk, return period of earthquake, probability of overcoming seismic events in the lifetime of the building. - Mitigation of seismic risk. Design and construction in accordance with the principles of aseismic design. Seismic safety and reinforcement of existing facilities. - Earthquake Preparedness. - Managing the activities of professional services after the earthquake. - Manage remediation of damaged objects. Classification of damages on construction objects Methodology of examination and assessment of the actual condition and safety of damaged construction objects. <ul style="list-style-type: none"> - Professional cooperation and communication. <i>Practical teaching</i> Exercises The exercises follow lectures and the exercise program is identical to the lecture program.
Literature <ol style="list-style-type: none"> 1. S. Janković: Osnovi seizmičkog planiranja i projektovanja, Univerzitet Crne Gore, Građevinski fakultet, Podgorica, AGM knjiga, Beograd, 2014. 2. B.Pavićević: Aseizmičko projektovanje i upravljanje seizmičkim rizikom, Univerzitet Crne Gore, Podgorica, 2000. 3. M.Hrasnica: Aseizmičko građenje, Građevinski fakultet Univerziteta u Sarajevu, Sarajevo, 2012. 4. D.Aničić, P.Fajfar, B.Petrović, A.S.Nosan, M.Tomažević: Zemljotresno inženjerstvo-visokogradnja,

- Građevinska knjiga Beograd, 1990.
5. G.S.T. Armer: Monitoring and Assessment of Structures, SPON Press, London & New York, 2001.
4. Pravilnik o tehničkim normativima za izgradnju objekata visokogradnje u seizmičkim područjima, Službeni list, SFRJ, br. 31/81 i dopune br.49/82, 29/83, 21/88 i 52/1990.
6. Nacrt Pravilnika o tehničkim normativima za projektovanje i proračun inženjerskih objekata u seizmičkim područjima, Savezni zavod za standardizaciju, br. 07-93/96, 1987, Beograd.
7. Pravilnik o tehničkim normativima za sanaciju, ojačanje i rekonstrukciju objekata visokogradnje oštećenih zemljotresom za rekonstrukciju i revitalizaciju objekata visokogradnje, Službeni list SFRJ, br.51/81 Beograd.
8. Evrokod 8, Proračun seizmički otpornih konstrukcija, Deo 1: Opšta pravila, seizmička dejstva i pravila za zgrade, prevod na srpski jezik, Građevinski fakultet, Univerzitet u Beogradu, 2009.

Number of classes of active teaching 60				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Lectures, exercises, consultations, preparation and defense of seminar work.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	10	written exam		
practical teaching		oral exam	30	
colloquia	30			
seminar paper	30			

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK
Level: Master Academic Studies
The name of the course: Drought and flood risk management
Lecturer (Name, middle name, last name): Borislava D. Blagojević, Milan Lj. Gocić, Predrag Popović
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective
The objective of the course is to introduce students to the causes of extreme climate events such as droughts and poles, as well as possible consequences for property and human lives.
Learning outcomes
Students will be introduced to methodology and measures to protect themselves from floods and drought, and after passing the exam, they will be qualified to plan and anticipate potential risks to property and population, vulnerability and vulnerability of people, and define and plan measures for protecting and saving people and property in conditions of drought and flooding.
Content
<i>Theoretical teaching</i>
Introduction to the management of drought and flood risks, defining terms and concepts. Drought distribution and ways of quantifying them. Division of floods and causes of their formation. Passive and active measures of drought and flood protection. The basic elements of defensive objects (accumulations, dams, embankments, quay walls, reservoir channels) and the determination of the return period on which the defensive objects are built. Dry and flood protection equipment. Rules for the defense of drought and floods. Regular and extraordinary defense. Measures taken in case of accidental situations caused by demolition of embankments and dams.
Uncertainty in risk assessment of drought and floods. Remediation of the consequences of extreme floods and droughts.
<i>Practical teaching</i>

Drought indices: definition, division, and budgeting methods. Selecting the drought index depending on the number of parameters measured. Parameters for flood characterization. Transformation of the flood wave. Determination of minimum time required for evacuation as a result of the breakdown of embankments and other defenses.

Literature

1. S.N. Ghosh, 2013. Flood Control and Drainage Engineering, CRC Press, New York.
2. Vijay Singh, 2015. Entropy Theory in Hydrologic Science and Engineering, McGraw-Hill Education, New York.
3. A.R. Rao, E.-C. Hsu, 2008. Hilbert-Huang Transform Analysis of Hydrological and Environmental Time Series, Springer, London.
4. Peter J. Brockwell, Richard A. Davis, 2010. Introduction to Time Series and Forecasting, Springer, London.
5. Nacionalna strategija zaštite i spasavanja u vanrednim situacijama, Sl. Glasnik RS, br. 86/2011.

Number of classes of active teaching 60

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
30	30			

Teaching methods

Teaching is carried out through auditory lectures followed by slides and auditory exercises that deepen the solution of certain problems. Lectures and exercises are accompanied by a large number of examples from practice. It is also planned to lecture representatives of some of the institutions and companies, and visits to institutions and companies, which are characteristic of some of the areas that are processed in teaching units.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	20
practical teaching		oral exam	20
colloquia	30		
seminar paper	20		

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK

Level: Master Academic Studies

The name of the course: Sustainable development of settlements and natural disasters

Lecturer (Name, middle name, last name): Petar Mitković

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Overcoming basic knowledge in the field of urbanism in the conditions of natural disasters.

Learning outcomes

By realizing the program students can acquire basic knowledge about urban planning and issues of urban environment development in the conditions of natural disasters.

Content

Theoretical teaching

- Types of planning documents in urban and spatial planning.
- Current regulations in spatial planning and urban design.
- Elements of sustainable development of settlements.
- Significance and development of cities through history.
- Urbanization as a process.
- Modern cities, their characteristics and problems.
- Functioning of city systems.

- Sustainable development of cities.
- Contemporary approach to planning sustainable cities.
- Analyzing the possibility of including risk analysis within the applicable legal solutions.
- Identification and analysis of risks from natural disasters in the preparation of planning documents.
- The concept of vulnerability.
- Analysis of existing plans and perception of applied conceptual solutions from the aspect of protection from natural disasters.
- Case studies - analysis of valid planning documents (all levels) and analysis of events from the previous period.

Practical teaching

During the semester, students independently work on seminar work in the area of sustainable development of the settlement.

Literature

1. Jelena Mijić - Vučković, Grad – juče, danas, sutra, Narodna knjiga, Beograd, 2005.
2. United Nations Human Settlements Programme (UN-HABITAT), Land and Natural Disasters, 2010.

Number of classes of active teaching 60				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	

Teaching methods

Lectures, practical lessons, colloquiums, field lessons, consultations, study research work.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam*	40
practical teaching		oral exam	30
colloquia	40		
seminar paper	20		

* Students take a written exam if they have not passed the colloquiums.

Study programme: ENGINEERING MANAGEMENT FOR NATURAL DISASTERS RISK

Level: Master Academic Studies

The name of the course: Application of geographic information systems in risk management

Lecturer (Name, middle name, last name): Borislava D. Blagojević

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Getting acquainted with the basic settings and possibilities of applying geographic information systems (GIS). Co-operation with the QGIS package in order to manage seismic, geotechnical and hydrotechnical risks.

Learning outcomes

The student is able to develop and manage projects in the area of risk management using GIS software.

Content

Theoretical teaching

- Information systems. Geographic Information Systems (GIS) (definition, components, origin and development).
- Spatial data (types, structures, collection, input and sources)
- Spatial data (global positioning system, remote detection).
- Database.
- Standards in GIS. Basic functions.
- Project planning in GIS;

- Creating a database;
- Preparation of data for analysis;
- Analysis in GIS;
- Showing results;
- Examples of the application of GIS in the management of hydrotechnical risks;
- Examples of the application of GIS in the management of seismic and geotechnical risks;
- Situation in the world and Serbia - cooperation in the fields of data collection, processing, analysis and disclosure of information of importance through GIS;
- Defense seminar work;
- Recapitulation and discussion.

Practical teaching

QGIS - display basic concepts, tools, work with spatial data and database models. Supervised work on a computer on an individual or group project; Creation of an individual or group project (depending on the size of the group), presentation of results in the form of seminar work. Preparation of presentation and defense of seminar work.

Literature

1. Jovanović, V., Đurđev, B., Srđić, Z., Stankov, U. Geografski informacioni sistemi. Univerzitet Singidunum i Univerzitet u Novom Sadu. Beograd, 2012.
2. QGIS 2.2 Priručnik za obuku: https://docs.qgis.org/2.2/en/docs/training_manual/
3. Internet izvori za potrebe izrade seminarskog rada (nadgledani izbor).

Number of classes of active teaching 60

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
30	30			

Teaching methods

Lectures: A living word method (monologic) with the use of audiovisual means.

Exercises: Working on a computer with help and independently.

Study research work: Independent research work, literature review, group discussion, writing seminar work and oral defense.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
testing knowledge-test	25	oral exam	30
creating a project on exercises	15		
seminar paper	30		

1.4 Link between competencies and subjects

		MANDATORY SUBJECTS			ELECTIVE SUBJECTS				
		MS1	MS2	MS3	ES1	ES2	ES3	ES4	ES5
Generic competencies	communication	x		x				x	x
	critical thinking	x	x	x	x	x	x	x	x
	scenario modeling	x	x		x	x	x	x	
	creativity	x	x	x	x	x	x	x	x
	initiative	x	x	x	x	x	x	x	
	prediction of solutions and consequences	x	x	x	x	x	x	x	
	collaboration	x		x	x	x	x	x	x
	working in multidisciplinary team	x	x	x			x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x	x		x	x	x	x	

	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x	x				x	x	
	social and civic responsibility	x	x	x			x	x	x
	development of professional ethics and responsibility	x		x					x
	effective leadership	x		x					x
	strategic thinking	x	x	x			x	x	x
	identification and analysis of problems in NDRM	x	x		x	x	x	x	
	experience-based critical decision making	x	x	x			x	x	
	staying up-to-date with technological development	x	x		x	x	x	x	
	holistic and proactive approach to NDRM situations	x		x			x	x	
	clearly and unambiguously transfer knowledge to the professional and wider public	x		x	x	x	x	x	x
Subject-specific competencies	understanding of climate changes and natural disasters	x	x		x	x	x	x	x
	awareness of the complex and overlapping nature of disaster	x	x		x	x	x	x	x
	mastering of methods, procedures and processes of risk identification	x			x	x	x	x	
	understanding the causes and consequences of disasters	x	x	x	x	x	x	x	x
	devising strategies and developing methodology and methods of emergency as part of NDRM	x	x	x				x	
	optimizing and managing available resources in emergency as part of NDRM systems	x	x	x			x	x	
	statistical data processing in order to define and make adequate conclusions	x	x	x	x	x	x	x	
	integrated management in natural disaster situations	x	x					x	
	understanding of civil protection mechanism and institutional framework in NDRM	x	x	x				x	x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x		x	x	x	x	
	natural disasters analysis and risk assessment	x	x		x	x	x	x	
	knowledge about prevention, mitigation, response and recovery operations	x	x	x				x	x
	applying ICT in NDRM	x	x		x	x	x	x	
	development of human resources in NDRM	x		x					x
	applying specialized civil engineering fields in NDRM	x	x	x	x	x	x	x	
	protection of critical infrastructure in natural disaster situations	x		x	x	x	x	x	
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods	x	x				x	x	
	cognizant of the needs of special populations	x	x	x			x	x	x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x	x				x	x	

- MS1 - Integrated natural disasters risk management
- MS2 - Building resistance to natural disasters
- MS3 - Protection and rescue system
- ES1 - Seismic risk management
- ES2 - Risk management in geotechnical engineering
- ES3 - Drought and flood risk management
- ES4 - Water resources management in natural disasters' situations
- ES5 - Institutional framework for natural disasters risk management

2. University of Nis (UNI - FZNR)

2.1 Description of the study program

Name of study program and title

Master Academic Studies – MANAGEMENT OF EMERGENCY SITUATIONS

Title: Master engineer for protection from catastrophic events and fire

The purpose of the study program

The purpose of the study program Management of emergency situations is to educate master environmental engineers to work in accordance with the needs of society and for further academic development in line with modern safety requirements and emergency management in the future. The study program is designed to provide competencies and develop academic skills in the field of emergency management. Bearing in mind the social, economic and wider social significance of the security of people, natural and material assets related to emergency management, experts in this profile have socially and useful competences. Scientific disciplines and professional subjects at this level of study enable students to master specific theoretical knowledge and applied skills in emergency management, the development of critical thinking, teamwork skills and co-operation, while the variety of elective subjects stimulates both independence and creativity in creating study, as well as innovative and multidisciplinary approaches to managing the security system in emergency situations. Master study program provides opportunities for acquiring basic competences of scientific research work and development of professional and methodological culture for continuing education at doctoral studies.

Objectives of the study program

The main goal of the study program is to educate students for the application of scientific and professional achievements in solving the problems of security of people, natural and material goods and for development of emergency management system.

The specific objectives of the study program are acquiring the necessary knowledge and skills for:

- development of strategies for managing the emergency security system;
- development of plans and programs for response to accidents and for the coordination and management of accident recovery activities;
- development of strategic and tactical plans for intervention and rescue in emergency situations;
- protection of health and behavior in emergency situations;

- implementation and development of project management concept in the field of emergency management;
- acquiring knowledge about information and communication networks and forms of communication in emergency situations;
- informing the public and appropriate structures in emergency situations;
- acquiring basic knowledge about the functions of civil protection;
- human resources management and efficient operation for the development of human resources in the field of emergency management;
- innovation activities and team work in emergency management;
- permanent education and development of the knowledge system in the field of emergency management.

Competencies of graduated students

By mastering the study program of master academic studies Management of emergency situations, students gain competencies for the application of scientific and professional distortions in solving security problems and development of emergency management systems.

Upon completion of the study program, students acquire general skills for:

- identifying and analyzing problems in the working and living environment and forecasting solutions and consequences;
- mastering procedures, processes and methods of risk identification;
- monitoring technology development and improving their knowledge;
- developing communication skills with immediate and wider environments;
- working in a team composed of professionals of different profiles (multidisciplinary team);
- development of professional ethics and professional responsibility.

Upon completion of the study program, the student acquires subject-specific skills, i.e. professional competence for:

- risk analysis and emergency management,
- analysis of cause-effect relationships and solving problems of security, protection of health, material goods and nature of created values in emergency situations,
- developing methodologies for managing emergency situations,
- developing strategies and methods for managing emergency situations,
- innovative activities and team work in emergency management,
- developing a knowledge management system in the field of emergency management.
- optimization and management of available resources in the emergency management system,
- project management and innovation in the emergency management system.

By completing the study program of Master Academic Studies, students acquire the competency for inclusion in academic and doctoral academic study programs in the same or related fields of study.

Quality, contemporary and international compatibility of the study program

Study program Management of emergency situations is the result of real needs for highly educated personnel in the field of security and emergency management. This is supported by the fact that the Department for Emergency Situations operates within the Ministry of the Interior of the Republic of Serbia. The study program is designed to ensure the acquisition of competencies and the development of academic skills in the field of emergency management, bearing in mind the social, economic and wider social significance.

The proposed study program is based on internationally accepted standards and recommendations for higher education and appreciates contemporary scientific and professional programs in this field at higher education institutions in Europe and the world.

The study program is realized through a multidisciplinary approach within the applicative content of subjects from the fields of natural, technical, technological, social-humanistic and medical sciences with the aim of achieving competencies, academic knowledge and skills and their application.

The study program, respecting the specifics of the educational space and the needs for university education in the Republic of Serbia, is harmonized with the European standards regarding the enrollment conditions, the duration of studies, the conditions for transition to next year, the acquisition of a diploma and the manner of studying, especially with the outcome of study programs, with the competencies of master students.

The study program of graduate academic studies Management of emergency situations provides students adequate basics for continuing education at doctoral study programs at the Faculty or other higher education institutions in the same or related fields of study.

The study program is comparable and harmonized with the study programs of the following scientific and educational institutions:

- University of Copenhagen - Emergency Management,
- University of Newcastle, UK, Master in Disaster and Reconstruction, University of Newcastle, UK, Master of Disaster Preparedness and Reconstruction,
- Metropolitan College in New York - Disaster Management and Emergency Situations,
- University of Copenhagen - Risk management and engineering protection.

2.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Emergency Management Systems	2+2+0	5
2.	M	Fire dynamics	2+2+0	5
3.	M	The theory of human error	2+2+0	5
4.	M	Risk and recovery of the accident	2+2+0	5
5.	E	Elective subject 1	2+2+0	5
6.	E	Elective subject 2	2+2+0	5
		Project Management		
		Decision making theory		
		Psychology of groups		
		Public relations		
		English language		
SECOND SEMESTER				
7.	M	Civil protection	2+2+0	5
8.	M	Tactics of intervention and rescue	2+2+0	4
9.	E	Elective subject 3	2+2+0	4
10.	E	Elective subject 4	2+2+0	4
		System engineering		
		Human resource management and development		
		Information systems in protection		
		Information-communication networks		
		Fire expertise		
		Health protection		
11.		Practice		3
12.		Master thesis		10
Total			24+16+0	60

2.3 Subject specification

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS
Level: Master Academic Studies
The name of the course: Emergency Management Systems
Lecturer (Name, middle name, last name): Anđelković M. Branislav
Course status: mandatory
Number of ECTS: 5
Prerequisites: no

Course objective Acquiring knowledge about the causes, development and consequences of emergencies and institutional frameworks for emergency management.				
Learning outcomes Ability to recognize the phenomenon of an emergency situation and to understand the causes, effects and institutional frameworks for emergency management.				
Content <i>Theoretical teaching</i> Extraordinary situations - basic concepts, classifications, characteristics, development phases. Natural emergencies - earthquakes, landslides, floods, hurricanes, tsunami, natural fires, infectious diseases (characteristics and effects). Technical emergency situations - classification of technological systems according to the degree of danger; causes of emergencies: technology, people, shock waves, fires, dangerous goods, financial operations; technological disasters - in the chemical industry, oil industry, transport. Extraordinary situations of ecological character. Extraordinary situations of social character - social unrest, terrorist actions, diversions. Institutional Framework for Emergency Management - Policy, Regulatory, Supervision, Personnel and Certification of Technologies and Products, Insurance. <i>Practical teaching</i> Preparation of seminar papers on a given topic in the field of emergency situations, their presentation and defense.				
Literature 1. B. Anđelković, Rizik tehnoloških sistema i profesionalni rizik, Jugoslovenski savez Društava inženjera i tehničar zaštite, Niš, 2002. 2. B. Anđelković, I. Krstić, Tehnološki procesi i životna sredina, Univerzitetski udžbenik, Jugoslovenski savez Društava inženjera i tehničara zaštite, Niš, 2002. 3. B. Anđelković, Priručnik za obuku lica pri prevozu i radu sa opasnim materijama, Jugozaštita, Beograd, 2005.				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Lectures (interactive classes), computational and laboratory exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching		oral exam		40
colloquia	25			
seminar paper	25			

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS	
Level: Master Academic Studies	
The name of the course: Fire dynamics	
Lecturer (Name, middle name, last name): Dušica J. Pešić	
Course status: mandatory	
Number of ECTS: 5	
Prerequisites: no	
Course objective Acquiring fire knowledge as a dynamic process that takes place in time and space.	
Learning outcomes Understanding fire dynamics as a basis for dealing with preventive, repressive and sanitary fire	

protection.				
Content				
<i>Theoretical teaching</i>				
Phases of development of fire. Basic parameters of the development of fire within certain development phases. Events that follow the dynamics of fire (flash-over, backdraft, blew ...). The dynamics of fire in time and space (both indoors and outdoors). Influence of environmental parameters on the development of fire.				
Fire thermodynamics (gaseous mixture of products of combustion and air as an open thermodynamic system, differential equations of mass, energy, component composition of products, thermal and temperature regime of fire ...).				
Modeling and simulation of fire dynamics.				
<i>Practical teaching</i>				
Computational exercises: Calculating fire parameters.				
Computational classes: Training students for using FDS software packages, ALOHA ...				
Seminars: Creation and presentation of seminar papers according to the chosen theme, discussion.				
Literature				
1. D. Jovanović, D. Tomanović: Dinamika požara, Fakultet zaštite na radu, Niš, 2002, str. 252				
2. D. Drysdale, An Introduction to Fire Dynamics, p. 512, Wiley & Sons, 2011				
3. G.H. Yeoh, K.K. Yuen, Computational Fluid Dynamics in Fire Engineering: Theory, Modelling and Practice, p. 517, Elsevier, 2009.				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods				
Lectures and presentations of teachers; Computational exercises; Computer exercises; Seminars; Consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	20
practical teaching		5+5	oral exam	20
colloquia		15+15		
seminar paper		10		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS			
Level: Master Academic Studies			
The name of the course: The theory of human error			
Lecturer (Name, middle name, last name): Evica I. Stojiljković			
Course status: mandatory			
Number of ECTS: 5			
Prerequisites: no			
Course objective			
Acquiring knowledge about the nature of human behavior and the causes of human error, as well as methods for identifying and quantifying human error.			
Learning outcomes			
A student who successfully mastered the foreseen program content is able to: understand the nature and causes of human error, apply methods for identifying and quantifying human errors, evaluating the risks of human error, providing appropriate proposals for reducing human error to an acceptable level.			
Content			
<i>Theoretical teaching</i>			

Concept, definition and classification of human errors. Nature and causes of human error. Human error theories. Basic steps in estimating human error. Recognizing human error. Defining the problem. Analysis of tasks. Analysis of human error. Identification of human error. Error presentation. Checking the significance of the error. Evaluation of the impact of the error. Human error databases, mechanisms and factors of impact shaping. Methods for identifying human error (HAZOP, SHERPA, ...). Human error quantification methods - absolute probability estimation method, success rate method, method for predicting human error level, estimation method and human error reduction. Mitigation of human error: reduction, models of operator training for risk management, quality assurance, documentation. Synergy method. Case studies - practical application of methods.

Practical teaching

Audio-visual and computational exercises that follow theoretical instruction, presentation and defense of seminar papers in the areas covered by the theoretical content of the subject.

Literature

1. Stojiljković, E. (2013). Teorija ljudskih grešaka (interni materijal za pripremu ispita).
2. Stojiljković, E. (2011). Metodološki okvir za procenu ljudske greške. Doktorska disertacija. Niš: Fakultet zaštite na radu u Nišu.
3. Grozdanović, M. (1999). Ergonomsko projektovanje – delatnosti čoveka operatora. Niš: Fakultet zaštite na radu u Nišu.
4. Spurgin, J. A. (2010). Human Reliability Assessment: Theory and Practice. CRC Press. Taylor and Francis Group, LLC

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	2			

Teaching methods

Lectures, exercises, consultations. Multimedia lectures and exercises. The lectures give basic settings and examples related to the subject matter of the subject. At exercises, students perform calculus tasks that follow theoretical instruction and seminar papers using information technology.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	40
practical teaching		oral exam	
colloquia	30		
seminar paper	20		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS

Level: Master Academic Studies

The name of the course: Risk and recovery of the accident

Lecturer (Name, middle name, last name): Nenad V. Živković, Amelija V. Đorđević

Course status: mandatory

Number of ECTS: 5

Prerequisites: no

Course objective

Acquiring knowledge about procedures and methodological approaches for: identifying a risky object, determining the possible level of accident, protection measures, phases and rehabilitation procedures.

Learning outcomes

Ability to develop accident prevention policy, safety report, protection panes and rehabilitation plans.

Content

Theoretical teaching

Identification of risky objects. Materials subject to accident risk assessment. Limit quantities in the

process. Assessment of program level of accident: first, second, third program level. Analysis of consequences beyond the risky object complex: selection of modeling methods, scenarios of the worst possible case of hazardous substances release, alternative scenarios for the release of hazardous substances. Prerequisites for model design. Evaluation of the distance from the danger limit. Determining harmful objects outside the risky object complex. Accident risk assessment: selection and preliminary analysis of facilities, risk assessment caused by major accidents, risk assessment of continuous emissions. Risk maps: toxicological impacts, shock wave explosions, thermal influence. Measures of protection on facilities and installations. Rehabilitation of the accident, phases, procedures.

Practical teaching

Risk Assessment by Methodology for Rapid Risk Assessment - REHRA. Risk assessment by methodology EPA, CEEPO. Risk assessment by applying the Rulebook on the chemical risk assessment methodology. Accident prevention policy. Report on the state of security. Plan of accident protection. Plan of rehabilitation.

Literature

1. V. Nikolić, N. Živković, Bezbednost u radnoj i životnoj sredini, vanredne situacije i obrazovanje, Fakultet zaštite na radu u Nišu, Niš, 2010., str.330., CIP (monografija nacionalnog značaja).
2. S. Savić, M. Stanković, Simstemska analiza i teorija rizika, Zaštita pres, Beograd, 2002. str. 145.
3. Pritučnik za razvrstavanje i utvrđivanje prioriteta među rizicima izazvanim velikim nesrećama u procesnoj i srodnim industrijama, IAEA-TECDOC-727, Ministarstvo zaštite okoliša i prostornog uređenja, Zagreb, 2001., str. 59.
4. Opće smjernice za programe upravljanja rizicima (40-CFR-68), Ministarstvo zaštite okoliša i prostornog uređenja, Zagreb, 2001. str.72.
5. Utvrđivanje i procjena opasnosti u lokalnoj zajednici, Ministarstvo zaštite okoliša i prostornog uređenja, Zagreb, 2001

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	2			

Teaching methods

Oral presentation (lectures), preparation of the project task, defense of the project task at the exercises, discussion.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	40
practical teaching		oral exam	
colloquia	15+15		
seminar paper	20		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS

Level: Master Academic Studies

The name of the course: Project Management

Lecturer (Name, middle name, last name): **Srđan M. Glišović**

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Acquiring knowledge about the concept and implementation of the principles of project management in preventive engineering and other organizational / technical disciplines.

Learning outcomes

By mastering the program content students gain the ability to organize project activities, implement the

concept of project management in the field of work and environment protection, and use modern software tools for project management.

Content

Theoretical teaching

Development of the concept of project management. Project: concept, framework, goal. Planning, selection, resource identification, critical factors, project integration. SWOT analysis, SMART goals. Process groups and project life cycle. Project Planning, Logical Framework Matrix (LFM). Methods and techniques of planning: gantograms, network diagrams - determination of the critical path (CPM method). Rules for drawing and numbering, time analysis. Structural diagrams WBS - PBS - OBS. Organization of project management. Quality management of the project - managing the scope, time, costs, evaluating the progress of the project. Risk management within the project. Implementation of the project. Monitoring and control. Information tools for project management. Introduction to MS Project. Project management in environmental engineering.

Practical teaching

Audio-visual exercises that follow theoretical lessons, implementation of software project management tools (MS Project), implementation of CPM methods, presentation and defense of a project task from areas covered by the theoretical content of the subject.

Literature

1. Jovanović P. (2005): Upravljanje projektom, FON, Beograd
2. Stanimirović P. (2009): Mrežno planiranje i MS PROJECT, PMF, Univerzitet u Nišu
3. Jovanović P. (2006): Kako postati dobar projektni menadžer, Viša škola za projektni menadžment, Beograd, str. 21-25; 31-33; 35-39; 63-69; 54-61.
4. Sigfried Gehrecke (1996), Ekološki Menadžment I, FON, Univerzitet u Beogradu, A26-A32
5. Heerkens G.R., (2002): Project Management. New York, NY: McGraw-Hill.
6. H. Kerzner, Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Eighth Edition. Hoboken, NJ: John Wiley & Sons, Inc, 2003
7. PMI, A Guide to the Project Management Body of Knowledge, Third Edition (PMBOK Guide). Newtown Square, PE: Project Management Institute, 2004
8. H. Kerzner. Project Management Case Studies, Willey, 2004

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	2			

Teaching methods

Lectures, exercises, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	20
practical teaching	10	oral exam	20
colloquia	35		
seminar paper	5		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS

Level: Master Academic Studies

The name of the course: Decision making theory

Lecturer (Name, middle name, last name): Miomir S. Stanković, Mirjana V. Vidanović

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Acquiring knowledge about the types and characteristics of decision making and decision support systems.

Learning outcomes

Developed students' skills to make rational decisions in different conditions and requirements of the environment.

Content

Theoretical teaching

Basic decision making theories. Decision Analysis. Sampling decision-making analysis, sampling decision analysis. Decision tree and sequential decision making. Utility theory. An unambiguous theory of uncertainty. Multi-patriotic theory of utility. Multicriterial analysis methods. Group decision making. Information systems and systems for decision support and group decision making. Expert systems. Knowledge-based decision support systems. Intelligent decision support systems. Internet and decision support.

Practical teaching

Preparation of a Project for Managing Risks from Natural Disasters; or Preparation of seminar paper in the field of risk management from natural disasters (at the student's choice).

Literature

- Čupić, M., Rao Tummala, M. V., Suknović, M. (2001). Odlučivanje : formalni pristup, Beograd.
- Teale, M., Dispenza, V., Flynn, J., Currie, D. (2003). Management, Decision-Making : Towards an Integrated Approach, Harlow, England: Prentice Hall.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	2			

Teaching methods

Lectures and calculus / auditory exercises.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam	40
practical teaching	5	oral exam	
colloquia	30		
seminar paper	20		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS

Level: Master Academic Studies

The name of the course: Psychology of groups

Lecturer (Name, middle name, last name): Snežana B. Živković

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Acquiring knowledge about the psychological characteristics of the personality for work and behavior under conditions of uncertainty, the rules applicable to groups and the way of acting in emergency situations.

Learning outcomes

Acquired knowledge should: empower a student to do business in emergency and extraordinary events; enable recognition of certain situations and behaviors of individuals and their timely and adequate suppression; instructions on an adequate choice of associates; contribute to making decisions that will be based on group psychology and the behavior of individuals in the group; encourage the professionalism of the group and facilitate individual successful engagement in a professional job.

Content <i>Theoretical teaching</i> Human factor in the organization. Adapting work to worker and worker. Motivation for work. Organization and group and organization as a group. Types of groups in the organization. Group formation and maintenance. Group relations. Group design and development. Influence of personality traits on group processes, group psychology. Leading and managing groups and groups. Group processes: cooperation, competition, conflicts, problem solving, decision making. Groups in crisis situations and right-wing events. Behavior of professional persons - formal groups, behavior of persons involved in helping professional professionals - non-professional groups and behavior of certain structures and categories of vulnerable persons or groups.				
<i>Practical teaching</i> Exercises, Other forms of teaching, Study research work, Development of current topics in the field of social psychology, interpersonal relations ...				
Literature 1. S. Živković, Psihologija grupa, Fakultet zaštite na radu u Nišu, Niš, 2012				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Oral presentation (lectures), guest lectures by eminent professors, seminar work on exercises, discussions, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	20
practical teaching			oral exam	20
colloquia		15+15		
seminar paper		20		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS	
Level: Master Academic Studies	
The name of the course: Public relations	
Lecturer (Name, middle name, last name): Vesna D. Miltojević	
Course status: elective	
Number of ECTS: 5	
Prerequisites: no	
Course objective Acquiring basic knowledge about methods and ways of informing and communicating with different structures (target groups) in order to acquire the communication skills necessary for the performance of engineering professions.	
Learning outcomes Acquiring theoretical and practical knowledge that will enable and train future engineers for a better understanding of communication practice in the field of emergency management and communal systems, and the acquisition of communication skills.	
Content <i>Theoretical teaching</i> Information: the concept and structure of information. Message: the term, structure, and types of messages. Informing: concept and information functions. Communication: concept and forms of communicative practice. Models and functions of information and communication systems. Mass, audience, public. Public relations - concept and parameters. Public Relations Strategy. Communication with the public, professional circles and competent authorities. Methods of public relations. Public	

Relations in Accidental Situations.				
<i>Practical teaching</i>				
Creation and defense of seminar papers.				
Literature				
1. Radojković, M. i Stojković, B. (2009). Informaciono komunikacioni sistemi. Beograd: CLIO				
2. Mandić, T. (2003). Komunikologija- psihologija komunikacije. Beograd: CLIO.				
3. Jovanović, Z. (2012). U vrtovima dodira : (primalna komunikacija). Beograd : Čigoja štampa i Niš : Filozofski fakultet.				
4. Blek, S. (2003). Odnosi s javnošću. Beograd: CLIO.				
5. Van de Walle, B., Turoff, M. & Hiltz S. R. (2009). Information Systems for Emergency Management. New York & London: M.E.Sharpe.				
Number of classes of active teaching				Other
Lectures:	Exercises:	Other form of lectures:	Study and research work:	
2	2			
Teaching methods				
Lectures (oral presentation), exercises (individual and group work), seminar papers, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching		oral exam		40
colloquia	30			
seminar paper	20			

Study programme: CATASTROPHIC EVENTS MANAGEMENT
Level: Master Academic Studies
The name of the course: English language
Lecturer (Name, middle name, last name): Milan Đ. Blagojević
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective
Training students to receive and produce extralinguistic information which implies the development of all four language skills: reading, writing, listening and speaking.
Learning outcomes
Average governance of syntactical and lexical English units necessary for written and oral communication in the profession.
Content
<i>Theoretical teaching</i>
The English language in the field of work and environment protection represents the discipline of the English language profession, which, in this regard, processes extralinguistic contents related to the academic and professional needs and interests of students in this study program. It is a combination of a general and specialized English language both in terms of lexical and syntax. The academic and professional needs of students, dictating the content of the work, are in this case related to areas such as: occupational safety, fire protection, environmental protection, emergency management, and management of the communal system.
<i>Practical teaching</i>
Exercises follow the contents of the lectures.
Literature

1. Dr Jelica Tošić, Environmental Science in English, Fakultet zaštite na radu, Niš, 2002. 2. Dr Jelica Tošić, Environmental Science Dictionary, Fakultet zaštite na radu, Niš, 2009. 3. C.A. Wentz, Hazardous Waste Management, New York: McGraw-Hill, 1989 4. http://en.wikipedia.org/wiki/Emergency .			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures:	
Study and research work:			
Teaching methods			
Lectures and exercises (interactive teaching), testing, consultations.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	20
practical teaching		oral exam	20
colloquia	25		
seminar paper	25		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS			
Level: Master Academic Studies			
The name of the course: Civil protection			
Lecturer (Name, middle name, last name): Emina R. Mihajlović			
Course status: mandatory			
Number of ECTS: 5			
Prerequisites: no			
Course objective			
Acquiring basic knowledge of the backgrounds and the way civil protection works in the emergency protection system.			
Learning outcomes			
Knowledge for organizing, coordinating and managing the civil protection activities in the event of an emergency.			
Content			
<i>Theoretical teaching</i>			
Civil protection in the protection and rescue system. International legal aspects of civil protection. Management of protection and rescue actions. Use of force and means of civil protection. Disaster management. Observation and excitation. Evacuation and rescue as a basic task of civil protection. Organization, means of receiving and announcement of the accident, depending on the type of accident and place of origin. Organizational structure of bodies and organizations involved in evacuation and rescue. Providing first medical assistance and medical care. Organization of traffic. Protection and disposal of material and cultural goods in the vulnerable zone. Protection of infrastructure facilities: water supply, electrical installations, roads ... Decontamination.			
<i>Practical teaching</i>			
Calculating the time needed for evacuation and rescue. Developing an evacuation and rescue plan. Selection of persons for conducting evacuation and rescue. Guiding the evacuation and rescue action.			
Literature			
1. Emina Mihajlović, Civilna zaštita, autorizovan rukopis za udžbenik u pripremi			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures:	
Study and research work:			
Teaching methods			

Lectures are based on meaningful verbal receptive learning: presentation of the starting frame, presentation of new material, linking with already acquired knowledge, introduction of appropriate examples, conclusions and linking with the starting framework. Exercises are based on interactive learning and work on the design of the project task.

Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam	
practical teaching	5	oral exam	40
colloquia	15+15		
seminar paper	20		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS	
Level: Master Academic Studies	
The name of the course: Tactics of intervention and rescue	
Lecturer (Name, middle name, last name): Dragan M. Mlađan	
Course status: mandatory	
Number of ECTS: 4	
Prerequisites: no	
Course objective	
Acquiring knowledge for developing strategic and tactical plans for intervention in emergency situations caused by fires and explosions.	
Learning outcomes	
Knowledge required for the organization, participation and development of plans for command and operational tactical operation in accidents.	
Content	
<i>Theoretical teaching</i>	
The notion of tactics. Application of tactical performances depending on the event. Basic tactical performances - procedures (reception of alerts, alerting units, estimation of the size of the event based on the announcement, the way to the place of events, assessment of the place of events, decision making about the performance, appearance of the units, logistical support, coordination of work of a number of units - basic and special). Tactical performances under unfavorable environmental conditions (bad weather conditions - rain, snow, wind, low visibility, fires below ground level - basements, underground garages, tunnels and metro). Determining the priority of intervening in complex conditions (more concurrent, by type of different events - spillage of dangerous substance and fire, fire and explosion with delusions, traffic accidents with fire and spillage of dangerous substance in the presence of captured persons in the means of transport ...). Strategic and tactical actions in interventions based on scope and level of accident and expected consequences (decision on evacuation of the population.	
<i>Practical teaching</i>	
Exercises: Exercises are part of calculus and are performed in a classroom and partly demonstrative, they are performed in the Department of Protection and Rescue in Nis.	
Literature	
1. Terebnev, V.V., Terebenev A.V., Podružnyi, A.V., Gračev, V.A. (2006). Taktičeskaja podgotovka dolžnostnyh lic organov upravljenja silami i sredstvami na požare, Moskva: Akademija gosudarstvennoj protivpožarnoi služby.	
2. Terebnev, V.V., Terebenev A.V. (2006). Upravljenje silami i sredstvami na požare. Moskva: Akademija gosudarstvennoj protivpožarnoi služby.	
3. Terebnev, V.V. (2007). Spravočnik rukovoditelja tušenija požara. Moskva: Centr propagandy	
Number of classes of active teaching	Other

Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Lectures and presentations of teachers; computational exercises; consultation.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	10	written exam		
practical teaching	10	oral exam	40	
colloquia	20+20			
seminar paper				

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS	
Level: Master Academic Studies	
The name of the course: System engineering	
Lecturer (Name, middle name, last name): Suzana M. Savić	
Course status: elective	
Number of ECTS: 4	
Prerequisites: no	
Course objective	
Acquiring knowledge about basic characteristics, processes and disciplines of system engineering and on models and methods of decision making and assessment of effectiveness.	
Learning outcomes	
Ability to connect engineering and managerial requirements in the process of analyzing and solving environmental problems, developing and applying methods and procedures for assessing the effectiveness of the environmental protection system and for engaging in teamwork and collaborative decision making.	
Content	
<i>Theoretical teaching</i>	
Introduction to System Engineering - a Modern Environment and System Engineering Requirements; system analysis (concept, phases, functions, advantages); system engineering and system life cycle. System engineering process - identification of user, operational requirements and environmental requirements; identification and ranking of performance measures; functional analysis; optimization. Basic disciplines of system engineering - software engineering, reliability engineering, maintenance engineering, human factor engineering, security engineering, manufacturing engineering, logistics engineering, quality engineering, environmental engineering, engineering economics (functions, basic processes, process interaction, methods of analysis). System Engineering Management - Planning and Organizing System Engineering Systems. Models and decision-making methods - decision-making alternatives, decision-making models, evaluation decisions, decision-making in terms of determining, in terms of risk and in uncertain terms. Models and methods for assessing the effectiveness of the environmental protection system.	
<i>Practical teaching</i>	
Audio-visual exercises that follow theoretical lessons; presentation and defense of seminar papers in the areas covered by the theoretical content of the course.	
Literature	
1. Blanchard, B.S. (2004). System Engineering Management. New Jersey: John Wiley&Sons, Inc. 2. Papić, Lj., Milovanović, Z. (2007). Održavanje i pouzdanost tehničkih sistema. Prijedor:DQM 3. Čupić, M., Suknović, M. (2010). Odlučivanje. Beograd: Fakultet organizacionih nauka	
Number of classes of active teaching	Other

Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Lectures, exercises, consultations				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	5	written exam		
practical teaching	5	oral exam	40	
colloquia	15+15			
seminar paper	20			

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS
Level: Master Academic Studies
The name of the course: Human resource management and development
Lecturer (Name, middle name, last name): Vesna M. Nikolić
Course status: elective
Number of ECTS: 4
Prerequisites: no
Course objective Mastering basic theoretical concepts of human resource management and development and understanding of their interconnectedness and influence. Acquiring knowledge and skills for effective operation for the development of human resources in the system of security and protection. Development of critical thinking about different aspects of human resources management and development. Consider the basic characteristics of human resources development in this area in national and international frameworks.
Learning outcomes Possession of a developed knowledge system on contemporary concepts, strategies and capabilities of human resources management; competencies - knowledge and skills for effective action for the development of human resources in the system of protection of working and environment
Content <i>Theoretical teaching</i> Basic concepts, characteristics and functions of human resources management. Needs, Impacts and Challenges of Human Resource Management Strategic Human Resource Management - concept, formulation, implementation, evaluation and audit. Management and development of human resources - theoretical, historical, legal - ethical and others. dimensions. Human resources planning. Analysis and design of work. Staffing. Human resources development - socialization and employee orientation, performance and motivation. Education and training. Career development of employees. Security, employee health, emergency situations in communal systems from human resource management discourse. Management of human resources development (assessment and evaluation of performance, relationships, organizational learning). Modern organization as a space for the development of human resources. <i>Practical teaching</i> Exercises, Other forms of teaching, Study research work. Review of current issues and problems of human resource management and development and consideration of their implications on the development of the system of work and environment protection through the preparation and defense of seminar papers. Case studies of human resources management and their development from the aspect of protection on the examples of different working organizations in national and international frameworks.
Literature 1. Nikolić, V., Menadžment ljudskih resursa, Fakultet zaštite na radu u Nišu (udžbenik u pripremi)

2. Nikolenko, N.P. Menadžment čelovečeskih resursov, Moskva, 2003.
3. Dessler, G. (2007). Osnovi menadžmenta ljudskih resursa, Beograd: Data status. (određena poglavlja)
4. Torrington, D., Hall, L., Taylor, S. (2004). Menadžment ljudskih resursa, Beograd: Data status. (odr.pog.)
5. Nikolić, V. (2012). Tendencije upravljanja i razvoja ljudskih resursa u budućnosti, uvodni referat, Zbornik radova: Upravljanje ljudskim resursima i sigurnost, Visoka škola za sigurnost, Zagreb, s.19-37.
6. Nikolić, V., Živković, N. (2010). Bezbednost radne i životne sredine, vanredne situacije i obrazovanje, Niš: Fakultet zaštite na radu.

Number of classes of active teaching				Other
Lectures:	Exercises:	Other form of lectures:	Study and research work:	
2	2			

Teaching methods

Lectures, presentations, creation and defense of seminar works, discussion and discussion, consultations.

Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	15+15		
seminar paper	20		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS
Level: Master Academic Studies
The name of the course: Information systems in protection
Lecturer (Name, middle name, last name): Bojana M. Zlatković
Course status: elective
Number of ECTS: 4
Prerequisites: no
Course objective
Acquiring knowledge about information systems and application of information systems in occupational safety.
Learning outcomes
Possession of knowledge about organization, types and application of information systems in occupational safety engineering.
Content
<i>Theoretical teaching</i>
Overview of information systems. Basic concepts of information systems. The concept, functions and components of information systems. Methods of analysis and design of information systems. Formation of information requirements and development of information systems, management of operation and use of information systems.
Availability and manner of implementation of information systems. Planning, developing or downloading, implementing and managing an infrastructure with information technology, data, and information processing systems at the organization level.
Areas of application of information systems. Information systems to support work with a large number of users. Decision support systems for protection. Collaborative systems. Security management systems. Application of information systems in environmental engineering.
<i>Practical teaching</i>
Exercises, Other forms of teaching, Study research work
Literature

1. Shay, W. A. Savremene komunikacione tehnologije i mreže. Čačak: Kompjuter biblioteka.			
2. Tanenbaum, A. S. Računarske mreže. Beograd: Mikroknjiga.			
3. Kelly R.R., Turban, E. Uvod u informacione sisteme. Beograd: Mikroknjiga.			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures:	
Study and research work:			
Teaching methods			
Lectures and calculus / auditory exercises.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching	20	oral exam	40
colloquia	30		
seminar paper			

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS			
Level: Master Academic Studies			
The name of the course: Information-communication networks			
Lecturer (Name, middle name, last name): Bojana M. Zlatković			
Course status: elective			
Number of ECTS: 4			
Prerequisites: no			
Course objective			
Acquiring knowledge about information and communication networks and forms of communication in emergencies.			
Learning outcomes			
Possession of knowledge about organization, types and applications of information and communication networks, as well as skills for their implementation and communication in emergencies.			
Content			
<i>Theoretical teaching</i>			
Information and communication technologies as the technological basis of information systems. Organizational Aspects of Information Systems. Technological aspects of information systems. Areas of application of information networks. Types of wireless communication systems. Evolution of the standards of mobile communication systems. Architecture of modern mobile systems. Satellite systems for global positioning. Computer networks. Network Architecture. Network hardware and software. Layered architecture of the communication network. Architecture OSI reference model. Topology of computer networks. IEEE 802.x standards. LAN and WAN networks. Client-server model. E-mail, FTP, HTTP, WWW. Networks of the sensor. Environmental Monitoring Networks. Application of information and communication networks in the protection of the working and environment.			
<i>Practical teaching</i>			
Exercises, Other forms of teaching, Study research work			
Literature			
1. Shay, W. A. Savremene komunikacione tehnologije i mreže. Čačak: Kompjuter biblioteka.			
2. Tanenbaum, A. S. Računarske mreže. Beograd: Mikroknjiga.			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures:	
Study and research work:			
Teaching methods			
Lectures and exercises are performed audibly - in the classroom, and in combination with audible -			

practical use of computer equipment, devices, devices and components of the fire alarm system and equipment, through parallel work of students during lectures and independent work during the exercise.

Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching	20	oral exam	40
colloquia	30		
seminar paper			

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS			
Level: Master Academic Studies			
The name of the course: Fire expertise			
Lecturer (Name, middle name, last name): Milan Đ. Blagojević			
Course status: elective			
Number of ECTS: 4			
Prerequisites: no			
Course objective			
Acquiring knowledge that is necessary for determining the circumstances and causes that led to the occurrence of a fire.			
Learning outcomes			
Knowledge that enables the organization of fire and knowledge expertise that enables independent or team explanation of the causes and circumstances under which the fire occurred.			
Content			
<i>Theoretical teaching</i>			
Definition of procedures and method of expertise. Expert selection. Organization of expertise. Study of possible causes that led to a fire or explosion: electrical power plants, electrical installations and devices, static electricity in various branches of industry, welding, self-heating of various materials and materials of chemical, vegetable origin, etc., natural causes of fire, ...			
Analysis of the appearance of materials, objects, parts of the building, means of transportation, etc. after a fire or explosion. Analysis of traces of fire and explosions (wood, glass, metal elements, constructive building elements of the building, ...), traces from outside and inside the building (roof structure, walls, doors, windows, electrical, gas, smoke installations). Methods for determining the center of fire or explosion. Phases of the work on the expertise. Photography and other registration techniques. Non-destructive and destructive physicochemical methods for testing labels in the laboratory. Complete reconstruction of the event and preparation of inspection records.			
<i>Practical teaching</i>			
Getting acquainted with the means and equipment for physical chemical examination of fire traces on the field and in the laboratory.			
Literature			
1. Aleksić, Kostić: Požari i eksplozije, ISBN 86-80261-34-			
2. Blagojević M.: Ekspertiza požara, (u pripremi), Fakultet zaštite na radu, Niš, 2013.			
3. Butorac B., Istraživanje uzroka požara, Hrvatska, 2001.			
Number of classes of active teaching			Other
Lectures:	Exercises:	Other form of lectures:	
2	2		
Teaching methods			
Lectures and exercises are performed audibly - in classroom, and in combination with audible - practical use of computer equipment, devices, devices and components of fire alarm system and burglary,			

through parallel work of students during lectures and independent work during exercise			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	20
practical teaching		oral exam	20
colloquia	20+20		
seminar paper	10		

Study programme: MANAGEMENT OF EMERGENCY SITUATIONS			
Level: Master Academic Studies			
The name of the course: Health protection			
Lecturer (Name, middle name, last name): Ljiljana M. Blagojević			
Course status: elective			
Number of ECTS: 4			
Prerequisites: no			
Course objective			
Acquiring basic knowledge in physiology and hygiene of work, on the impact of workload, working conditions and environment on the health status of employees and working ability.			
Learning outcomes			
Possession of knowledge to understand the impact of workload, working conditions and the environment on the health of employees. Development and supervision in the field of safety and health protection.			
Content			
<i>Theoretical teaching</i>			
Determinants of health and health effects of the most significant risk factors related to the work environment. Impact of work on psychophysiological processes; consequences that occur in a human organism under the influence of work (content, regime and organization of work) in a particular work environment. Neurological and psychological functions. Cardiovascular and respiratory system under conditions of physical effort. Adjustment of the body during work. Safety at work and protection measures for jobs with increased risk. Stress, professional stress and addiction diseases. Occupational diseases, work-related illnesses and professional traumatism. Preventive medical examinations. Assessment of working ability. Health care of special categories of persons.			
<i>Practical teaching</i>			
Exercises			
Literature			
1. Blagojević Lj., Životna sredina i zdravlje, Fakultet zaštite na radu u Nišu, Niš, 2012.			
2. Dalmacija B., Kontrola kvaliteta voda, Prirodno-matematički fakultet - Institut za hemiju, Novi Sad , 2011			
3. Mitrović R. i saradnici, Higijena, Medicinski fakultet Niš, 2009.			
4. Kristoforović-Ilić M, Komunalna higijena, Prometej Novi Sad, 2002.			
5. Kocijančić R., Higijena, Zavod za udžbenike i nastavna sredstva, Beograd, 2002.			
6. Radovanović Z. Najčešće bolesti i povrede, Epidemiologija, etiologija, prevencija, Beograd 2004			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures:	
Study and research work:			
Teaching methods			
Lectures, exercises (auditory and field), consultations, knowledge check (colloquium).			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits

activity during lectures	5	written exam	
practical teaching	5	oral exam	40
colloquia	30		
seminar paper	20		

2.4 Link between competencies and subjects

		MANDATORY SUBJECTS					
		MS1	MS2	MS3	MS4	MS5	MS6
Generic competencies	communication	x	x			x	x
	critical thinking	x	x		x	x	x
	scenario modeling	x		x	x		
	creativity	x	x	x		x	x
	initiative	x	x		x	x	x
	prediction of solutions and consequences	x	x	x	x	x	x
	collaboration	x	x			x	x
	working in multidisciplinary team	x		x	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x					
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x			x	x	x
	social and civic responsibility	x	x	x		x	x
	development of professional ethics and responsibility	x	x	x		x	x
	effective leadership	x	x	x		x	x
	strategic thinking	x	x	x		x	x
	identification and analysis of problems in NDRM	x			x	x	x
	experience-based critical decision making	x	x	x		x	x
	staying up-to-date with technological development	x			x		
	holistic and proactive approach to NDRM situations	x		x			
	clearly and unambiguously transfer knowledge to the professional and wider public	x			x		
Subject-specific competencies	understanding of climate changes and natural disasters	x		x		x	x
	awareness of the complex and overlapping nature of disaster	x			x	x	x
	mastering of methods, procedures and processes of risk identification	x		x			
	understanding the causes and consequences of disasters	x	x	x		x	x
	devising strategies and developing methodology and methods of emergency as part of NDRM	x			x		
	optimizing and managing available resources in emergency as part of NDRM systems	x		x		x	x
	statistical data processing in order to define and make adequate conclusions	x			x	x	x
	integrated management in natural disaster	x		x			

situations						
understanding of civil protection mechanism and institutional framework in NDRM	x	x				
knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x	x	x	x	x
natural disasters analysis and risk assessment	x	x		x		
knowledge about prevention, mitigation, response and recovery operations	x				x	x
applying ICT in NDRM	x		x	x		
development of human resources in NDRM	x	x	x			
applying specialized civil engineering fields in NDRM	x					
protection of critical infrastructure in natural disaster situations	x			x		
understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods	x					
cognizant of the needs of special populations	x	x	x		x	x
evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x			x		

		ELECTIVE SUBJECTS										
		ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8	ES9	ES10	ES11
Generic competencies	communication	x		x	x	x		x	x	x		x
	critical thinking	x	x				x		x	x	x	
	scenario modeling	x	x				x					
	creativity	x						x	x	x	x	
	initiative		x				x	x				x
	prediction of solutions and consequences	x							x	x		
	collaboration		x	x	x	x	x	x			x	
	working in multidisciplinary team	x	x				x	x				x
	intensive use of ICT in acquiring knowledge and solving problems								x	x		
	solving complex multidisciplinary problems in theory and practice	x					x		x	x		x
	applying acquired knowledge											
	social and civic responsibility		x	x	x			x				x
	development of professional ethics and responsibility	x	x	x	x	x	x	x	x		x	x
	effective leadership	x						x				
	strategic thinking	x	x				x		x	x		x
	identification and analysis of problems in NDRM		x									x
	experience-based critical decision making	x					x					
	staying up-to-date with technological development	x							x	x	x	
	holistic and proactive approach to NDRM situations						x		x	x	x	
	clearly and unambiguously transfer knowledge to the professional and wider public	x		x	x	x	x	x	x		x	x

Subject-specific competencies	understanding of climate changes and natural disasters						x						x
	awareness of the complex and overlapping nature of disaster												x
	mastering of methods, procedures and processes of risk identification						x						x
	understanding the causes and consequences of disasters												x
	devising strategies and developing methodology and methods of emergency as part of NDRM						x						
	optimizing and managing available resources in emergency as part of NDRM systems												
	statistical data processing in order to define and make adequate conclusions						x						
	integrated management in natural disaster situations												
	understanding of civil protection mechanism and institutional framework in NDRM						x						x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation		x				x						
	natural disasters analysis and risk assessment												
	knowledge about prevention, mitigation, response and recovery operations	x					x						
	applying ICT in NDRM								x	x			
	development of human resources in NDRM			x	x		x	x					x
	applying specialized civil engineering fields in NDRM												
	protection of critical infrastructure in natural disaster situations												
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods		x				x						
	cognizant of the needs of special populations							x					x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management												

MS1 - Emergency Management Systems

MS2 - Fire dynamics

MS3 - The theory of human error

MS4 - Risk and recovery of the accident

MS5 - Civil protection

MS6 - Tactics of intervention and rescue

- ES1 - Project Management
- ES2 - Decision making theory
- ES3 - Psychology of groups
- ES4 - Public relations
- ES5 - English language
- ES6 - System engineering
- ES7 - Human resource management
- ES8 - Information systems in protection
- ES9 - Information communication networks
- ES10 - Fire expertise
- ES11 - Health protection

3. Academy of criminalistics and police studies (KPA)

3.1 Description of the study program

Name of study program and title

Master Academic Studies – NATURAL DISASTERS SECURITY RISK MANAGEMENT

Title: Master Security Manager

The purpose of the study program

The natural disasters security risk management is a problem that the world's public is faced frequently and the governments, specialized non-governmental agencies and intergovernmental organizations are dealt with seriously. In countries where occur frequently, natural disasters slow down sustainable development, reduce quality of life, but also create risks for developing new threats (poverty, unemployment, crime, gray economy, conflicts, terrorism, etc.). Natural disasters are not everyday events, and they require unusual reaction. Therefore, the routine methods of government institutions, businesses, NGOs and citizens are no longer sufficient in conditions of natural disasters. These entities must acquire specialized knowledge and skills in researching natural disasters, risk assessment, modeling and simulation of natural disasters, the use of modern information and communication technologies in natural disasters risk management, all within the national and international legal framework and the framework of the protection and rescue system. These knowledge and skills are just offered by the proposed study program Master of Academic Studies - Natural Disasters Security Risk Management. Therefore, the purpose of this study program is to acquire academic knowledge and skills to manage the security risks of natural disasters, as well as to gain the academic title Master Security Manager - ("Masters Management of the 1st year").

The content of this study program relates to the methodology of scientific research of security phenomena, risk management, natural disasters, protection and rescue system in natural disasters, modeling and simulation of security risks of natural disasters, information and communication technologies in natural disasters security risk management and the right to emergency situations caused by natural disasters. These contents are in line with the highest scientific achievements and standards of security practice in the context of natural disasters. The Master Security Manager is qualified to perform complex tasks of the police and civil servants in the competent state authorities in the Republic of Serbia and in local government units, in economic and other legal entities and in the non-governmental sector, in opposing the security risks of natural disasters. The Master Security Manager can be involved in the educational process and in the scientific research of primary higher education and research institutions (high police schools, security faculties, occupational safety faculties, etc.). This study program allows continuation of further specialization, i.e., enrollment in doctoral studies.

Objectives of the study program

The main goal of the study program is to educate students for the application of scientific and professional achievements in solving problems of security protection, protection of human health, material goods and natural values, development of risk management systems for emergencies arising from natural disasters, as well as for the application of acquired knowledge.

The specific objectives of the study program are acquiring the necessary knowledge and skills for:

- analysis of security risks and management of emergencies occurring in natural disasters;
- analysis of cause-effect relationships and solving problems of security risks, protection of human health, environment and material goods in natural disasters;
- development methodology of research and methods for managing the risks of natural disasters;
- development strategies, design and management the security system in risk assessment, preparation, response and recovery from natural disasters;
- innovation activities and team work in emergency management arising from natural disasters;
- permanent education and development of the knowledge management system in the field of managing the security risks in the conditions of natural disasters.

Competencies of graduated students

A student who passes all the exams established by the master's study program and defended master thesis is a higher education and academic title Master Security Manager - ("Master Management of the 1st year"). Student acquires competencies for:

- application of basic knowledge on harmful effects of natural hazards and disasters;
- assessment of the risks of natural disasters and other security risks in conditions of natural disasters;
- understanding the complex measures to prevent the security risks of natural disasters, as well as the component planning of economic and social development;
- preparation of documents on vulnerability assessment and protection and rescue plans;
- optimization, management and coordinatation of available resources of emergency headquarters;
- investigation the cause of the events and determination the facts, responsibilities and crimes in the resulting natural disasters;
- applying specific knowledge of psychology in extreme situations;
- reporting on the state of security in natural disasters;
- informing and communicating with the public;

- assessment and forecasting the consequences of security risks of natural disasters on the basis of modern information and communication technologies;
- assessing and forecasting the situation and changing the safety risks of the working environment using modeling and simulation;
- developing metrics and methods for assessing the effectiveness and efficiency of the natural disasters management system ;
- knowledge and implementation of the legal framework of the European Union and the Republic of Serbia in the field of natural disasters risk management.

Outcomes of the learning process are:

- more effective and efficient natural disasters risk management;
- more favorable state of security against natural disasters and in conditions of natural disasters;
- good security culture, organizational culture and behavior regarding the risk of natural disasters;
- valid standardization in the field of natural disasters risk management;
- higher impact in the prevention and response to the risks of natural disasters, as a result of a higher level of performance, competence and cooperation between the subjects of protection and rescue;
- more valid legal framework for natural disasters risk management.

Quality, contemporary and international compatibility of the study program

The study program "Natural Disasters Security Risk Management" meets all the standards, requirements and needs for scientific knowledge on the natural disasters risk management foreseen in international documents (International Strategy for Disaster Reduction - UNISDR; Global Platform for Risk Reduction from Disaster - Global Platform for Disaster Risk Reduction; Disaster Reduction Disaster Reduction Framework 2015-2030 - Sendai Feramework for Disaster Risk Reduction 2015-2030; Working Paper of the EU Commission - Action Plan for the Sendai Disaster Risk Reduction Framework 2015-2030 Access to the method of risk and disaster information for all EU policies); international standards (standards in the field of "social security" - Societal Security ISO 223, standards in the field of risk management - Risk Management ISO 31000), national laws (Law on Emergency Situations (2009), Law on Restoration after Elementar and Other Disasters (2015) , Law on Planning and Building (2014), Law on Fire Protection (2009), Law on Hydrological and Meteorological Activities (2010), Law on Waters (2010)), national strategies, programs and plans (National Strategy for Protection and Rescue, Fire Protection Strategy, National Program for Natural Disasters Risk Management, Action Plan for Implementation of National Program for Natural Disasters Risk Management (2017-2020) and national standards (National Social Security Standards (SRPS ISO 223)). This includes managerial, legal, technical and engineering component of natural disasters risk

management through successful monitoring which is the result of harmful events, response and recovery from harmful events.

Also, this study program is compatible with contemporary and accredited study programs abroad, and above all with the Master of Science in Environmental and Civil Protection of Marche Polytechnic University, in Ancona (Italy) (http://www.univpm.it/Entra/Offerta_formativa_2/Master_Degree_in_Environmental_Risk_and_Civil_Protection/L/0), master study program of Risk, Crisis and Disaster Management, University of Leicester in the United Kingdom (<https://le.ac.uk/courses/risk-crisis-and-disaster-management-msc-dl>).

3.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Methodology of research of security phenomena	2+2+0	6
2.	M	Risk management	3+1+0	6
3.	M	Natural disasters	3+1+0	6
4.	E	Elective subject 1	2+2+0	6
5.	E	Elective subject 2	2+2+0	6
		Protection and rescue system in natural disasters		
		Modeling and simulation of security risks from natural disasters		
		Information-communication support to the natural disasters security risks management		
		Right to emergency situations caused by natural disasters		
SECOND SEMESTER				
6.		Research work	0+0+20	15
7.		Master thesis		15
Total			12+8+20	60

3.3 Subject specification

Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT
Level: Master Academic Studies
The name of the course: Methodology of research of security phenomena
Lecturer (Name, middle name, last name): Saša V. Mijalković, Srđan M. Milašinović, Saša M. Milojević
Course status: mandatory

Number of ECTS: 6				
Prerequisites: no				
Course objective Acquiring knowledge about the basics of scientific research methodology				
Learning outcomes The acquired knowledge enables the independent implementation of scientific research, the preparation of final study papers and professional and scientific texts, the application of scientific research methods in performing security operations, more efficient assessment of the state of security and forecasting trends of security threats on certain geospatial resources and participation in teams for the development of doctrinal, strategic and action- planning documents related to risk management in natural disasters.				
Content <i>Theoretical teaching</i> Science and scientific knowledge, theory and language (conceptual-categorical apparatus) of science; basic understanding of the scientific method; logical basics of the methodology; method and methodology of investigation of phenomena (systems of security) and processes (challenges, risks and threats, measures, activities and activities of protection and rescue) in the field of security; research of natural disasters and social phenomena in conditions of natural disasters; preparation of methodological framework and design of research; organization and realization of research; production of scientific work; verification of research <i>Practical teaching</i> Development of instruments for the application of empirical methods of scientific research				
Literature 1. Milašinović, S., Milojević, S.: Projektovanje i realizovanje naučnih istraživanja, Kriminalističko-policijska akademija, Beograd, 2016. 2. Mijalković, S., Popović, M.: Uvod u studije bezbednosti: metodološko-istraživačke i teorijske osnove bezbednosti, Kriminalističko-policijska akademija, Beograd, 2015 i 2016. 3. Milošević, N., Milojević, S.: Osnovi metodologije bezbednosnih nauka, Policijska akademija, Beograd, 2001.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Lecture, modified lectures, presentations, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching	20	oral exam		50
colloquia				
seminar paper	20			

Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Risk management				
Lecturer (Name, middle name, last name): Dane R. Subošić, Obrad M. Stevanović, Dalibor D. Kekić				
Course status: mandatory				
Number of ECTS: 6				
Prerequisites: no				
Course objective Students understand the risk management methodology				

Learning outcomes			
Students' ability to apply a risk management methodology.			
Content			
<i>Theoretical teaching</i>			
Content and scope of risk management. Establishing a risk management context. Identification of risk. Analysis (determination of 1. frequency and vulnerability, 2. criticality and damage) and risk assessment. Methods of risk assessment (concept and division). Check lists. Preliminary Hazard Analysis. Structured interview and exchange of ideas. Delphi technique, brainstorming, panel / technique of the nominal group, "SWIFT" with the "what if" structure. Human Reliability Analysis (HRA). Analysis of the main cause (analysis of individual loss). Scenario analysis. Assessment of toxicological risk. Impact analysis. Analysis of the error tree. Analysis of the event tree. Analysis of causes and consequences. Analysis of causes and effects of FMEA (FMECA). Reliability analysis. Analysis of imperceptible errors. HAZOP Hazard and Operability Studies. HACCP Hazard Analysis and Critical Control Points. LOPA. Protection level analysis. Markov's analysis. Monte Carlo analysis. Bayesian analysis. One-criterion and multi-criteria methods for risk assessment. Deciding and applying decisions on risk treatment.			
<i>Practical teaching</i>			
Application of risk management standards on concrete examples.			
Literature			
1. Subošić, D, Daničić M.: Bezbednosni menadžment - organizacija i odlučivanje. Fakultet za bezbednost i zaštitu, Banja Luka, 2012.			
2. Subošić, D i dr.: Procena rizika u zaštiti lica, imovine i poslovanja, priručnik za obuku, Kriminalističko-policijska akademija, Beograd, 2016.			
3. Stevanović, O.: Bezbednosni menadžment, Kriminalističko-policijska akademija, Beograd, 2016.			
4. Kekić, D.: Upravljanje bezbednosnim sistemima u uslovima zaraznih (kontagioznih) epidemija, Kriminalističko-policijska akademija, Beograd, 2016.			
5. Savić, S., Stanković, M.: Teorija sistema i rizika, Akademska misao, Beograd, 2012.			
Number of classes of active teaching			Other
Lectures: 45	Exercises: 15	Other form of lectures:	
Study and research work:			
Teaching methods			
Lecture, modified lectures, presentations, exercises.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching	20	oral exam	50
colloquia			
seminar paper	20		
Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Natural disasters			
Lecturer (Name, middle name, last name): Slobodan B. Miladinović			
Course status: mandatory			
Number of ECTS: 6			
Prerequisites: no			
Course objective			
Acquiring knowledge about the recent state of natural conditions on the Earth's surface. Getting to know the causes and consequences of all kinds of natural disasters. Analysis of their impact on the nature,			

security of the population, the economy and the state. Developing the basis for modern management of natural disasters.

Learning outcomes

Understanding the natural conditions and processes on the Earth's surface and their relationship with the emergence of natural disasters. Awareness of the differences between natural disasters caused by the action of natural forces and the impact of man on climate change and the increase in the intensity of natural disasters. Strengthening awareness of the prevention of destructive anthropogenic activities and the preservation of natural conditions and processes, as well as the importance of preventing and countering natural disasters for poverty reduction and the progress of humanity.

Content

Theoretical teaching

The notion and division of natural disasters. Natural disasters on the geological surface of the Earth. Litospheric disasters-tectonic movements, volcanism and earthquakes. Factors of change of relief conditions (geomorphologic disasters) - landslides, slopes, mass collapse. Measures of protection against geomorphologic accidents. Atmospheric disasters - intense precipitation, extreme temperatures, storm-gradient disasters, droughts. Hydrological disasters - floods, tsunamis, avalanches. Measures of protection against atmospheric disasters. Biogeographical forest accidents - fires. Measures for protection against forest fires. Biological disasters - epidemics. Measures of preventive-medical protection.

Practical teaching

Familiarization with the way of display, structure and disposition of natural disasters. Determination of basic indicators for monitoring natural disasters. Analysis of geological maps for monitoring of seismic and volcanic dangers, landslides and erosion. Application of GIS in the assessment of the risk of natural disasters. Teletective research of the environment.

Literature

1. Gavrilović, Lj., Dukić, D.: Hidrologija, Zavod za izdavanje udžbenika, Beograd, 2008,
2. Dragičević, S., Filipović, D.: Prirodni uslovi i nepogode u planiranju i zaštiti prostora, Univerzitet u Beogradu, Geografski fakultet, Beograd, 2016.,
3. Petrović, D., Manojlović, P.: Geomorfologija, Univerzitet u Beogradu, Geografski fakultet, Beograd, 2003.
4. Mirović, P.: Sanacija klizišta i nedovoljno nosivog tla, AGM knjiga, Beograd, 2014.
5. Milanović, M., Lješević, M.: Teledetekcione metode istraživanja životne sredine, Univerzitet u Beogradu, Geografski fakultet, Beograd, 2009.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
45	15			

Teaching methods

Lecture, modified lectures, presentations, exercises.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching	20	oral exam	50
colloquia			
seminar paper	20		

Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT

Level: Master Academic Studies

The name of the course: Protection and rescue system in natural disasters

Lecturer (Name, middle name, last name): Dragan M. Mlađan, Aleksandra M. Ljuština, Goran N. Bošković, Slaviša Lj. Vuković, Bojan D. Janković

Course status: elective				
Number of ECTS: 6				
Prerequisites: no				
Course objective Acquiring basic knowledge about organizational models (subjects, forces, resources and tactics) in order to protect and save the population, the environment and material goods in conditions of natural disasters				
Learning outcomes Students' ability to understand and implement security measures in the system of protection and rescue in natural disasters, organization of search and rescue systems, implementation of basic police measures, determining the causes of death of the injured and injured and informing the public, researching causes and developments				
Content <i>Theoretical teaching</i> Objective and tasks of studying the subject. Concept, mission, goals, tasks of protection and rescue system. Entities, forces and means of protection and rescue system (state, local self-government, economic and other legal entities, citizens and their associations). Organization and structure of the protection and rescue system. Management, coordination and integration of the forces of protection and rescue systems in natural disasters. MUP Emergency Situations Department. Civil Protection System. Emergency headquarters. Planning measures for removing the consequences of natural disasters. Organization and coordination of the operation of forces and means of protection and rescue system. Organization, forces and means for conducting actions of search and rescue in various natural disasters. The system of evacuation and care of the population. Psychological Support System for Victims and Rescuers. Police activities (police cordons, police traffic measures and provision of conditions for the intervention and evacuation of residents. Police support to competent state and local authorities and organizations in the implementation of protection and rescue measures.) Protection of property and prevention of the commission of criminal offenses after natural disasters Prevention and suppression of crime (gray economy, corruption, classical crime, juvenile crime, etc.) Identifying and determining the causes of the death of the victims and injuries Exploring the cause (forensics) of the development of the events and establishing the facts and responsibilities The system of recovery from the emerging natural disasters The system of international cooperation in the field protection and rescue in natural disasters. <i>Practical teaching</i> Developing plans for organizing and coordinating measures, activities and activities of entities and protection and rescue forces in specific situations of natural disasters. Development of plans for organizing and coordinating measures, activities and activities of crime prevention and suppression undertaken by the police in specific situations of natural disasters.				
Literature 1. Mlađan, D.: Bezbednost u vanrednim situacijama, Kriminalističko-policijska akademija, Beograd, 2015. 2. Stevanović, O.: Bezbednosni menadžment, Kriminalističko-policijska akademija, Beograd, 2016. 3. Ljuština, A.: Ekološka bezbednost, Kriminalističko-policijska akademija, Beograd, 2012. 4. Mlađan, D.: Taktika gašenja požara, Zavod za udžbenike i nastavna sredstva, Beograd 1997. 5. Bošković, G.: Organizovani kriminal, drugo izmenjeno i dopunjeno izdanje, Beograd, Kriminalističko-policijska akademija, 2014. 6. Vuković, S.: Prevencija kriminala, drugo izmenjeno i dopunjeno izdanje. Kriminalističko-policijska akademija, Beograd, 2014.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods				

Lecture, modified lectures, presentations, exercises.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching	20	oral exam	50
colloquia			
seminar paper	20		

Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT	
Level: Master Academic Studies	
The name of the course: Modeling and simulation of security risks from natural disasters	
Lecturer (Name, middle name, last name): Stevo K. Jaćimovski, Slobodan B. Miladinović	
Course status: elective	
Number of ECTS: 6	
Prerequisites: no	
Course objective	
Acquiring basic knowledge about the cause, the origin, the consequences, the prevention and protection against consequences of natural disasters through the process of modeling and simulation.	
Learning outcomes	
Understanding of natural conditions and processes on the Earth's surface and their connection with the emergence of natural disasters. Acquiring the necessary knowledge on how to present registered natural disasters. Training for reading remote-received (aerial or satellite) footage in the process of obtaining information on the disposition and consequences of natural disasters.	
Content	
<i>Theoretical teaching</i>	
Theory classes: Variables (features and properties) of natural disasters that occur on the geological surface of the Earth, in the atmosphere, in the hydrosphere and in the biosphere, which are significant for the processes of modeling and simulating the security risks of natural disasters. Prediction, protection measures and rehabilitation of natural disasters. Analysis of the risk of natural disasters. Semiempirical models. Mathematical models (Lagrange, Euler, Gauss). Statistical models. Using software packages for modeling and simulating appropriate accidents.	
<i>Practical teaching</i>	
Familiarization with the way of display, structure and disposition of natural disasters. Determination of basic indicators for monitoring natural disasters. Analysis of geological maps in the representation of earthquakes, volcanism, landslides and soil erosion. Compilation of the hazard inventory based on the available data of meteorological seismological stations, data of the United Nations, etc. Assessment of hazards using geographic information systems. Use of software packages for simulation and risk assessment for accidents.	
Literature	
1. Dragičević, S., Filipović, D.: Prirodni uslovi i nepogode u planiranju i zaštiti prostora, Univerzitet u Beogradu, Geografski fakultet, Beograd, 2009.	
2. Jovanović, V., Đurđev, B., Srdić, Z., Stankov, U.: Geografski informacioni sistemi, Univerzitet Singidunum, Univerzitet u Novom Sadu, Novi Sad, 2012.	
3. Milanović, M., Lješević, M.: Teledetekcione metode u istraživanju životne sredine, Univerzitet u Beogradu, Geografski fakultet, Beograd, 2009.	
4. Zannetti, P.: Air Pollution Modeling, Springer Science+Business Media, New York, 1990.	
5. Marchuk, G.I.: Mathematical Models in Environmental Problems, Kobo Ebook, 2011.	
Number of classes of active teaching	Other

Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Lecture, modified lectures, presentations, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	10	written exam		
practical teaching	20	oral exam	50	
colloquia	20			
seminar paper				

Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT
Level: Master Academic Studies
The name of the course: Information-communication support to the natural disasters security risks management
Lecturer (Name, middle name, last name): Brankica M. Popović, Boban R. Milojković, Nenad S. Milić, Milan M. Gligorićević
Course status: elective
Number of ECTS: 6
Prerequisites: no
Course objective Acquiring knowledge about characteristics, possibilities and ways of using information, telecommunication and geoinformation technologies in support of decision making in managing the security risks of natural disasters
Learning outcomes Students' ability to apply technologies for more efficient and effective decision support in all phases of natural disaster management (in phases: prevention and mitigation of natural disasters; preparation for response, response and recovery from natural disasters).
Content <i>Theoretical teaching</i> Basic concepts, components and technological basics of information systems: hardware, software, communication resources. Computer networks. Formation of relevant databases. Sensor systems. Early detection and warning systems (excitation). Emergency communication systems: communication with vulnerable persons and the entire population; establishment of command centers for emergency management; systems for communicating participants in actions with the command center; mobile command and control centers; mobile applications; functional emergency management systems. Remote detection of security risks (satellite, digital orthophoto, pycometric and lidar products). Unmanned aerial video systems (aerospace systems and small unmanned aircraft). Global Navigation Satellite Systems (GNSS). Systems for automatic tracking of faces and objects (location-based services in systems of special importance). Geographic Information System (GIS) as support for decision-making in emergency situations caused by natural disasters: concept, components, functions, inquiries and analyzes; GIS in the function of risk vulnerability assessment and in the preparation of response plans in case of natural disasters; GIS in the function of more efficient protection of people and property during and after the manifestation of natural disasters; GIS in the function of analyzing the consequences of natural disasters. <i>Practical teaching</i> Case studies of the use of information, telecommunication and geoinformation technologies in cases of natural disasters. Case studies of establishing functional communication systems in conditions of natural disasters. Practical work in GIS. Application of software programs for simulating emergency management

Literature				
1. Brankica, P., Kuk, K.: Informacioni sistemi, Kriminalističko-policijska akademija, Beograd, 2017.				
2. Gligorijević, M., Čisar P.: Osnovi telekomunikacija, Kriminalističko-policijska akademija, Beograd, 2017.				
3. Milojković, B.: Policijska topografija, Kriminalističko-policijska akademija, Beograd, 2013.				
4. Milić, N.: Mapiranje kriminala, Kriminalističko-policijska akademija, Beograd, 2017.				
5. Keith, R. McCloy. Resource Managament Information Systems Remote Sensing, GIS and Modelling, Taylor & Francis, 2006.				
6. Filipović, I., Milojković, B., Osnovi kartografije sa topografijom, Prirodno-matematički fakultet u Nišu – Departman za geografiju, 2010.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods				
Lecture, modified lectures, presentations, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching		20	oral exam	50
colloquia				
seminar paper		20		
Study programme: NATURAL DISASTERS SECURITY RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Right to emergency situations caused by natural disasters				
Lecturer (Name, middle name, last name): Darko Z. Simović				
Course status: elective				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
Acquiring knowledge about the international legal and national legal regulation of emergency situations caused by natural disasters, as well as the legal regime of human rights during emergencies.				
Learning outcomes				
Acquired knowledge of the rights, duties and responsibilities of various entities in emergency situations enables effective participation in the emergency protection and rescue system caused by natural disasters, as well as the realization and protection of human rights in such circumstances				
Content				
<i>Theoretical teaching</i>				
Forms of emergency: emergency and emergency situations. The concept and character of emergency situations. Causes of the declaration of an emergency. Principles of the legal regime of emergency situations (the principle of protection and rescue, the principle of the right to protection, the principle of solidarity, the principle of publicity, the principle of responsibility, the principle of gradualness). Comparative emergency rights models. Characteristics of emergency situations caused by natural disasters. International legal sources of rights of emergency situations. Interstate cooperation: European cooperation mechanisms, regional cooperation, bilateral agreements. International humanitarian aid. The right of emergency situations in the Republic of Serbia. Legal framework of the protection and rescue system. Realizing and protecting human rights in emergencies. Human Rights Restrictions in Emergencies. The right to protection and conservation of the environment.				
<i>Practical teaching</i>				

Analysis of legal regulations. Analysis of the jurisprudence of the European Court of Human Rights. Case study

Literature

1. Simović, D., Zekavica, R.: Policija i ljudska prava, Kriminalističko-policijska akademija, Beograd, 2012.
2. Petrović-Mrvić N., Todić D., Mladjan D. (ur.), Elementarne nepogode i vanredne situacije, Institut za uporedno pravo, Beograd, 2014.
3. Čipčić, S.: Država u vanrednim prilikama, SCI, Novi Sad, 1999.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
30	15		15	

Teaching methods

Lecture, modified lectures, presentations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures		written exam	
practical teaching	20	oral exam	50
colloquia			
seminar paper	30		

3.4 Link between competencies and subjects

		MANDATORY SUBJECTS			ELECTIVE SUBJECTS			
		MS1	MS2	MS3	ES1	ES2	ES3	ES4
Generic competencies	communication	x	x	x				x
	critical thinking	x	x	x	x	x	x	x
	scenario modeling	x	x		x	x	x	
	creativity	x	x	x	x	x	x	x
	initiative	x	x	x	x	x	x	
	prediction of solutions and consequences	x	x	x	x	x	x	
	collaboration		x	x	x	x	x	x
	working in multidisciplinary team	x	x	x			x	x
	intensive use of ICT in acquiring knowledge and solving problems	x	x		x	x	x	
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x	x				x	
	social and civic responsibility		x	x			x	x
	development of professional ethics and responsibility	x	x	x				x
	effective leadership	x	x	x				x
	strategic thinking	x	x	x			x	x
	identification and analysis of problems in NDRM	x	x		x	x	x	
	experience-based critical decision making	x	x	x			x	
	staying up-to-date with technological development	x	x		x	x	x	
	holistic and proactive approach to NDRM situations			x			x	
	clearly and unambiguously transfer knowledge to the professional and wider public	x	x	x	x	x	x	x

Subject-specific competencies	understanding of climate changes and natural disasters	x	x		x	x	x	x
	awareness of the complex and overlapping nature of disaster		x		x	x	x	x
	mastering of methods, procedures and processes of risk identification	x			x	x	x	
	understanding the causes and consequences of disasters	x	x	x	x	x	x	x
	devising strategies and developing methodology and methods of emergency as part of NDRM	x	x	x				
	optimizing and managing available resources in emergency as part of NDRM systems		x	x			x	
	statistical data processing in order to define and make adequate conclusions	x	x	x	x	x	x	
	integrated management in natural disaster situations		x					
	understanding of civil protection mechanism and institutional framework in NDRM		x	x				x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x		x	x	x	
	natural disasters analysis and risk assessment	x	x		x	x	x	
	knowledge about prevention, mitigation, response and recovery operations	x	x	x				x
	applying ICT in NDRM	x	x		x	x	x	
	development of human resources in NDRM	x		x				x
	applying specialized civil engineering fields in NDRM	x	x	x	x	x	x	
	protection of critical infrastructure in natural disaster situations			x	x	x	x	
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods	x	x				x	
	cognizant of the needs of special populations		x	x			x	x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x	x				x	

MS1 - Methodology of research of security phenomena

MS2 - Risk management

MS3 - Natural disasters

ES1 - Protection and rescue system in natural disasters

ES2 - Modeling and simulation of security risks from natural disasters

ES3 - Information and communication support to the natural disasters security risks management

ES4 - Right to emergency situations caused by natural disasters

4. University of Pristina settled in Kosovska Mitrovica (UPKM)

4.1 Description of the study program

Name of study program and title

Master Academic Studies – NATURAL DISASTER RISK MANAGEMENT

Title: Master engineer for protection from catastrophic events and fire

The purpose of the study program

The purpose of the study program is to educate Masters in the field of Natural Disaster Risk Management, in line with basic needs of the society. This study program is conceptualized to provide acquisition of competencies and qualifications which are socially justified and useful. Natural Disaster Risk Management Master program will provide experts in the managing natural disasters, by interdisciplinary and multi disciplinary approach to the problem of natural disasters, technical solutions and social responses to the disaster situations. It is based on the modern curriculum and modern syllabi that follow the trends and directions in the field of disaster risk management.

The Study program is based on adopted principles of national policy and strategy in the field of environmental protection, international, European and national regulations and standards and modern trends for the development of the system of protection from catastrophic events.

In accordance with the University Mission, the Study program provides available and modern, high-quality education which shall fulfill the expectations of students and requirements of the public, private and civil sector. The Study program organized in such way aims to educate Master engineers in the field of Natural Disaster Risk Management who are competent, comparable and competitive in the national and international context.

Objectives of the study program

As Natural disasters occurrence frequency increases in the last decade, the understanding of the roots and complexness of natural disasters is crucial for the study program. This topic is complex and should provide knowledge and deeper understanding of science behind the natural risks along with empowering the applied and practical skills. Theoretical part will critically review the scientific basis of the natural disaster risk management in technical domain. As the engineering and managing processes are rapidly innovated, the theory will provide deep understanding of the disasters, engineering principles of the activities on prevention and mitigation, but not suggest the solutions. Complex interconnections between nature, technology and society will be part of the planning process in prevention, managing and mitigation of the natural disasters. As the Faculty of Technical Sciences has common ground for all departments in fundamental sciences on the Bachelor level, with in deep knowledge of Mathematics, Physics,

Chemistry, Mechanics, and educate engineers, the emphasize will be put on holistic and interdisciplinary approach of using engineering solutions in managing Natural Disasters. Graduates should be aware that measures for dealing with natural disasters are part of wider scope and have to consider that in planning processes. Their actions must be incorporated into neighbourhood and regional plans and be part of sustainable and environmental-friendly solutions, but also in line with actual national and international legislation.

Competencies of graduated students

Master program introduces students into Natural Disaster Risk Management problems and solutions on a deeper level. Since at the Faculty of Technical Sciences of UPKM, there is Graduate programme on Environmental Engineering, the Bachelors have knowledge, skills and competences to recognize a situation in nature, discuss possible solutions and implement some parts of a strategy, in order to solve engineering problems, NDRM Master graduates will be able to recognize a problem, understand its roots, define natural and manmade mechanisms of defined processes, propose a strategy to deal with a problem and develop the necessary protocols and methods to implement a strategy, in order to achieve a goal, instead of objectives. The Graduates will have the following competencies:

Knowledge

The graduate will:

- have knowledge and understanding of practice, applied theory and methods in Natural Disaster Risk Management in a local and international context;
- have knowledge of social communication, consulting and models for project management;
- have knowledge and understanding of the relationship between consulting, management, leadership, communication in general and teaching;
- be able to reflect on analysis, methods and theories in relation to Natural Disaster Risk management;
- have knowledge on relevant legislation and legal practice in relation to Natural Disaster Risk management in an local and international context.

Skills

The graduate will:

- be able to collect and process data as foundation for choosing the best methods or tools for solving tasks and problems in relation to Natural Disaster Risk management;
- be able to manage projects and control resources within the subjects;
- be able to analyse and assess theoretical and practical problems in relation to planning, strategy and development, and present proposal for future strategy and solutions;
- be able to communicate knowledge and carry out consulting in NDRM in relation to partners and other stakeholders;
- be able to use mathematical and statistical methods on analytic results and relate to the results in practice;

Competencies

The graduate will:

- be able to handle complex and developing tasks and situations in relation to NDRM and also document and communicate tasks, projects and solutions;
- be able to convert practical experience, knowledge and research results in to solutions;
- be able to form part of multidisciplinary teams and be able to independently plan and implement assignments related to natural disasters;
- be able to identify personal need for development of further competencies and for further education;
- develop independence, the ability to co-operate and the ability to create something new;
- develop an interest in and ability to actively co-operate in a democratic society.

Quality, contemporary and international compatibility of the study program

The Study program is in compliance with contemporary world trends and state of the profession, science and arts in the appropriate educational and scientific field and is comparable with similar programs at the foreign higher education institutions, especially within the European education area.

By mastering the study program, the student acquires knowledge, skills and abilities that provide realization of competencies and learning outcomes needed by the society as a whole.

The study program is harmonized with the contemporary and current scientific and professional knowledge, and is comparable with the study programs of protection against disasters and fire which exist at colleges and faculties in our vicinity. The fundamental principles of harmonization are:

- each course lasts one semester,
- credit system,
- elective courses,
- independent semester projects,
- objectives and outcomes of studying, that is, the knowledge and skills that student acquires after the completed studies are clearly defined.

Taking into account the specific characteristic of the Natural Disasters risk management and in Serbia, respecting the experiences of relevant world university institutions which are engaged in the education of experts in this field, the study program Natural Disasters risk management has been established and defined and its profile is recognized as sublimation of study programs of the following university institutions:

- Middlesex University, (OHS), London (www.mdx.ac.uk);
- University of Natural Resources and Life Sciences, Vienna (www.boku.ac.at/en/);
- The University of Edinburgh, GB (www.see.ed.ac.uk/postgraduate/taughtdeg/SFSE/);

- Faculty of Technical Sciences, Novi Sad (www.ftn.uns.ac.rs);
- Faculty of Occupational Safety Nis (<http://www.znrfak.ni.ac.rs/>);

4.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Natural disasters	3+2+0	6
2.	M	Natural disasters risk assesment	2+2+0	5
3.	M	Transportation Systems in Natural disasters	3+3+0	5
4.	M	Institutional framework for managing natural disasters	2+1+20	4
5.	E	Elective subject 1	2+2+0	5
6.	E	Elective subject 2	3+3+0	5
		Monitoring in prevention, recording and estimation of Natural disasters		
		Information technologies in Natural Disaster Risk Management		
		Natural disasters with participation of chemical agents		
		Urban Design for Disaster Mitigation		
SECOND SEMESTER				
7.	M	Natural disasters risk management	2+2+0	5
8.	M	Power suppply in Post Disaster Period	2+2+0	5
9.	E	Elective subject 3	2+2+0	5
		Post-disaster measures in waste, water and sewer management		
		Water Resources Management in Natural Disaster Situations		
10.		Professional practice		3
11.		Master thesis		12
Total			21+19+20	60

4.3 Subject specification

Study programme: NATURAL DISASTER RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Natural disasters				
Lecturer (Name, middle name, last name): Gordana Milentijevic				
Course status: mandatory				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
The course objective is understanding and accepting the impact of natural disasters on people and communities, as well as natural processes which cause these phenomena.				
Learning outcomes				
The course will equip the students to recognize, understand and accept natural disasters as part of Earth's evolution. They will also be introduced with basic principles of measuring of extreme situations on Earth.				
Content				
Theoretical teaching				
Natural disaster concept. The history of the planet, origins and evolution. Earth composition and material. Meteorite impacts. Endodynamics. Tectonic disorders. The impact of tectonic movements to the environment. Earthquakes. Volcano,. Exhodynamics: The Atmosphere of Earth and exodynamic processes of Earth destruction. Erosions and Landslides. Ground waters, aquifers, springs. Climatic and meteorological natural disasters-global warming, ice ages, droughts, hurricane, tornado. Hydrology-morphology natural disasters-floods. Monitoring and recording.				
Literature				
1. Boris Vakanjac, Lidija Amidžić, Maja Mitić, 2011: Prirodni hazard, skripta, Fakultet za primenjenu ekologiju Futura, Beograd				
2. Keller, E. A., & Blodgett, R. H. (2007). Natural Hazards: Earth's Processes as Hazards. Disasters, and Catastrophes: Pearson Prentice Hall, Upper Saddle River, NJ, USA.				
3. Hyndman, D., & Hyndman, D. (2016). Natural hazards and disasters. Cengage Learning				
4. Milentijević G. (2011): Osnove geologije i inženjerske geologije. Udžbenik. Univerzitet u Prištini, Fakultet tehničkih nauka Kosovska Mitrovica, Kosovska Mitrovica				
Number of classes of active teaching				Other
Lectures: 3	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods				
Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching	10	oral exam		60
colloquia				
seminar paper	20			

Study programme: NATURAL DISASTER RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Natural disasters risk assesment			
Lecturer (Name, middle name, last name): Irma Dervišević			

Course status: mandatory				
Number of ECTS: 5				
Prerequisites: no				
Course objective Knowledge of the hazards and the physical, social, economic and environmental vulnerabilities and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.				
Learning outcomes The graduate will have competence to -Understand of current situation, needs and gaps to assess what already exists, avoid duplication of efforts, and build on existing information and capacities; -to identify the nature, location, intensity and likelihood of major hazards prevailing in a community or Society - to identify population and assets at risk and delineate disaster prone areas - to determine the capacity (or lack of it) of elements at risk to withstand the given hazard scenarios				
Content <i>Theoretical teaching</i> Desk Study of existing information: Data Mining. Hazard Assessment. Exposure Assessment. Vulnerability analysis. Loss/impact analysis Risk profiling and evaluation.				
Literature 1. Ellis, Derek V. 1989. Environments at Risk: Case Histories of Impact Assessment. Berlin; New York: Springer-Verlag. 2. Reducing Disaster Risk: A Challenge for Development. 2004. United Nations Development Programme, Bureau for Crisis Prevention and Recovery. New York. www.undp.org/bcpr 3. Tickner, Joel A. (ed.). 2003. Precaution, Environmental Science, and Preventive Public Policy. Washington, DC: Island Press. 4. van Aalst, Maarten, and Ian Burton. 2002. "The Last Straw; Integrating Natural Disaster Mitigation with Environmental Management." Disaster Risk Management Working Paper Series No. 5. The World Bank. http://www.worldbank.org/hazards/files/last_straw_final.pdf				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Lectures, presentations, preparation and defence of the seminar paper, interview and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching		oral exam		40
colloquia	30			
seminar paper	20			

Study programme: NATURAL DISASTER RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Transportation Systems in Natural disasters			
Lecturer (Name, middle name, last name): Srđan Jović			
Course status: mandatory			
Number of ECTS: 5			

Prerequisites: no				
Course objective				
Knowledge from the field of transportation processes and material flows. The student will be able to perform a simulation of the automatic transportation systems				
Learning outcomes				
Competencies will be used in a practice for concept design formulations and full project design of the complex automated transportation systems in the Emergency recovery sector				
Content				
<i>Theoretical teaching</i>				
Introduction. Transportation material. Transportation units. Auxiliary means, storage and loadings. Basic elements of the material flow. Capacity and tact. Limited values. Stochastic of the transportation units. Diversification and coupling of the material flows. Universal flow elements. Equipment layout. Flow diagrams. Material flow matrix. Theory of the waiting orders. Material flow knots. Mechanization and automatics of the reloading process. Characteristics, selection and dimensions of the transportation means. Flexible transportation systems. Devices and systems form signalization, and coding. Modular projects-composition of the transportation systems.				
Literature				
1. Vladić J. Transportno manipulacioni sistemi, skripta, 2006 FTN, Novi Sad				
2. Dieter A. Materialflusslehre, 1998, Vieweg				
3. Guenter M. Materialflusstechnik, 2002, TU München				
4. Zrnić Đ., Savić D. Simulacija procesa unutrašnjeg transporta, 1997, MF, Beograd				
Number of classes of active teaching				Other
Lectures: 3	Exercises: 3	Other form of lectures:	Study and research work:	
Teaching methods				
Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching		oral exam		40
colloquia	30			
seminar paper	20			

Study programme: NATURAL DISASTER RISK MANAGEMENT
Level: Master Academic Studies
The name of the course: Institutional Framework in NDRM
Lecturer (Name, middle name, last name): Blagoje Nedeljković
Course status: mandatory
Number of ECTS: 4
Prerequisites: no
Course objective
Graduates of a master degree programme will acquire the competencies that have to be in accordance with policy and operational frameworks. Due to the fact that different stakeholders (e.g.: companies, citizens, authorities, NGO's, etc.) are affected by natural disasters, graduates should have the capabilities for managing multidisciplinary holistic approaches and the areas of their activities and responsibilities are widely spread.
Learning outcomes
The graduate should have knowledge about valid institutional framework for action in natural disasters

situations; Knowledge about institutes and authorities responsible for developing and executing international, federal, provincial and/or municipal laws and contacts to relevant persons are crucial. Additionally, awareness about EU legislation (e.g.: EU Floods Directive, EU Water Framework Directive, bilateral or multilateral agreements etc.) is necessary to meet the international legal requirements.

Content

Theoretical teaching

- Legal framework in Natural Disaster Risk Management
- Public institution in Natural Disaster risk management
- Public awareness, education and research
- Risk management and sustainable development
- The role of Association, local, national and international Non-governmental Organizations, International humanitarian organizations

Literature

1. Sl. glasnik RS", br. 111/2009, 92/2011 i 93/2012 . Zakon o vanrednim situacijama.
European Commission (2014). Overview of natural and man-made disaster risks in the EU. Commission staff working document, Brussels, 8.4.2014 SWD(2014) 134 final.
http://ec.europa.eu/echo/civil_protection/civil/pdfdocs/prevention/COMM_PDF_SEC_2010_1626_F_staff_working_document_en.pdf

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	1		20	

Teaching methods

Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	60
colloquia			
seminar paper	30		

Study programme: NATURAL DISASTER RISK MANAGEMENT

Level: Master Academic Studies

The name of the course: Monitoring in prevention, recording and estimation of Natural disasters

Lecturer (Name, middle name, last name): **Nataša Elezović**

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

The student will get knowledge in the field of prevention, assessment, recording of the natural disasters, identification of the hot spots of the area, timely and adequate information about the status of air, water, soil before, during and after the natural disasters. Enabling the holistic approach in actual informing, alarming and reporting to the public.

Learning outcomes

The student will have competencies to act based on environmental criteria in sound environmental policy of reducing natural disaster risks, which should provide prevention, timely reactions and planning the programs of post disaster remedy.

Content

<i>Theoretical teaching</i> General characteristics of monitoring. The impact of climate change to the potential natural disasters. Systematic recording of the parameters of the environmental criteria. Monitoring and assessment of the environment. Natural Disaster risk assessment. Specific needs of the natural disaster monitoring. Situation observation and consequences of the natural disasters to the human population. Strategic impact assessment. Estimation presentation and impact characteristics. Monitoring of the mitigation and rehabilitation measures.				
Literature 1. Hyndman, D., & Hyndman, D. (2016). Natural hazards and disasters. Cengage Learning. 2. G.W. Van Loon, S.J. Duffy, Environmental Chemistry – A Global Perspective, Oxford University Press, New York, 2005. 3. Keller, E. A., & Blodgett, R. H. (2007) Natural Hazards: Earth’s Processes as Hazards. Disasters, and Catastrophes: Pearson Prentice Hall, Upper Saddle River, NJ, USA.				
Number of classes of active teaching				Other
Lectures: 3	Exercises: 3	Other form of lectures:	Study and research work:	
Teaching methods Lectures, presentations, preparation and defence of the seminar paper, interview and discussion, consultations				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching			oral exam	40
colloquia		30		
seminar paper		20		

Study programme: NATURAL DISASTER RISK MANAGEMENT	
Level: Master Academic Studies	
The name of the course: Information technologies in Natural Disaster Risk Management	
Lecturer (Name, middle name, last name): Jelena Đokić	
Course status: elective	
Number of ECTS: 5	
Prerequisites: no	
Course objective The students will have competences in modeling and simulation of potential natural disaster risk situation by applying environmental management tools in order to perform feasibility study for the future objects and processes or Environmental Impact Analysis for the existing production processes and objects. The student will have skills to present the results to the different stakeholders in order to enable decision making process in Natural Disaster Risk Management.	
Learning outcomes The students will get key skills and techniques such as: data mining, statistical interpretation, visualization and, predictive analytics for handling such data collected by environmental monitoring.	
Content <i>Theoretical teaching</i> The course comprises eight assessed modules, a group project and an individual research project. The group project is an applied multi-disciplinary activity, providing student teams with the opportunity, whilst working under academic supervision, to gain an intimate knowledge of practical applied informatics technologies and systems, working within agreed objectives, deadlines and budgets.	

The project involves the application and integration of component informatics technologies and methodologies (such as visualization, GIS, modeling, software design, and geo-statistical and statistical analytics) to produce quality-assured innovative solutions

Literature

1. Bill, R., (1995): Spatial Data Processing in environmental Information Systems, , in: "Environmental Informatics - Methodology and Applications of Environmental Processing, Kluwer Academic Publishers, Dordrecht.
2. Burrough, P.A. and McDonnell, R.A. (1998) Principles of geographical information systems. Oxford University Press, Oxford, 327 pp.
3. Đokić Jelena, Galjak Jovana Primena informacionih tehnologija u zaštiti životne sredine, Praktikum 2017.
4. Hilty, L.M., Page, B., Radermacher F.J., Riekert W.F., (1995): Environmental Informatics as a new Discipline of Applied Computer Science, in: "Environmental Informatics - Methodology and Applications of Environmental Processing, Kluwer Academic Publishers, Dordrecht.
5. Lješević M., (2010): Životna sredina teorija i metodologija istraživanja, Univerzitet Singidunum, Fakultet za primenjenu ekologiju Futura, NVO EKORIZIK, Beograd.
6. Martijn van Leusen P., (1993): Cartographic modelling in a cell-based GIS, Computing the Past. Computer Applications and Quantitative Methods in Archaeology. CAA92. J. Andersen, T. Madsen & I. Scollar, pp.105-123. Aarhus University Press. Oxford (1993).
7. Nebert, Douglas D., (1995): Serving digital map information through the World Wide Web and wide-area information server technology. Reston, U.S. Geological Survey.
www.fao.org/nr/climpag/.../en3_051002_en
<http://www.weblakes.com/products/screen/>
<http://swat.tamu.edu/>
http://www.brr.cr.usgs.gov/projects/GWC_coupled/phreeqc/
<http://www.esri.com/what-is-gis>
<http://www.mikebydhi.com/Products/WaterResources/MIKESHE.aspx>

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
1	3		30	

Teaching methods

Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	10		
seminar paper	40		

Study programme: NATURAL DISASTER RISK MANAGEMENT

Level: Master Academic Studies

The name of the course: Natural disasters with participation of chemical agents

Lecturer (Name, middle name, last name): **Danijela Ilić**

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Completing the existing knowledge of chemistry and chemical hazards and risks in order to get results

of the managing function for the minimizing the risk from chemical hazards, based on systemic approach. The student should have overall definition of the chemical risk, recognize the possible sources, define chemical accidents and assess the risk. The student should give recommendation for information distribution, and normative form chemical accidents in case of natural disasters.

Learning outcomes

Graduate student have competences to apply the knowledge and skill in practice, and present complex risk assessment from chemical agents in natural disasters. The student will have competences to recommend the procedure for prevention, as well as for the mitigation of the chemical associated risk in natural disasters.

Content

Theoretical teaching

Hazardous materials (properties, classification). Chemical accidents (Intro, classification, phases, endangerous zones, accident status). Chemical accidents with discharge of hazardous materials. Chemical accidents with fire and explosions. Risk and risk management with presence of chemical agents. Procedures for prevention and mitigation from chemical associated risk

Literature

1. Bogdanović, M. (1999). Opasnosti od hemijskih akidenata. Beograd: Zadužbina Andrejević.
2. O. Stojanović, N. Stojanović, Đ. Kosanović, Opasne i štetne materije, Rad, Beograd, 1986.
3. Gržetić, I. (2006). Upravljanje rizikom u životnoj sredini i njegova procena, Hemijski fakultet, Univerzitet u Beogradu, Beograd
4. Pravilnik o metodologiji za ocenu opasnosti od hemijskog udesa i od zagađivanja životne sredine, merama pripreme i merama za otklanjanje posledica, "Službeni glasnik RS", br. 60/94.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	2			

Teaching methods

Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	60
colloquia	10		
seminar paper	20		

Study programme: NATURAL DISASTER RISK MANAGEMENT

Level: Master Academic Studies

The name of the course: Urban Design for Disaster Mitigation

Lecturer (Name, middle name, last name): Saja Kosanović

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

To introduce students with necessity to recognize the need for comprehensive taking into account of all problems in relation with sustainability and resilience of built environment, with special emphasis on causative factors, connections and influences, as well as consequences.

Learning outcomes

Students should:

- Learn basic terms and definitions in the area of sustainability and resilience of built environment;

- Have holistic perception of built environment as a complex system that in order to be functional has to spend resources and produce pollution, but in the same time is faced with local manifestation of climate changes. On the other hand it represents the basic spatial frame of life, which as such must find ways to react against existing challenges and in such a way ensure sustainability and resilience;
- Now how to deal with developed approaches in the area of sustainability and resilience of built environment and become capable for critical thinking;
- Become capable to develop argument-based discussion in relation with sustainability and resilience of built environment from the aspect of ecological, social and cultural aspects;

Content

Theoretical teaching

- Ecology of built environment: pollution, hygiene, health, biodiversity – situation and challenges
- Resources and built environment: energy, water, raw materials, soil;
- Sustainable development and built environment: concept of sustainable cities; problems of developing countries;
- Climate changes and built environment: global and local level, mitigation and adaptation to climate changes; energy crises and climate changes; pillars of sustainable development and the role of culture; social justice; psychological and sociological readiness; the role of empathy;
- Sustainable and resilient urban communities: sustainable and resilient rural communities; healthy communities and their relations to sustainable and resilient communities; smart societies;

Literature

1. Lješević, M. (2002) Urbana ekologija, Geografski fakultet Univerziteta u Beogradu, Beograd
2. Lješević, M. (2002) Ruralna ekologija, Geografski fakultet Univerziteta u Beogradu, Beograd
3. Gracia, E. and Vale, B. (2017) Unravelling Sustainability and Resilience in the Built Environment. Routledge
4. Hodson, M. and Marvin, S. (2014) After Sustainable Cities? Taylor & Francis
5. Bell, A.P. et al. (2005) Environmental Psychology. 5th edition. Psychology Press
6. Coyle, J.S. (2011) Sustainable and Resilient Communities: A Comprehensive Action Plan for Towns, Cities and Regions. John Wiley & Sons
7. Pickett, S.T.A., Cadenasso, M.L. and McGrath, B. (2013) Resilience in Ecology and Urban Design: Linking Theory and Practice for Sustainable Cities. Springer Science & Business Media
8. Morrison-Saunders, A., Pope, J., and Bond, A. (Eds.) (2015) Handbook of Sustainability Assessment. Edward Elgar Publishing Ltd

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
3	3			

Teaching methods

Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	15	written exam	
practical teaching	25	oral exam	40
colloquia			
seminar paper	20		

Study programme: NATURAL DISASTER RISK MANAGEMENT

Level: Master Academic Studies

The name of the course: Natural disasters risk management

Lecturer (Name, middle name, last name): Jelena Đokić

Course status: mandatory			
Number of ECTS: 5			
Prerequisites: no			
Course objective Understand of current situation, and build on existing information and capacities to determine the capacity (or lack of it) of elements at risk to withstand the given hazard scenarios; Development a strategy and action plan for different stakeholders in Natural Disasters.			
Learning outcomes The graduate will have competence to <ul style="list-style-type: none"> - awareness of the complex and overlapping nature of disaster, - mastering of methods, procedures and processes of risk identification - devising strategies and developing methodology and methods of emergency as part of NDRM - optimizing and managing available resources in emergency as part of NDRM systems - integrated management in natural disaster situations 			
Content <i>Theoretical teaching</i> History of risk and fire protection management and accidents with catastrophic consequences. Introduction to the risk function and its basic components. Introduction to the cycle of risk management in the events with catastrophic consequences. Introduction to institutional and legislative frameworks of risk and management and events with catastrophic consequences. Insurance and risk management and events with catastrophic consequences. The role of information and communication technologies in risk and fire protection management. Advanced techniques used in the integrated risk management of catastrophic events. An integrated view of multihazardous situations.			
Literature 1. Ellis, Derek V. 1989. Environments at Risk: Case Histories of Impact Assessment. Berlin; New York: Springer-Verlag. 2. Reducing Disaster Risk: A Challenge for Development. 2004. United Nations Development Programme, Bureau for Crisis Prevention and Recovery. New York. www.undp.org/bcpr 3. Tickner, Joel A. (ed.). 2003. Precaution, Environmental Science, and Preventive Public Policy. Washington, DC: Island Press. 4. van Aalst, Maarten, and Ian Burton. 2002. "The Last Straw; Integrating Natural Disaster Mitigation with Environmental Management." Disaster Risk Management Working Paper Series No. 5. The World Bank. http://www.worldbank.org/hazards/files/last_straw_final.pdf			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures:	
Study and research work:			
Teaching methods Lectures, presentations, preparation and defence of the seminar paper, interview and discussion, consultations.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	30		
seminar paper	20		
Study programme: NATURAL DISASTER RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Power supply in Post Disaster Period			

Lecturer (Name, middle name, last name): Nebojša Arsić				
Course status: mandatory				
Number of ECTS: 5				
Prerequisites: no				
Course objective Knowledge about composition and vulnerability of systems of power supply. Students will be introduced with major risks for operation of power supply and with measures for efficient recovery.				
Learning outcomes Students should be familiar with the functioning of power supply systems and to be able to recognize major threats for operational structure in specific regions. They should be able to give appropriate recommendations and apply adequate measures in order to mitigate consequences of natural disasters.				
Content <i>Theoretical teaching</i> Introduction. Types of natural disasters. Grid infrastructure. Vulnerability of power supply systems. Risk assessment. Damage Assessment. Impacts of widespread long-lasting blackouts. Planning of the aftermath of natural disasters. Recovery measures and rehabilitation. Critical services and community resilience. Reconstruction and development. Long-range planning. The future of the grid. Distributed generation. The smart grid.				
Literature 1. Building Resilience- Post Disaster Rehabilitation and Recovery, Knowledge and training resource center (KTRC) 2. Restoration of Electric Power System in Case of Natural Disasters, The National Academies Press, Washington 3. The Resilience of the Electric Power Delivery System in Response to Terrorism and Natural Disasters, The National Academies Press, Washington				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching	10	oral exam		60
colloquia				
seminar paper	20			

Study programme: NATURAL DISASTER RISK MANAGEMENT	
Level: Master Academic Studies	
The name of the course: Post-disaster measures in waste, water and sewer management	
Lecturer (Name, middle name, last name): Danijela Ilić	
Course status: elective	
Number of ECTS: 5	
Prerequisites: no	
Course objective	
The course will provide the knowledge and skills for the provision of safe and reliable drinking water and the removal and treatment of solid waste and wastewater as key functions after the disasters.	
Learning outcomes	

The graduate will have competence to

- asses vulnerability and criticality of water supplies and sources, waste water pipeline and waste landfill resilience to the disasters.
- assess and propose measures for the contamination risk;
- Communicate the assessment with authorities, public and media
- Draft operational plans for Infrastructure resilience, including back-up and contingency operational capability

Content

Theoretical teaching

Infrastructure objects. Emergency phase. Initial response phase. Contingency for critical assets. Information storage. Coordination between different stakeholders. Media releases and public information. Long term implications. Repair and recovery.

Literature

1. Johannessen, A., Bikaba, D. (2009): Sustainable Sanitation for Emergencies and Reconstruction Situations - Factsheet of Working Group 8

Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	

Teaching methods

Lectures, presentations, preparation and defence of the seminar paper, interview and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	30		
seminar paper	20		

Study programme: NATURAL DISASTER RISK MANAGEMENT

Level: Master Academic Studies

The name of the course: Water Resources Management in Natural Disaster Situations

Lecturer (Name, middle name, last name): Nataša Elezović

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Management of water bodies at the region affected by Natural Disasters. Planning, implementing, control and modification of the procedures concerning water reserves in Natural Disasters

Learning outcomes

The graduate will have skills

- to analyze current situation of the water resources;
- to understand the impact of climate change on water reserves;
- To classify the water bodies, and apply Water Directives;
- to plan activities in emergency situation;
- To consider the ownership over water resources, and plan the activities accordingly;
- To communicate the plans in clear and professional manner ;

Content

Theoretical teaching

Water intro: water circuit ; Water use and water shortage; Water chemistry and physics; Ground water

and drinking water; Water protection; Rewinding of rivers and streams; project work; Dams and water reserves; Legal aspects of water bodies; Public and private utility companies; Strategic planning

Literature

1. Brandt, Malcolm J.; Johnson, Michael; Ratnayaka, Don D.: Water Supply.
2. Branmark; Hansson: Biology of Lakes and Ponds.
3. Hammer: Water and Wastewater Technology

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2	2		30	

Teaching methods

Lectures, presentations, preparation and defense of the seminar paper, interview and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	60
colloquia	10		
seminar paper	20		

4.4 Link between competencies and subjects

		MANDATORY SUBJECTS					
		MS1	MS2	MS3	MS4	MS5	MS6
Generic competencies	communication		x		x	x	x
	critical thinking	x	x	x		x	x
	scenario modeling		x	x		x	x
	creativity		x	x	x	x	x
	initiative		x	x		x	x
	prediction of solutions and consequences		x	x	x	x	x
	collaboration		x	x	x	x	x
	working in multidisciplinary team		x		x	x	x
	intensive use of ICT in acquiring knowledge and solving problems		x	x			x
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x	x		x	x	x
	social and civic responsibility	x	x		x	x	x
	development of professional ethics and responsibility	x	x		x	x	x
	effective leadership		x		x	x	x
	strategic thinking		x		x	x	x
	identification and analysis of problems in NDRM		x	x			x
	experience-based critical decision making	x	x		x	x	x
	staying up-to-date with technological development	x	x	x		x	x
	holistic and proactive approach to NDRM situations	x	x				x
	clearly and unambiguously transfer knowledge to the professional and wider public		x	x	x		x

Subject-specific competencies	understanding of climate changes and natural disasters	x	x	x		x	x
	awareness of the complex and overlapping nature of disaster	x	x	x		x	x
	mastering of methods, procedures and processes of risk identification	x	x	x	x	x	x
	understanding the causes and consequences of disasters	x	x	x			x
	devising strategies and developing methodology and methods of emergency as part of NDRM				x	x	x
	optimizing and managing available resources in emergency as part of NDRM systems			x	x	x	x
	statistical data processing in order to define and make adequate conclusions		x	x		x	x
	integrated management in natural disaster situations			x		x	x
	understanding of civil protection mechanism and institutional framework in NDRM			x	x	x	x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x	x	x	x	x
	natural disasters analysis and risk assessment		x			x	
	knowledge about prevention, mitigation, response and recovery operations		x	x	x	x	x
	applying ICT in NDRM		x	x		x	x
	development of human resources in NDRM		x		x	x	
	applying specialized civil engineering fields in NDRM		x	x	x	x	x
	protection of critical infrastructure in natural disaster situations	x	x	x		x	x
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods		x	x		x	x
	cognizant of the needs of special populations	x	x		x	x	x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x	x	x		x	x

		ELECTIVE SUBJECTS					
		ES1	ES2	ES3	ES4	ES5	ES6
Generic competencies	communication	x			x	x	x
	critical thinking	x		x	x	x	x
	scenario modeling		x	x	x		
	creativity		x		x	x	x
	initiative	x			x		
	prediction of solutions and consequences	x	x	x	x		
	collaboration	x	x	x	x	x	x
	working in multidisciplinary team	x	x	x	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x	x		x		
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x		x	x	x	x
	social and civic responsibility	x	x		x	x	x

	development of professional ethics and responsibility	x		x	x	x	x
	effective leadership					x	x
	strategic thinking				x	x	x
	identification and analysis of problems in NDRM	x	x	x	x	x	x
	experience-based critical decision making				x		
	staying up-to-date with technological development	x	x	x			
	holistic and proactive approach to NDRM situations	x	x	x	x	x	x
	clearly and unambiguously transfer knowledge to the professional and wider public	x	x	x		x	x
Subject-specific competencies	understanding of climate changes and natural disasters	x	x	x	x	x	x
	awareness of the complex and overlapping nature of disaster	x	x	x	x	x	x
	mastering of methods, procedures and processes of risk identification	x	x	x		x	x
	understanding the causes and consequences of disasters	x		x	x	x	
	devising strategies and developing methodology and methods of emergency as part of NDRM	x			x		
	optimizing and managing available resources in emergency as part of NDRM systems				x		x
	statistical data processing in order to define and make adequate conclusions	x	x		x	x	x
	integrated management in natural disaster situations				x		
	understanding of civil protection mechanism and institutional framework in NDRM	x			x		
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x		x	x	x
	natural disasters analysis and risk assessment	x	x			x	
	knowledge about prevention, mitigation, response and recovery operations				x		x
	applying ICT in NDRM	x	x		x	x	x
	development of human resources in NDRM						
	applying specialized civil engineering fields in NDRM				x	x	x
	protection of critical infrastructure in natural disaster situations			x	x	x	
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods	x	x	x	x		x
	cognizant of the needs of special populations	x			x		
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x	x		x		x

MS1 - Natural disasters

MS2 - Natural disasters risk assesment

MS3 - Transportation Systems in Natural disasters

MS4 - Institutional Framework in NDRM

MS5 - Natural disasters risk management

- MS6 - Power supply in Post Disaster Period
- ES1 - Monitoring in prevention, recording and estimation of Natural disasters
- ES2 - Information technologies in Natural Disasters Management
- ES3 - Natural disasters with participation of chemical agents
- ES4 - Urban Design for Disaster Mitigation
- ES5 - Post disaster measures in waste, water and sewer management
- ES6 - Water Resources Management in Natural Disaster Situations

5. University of Sarajevo (UNSA - CIS)

5.1 Description of the study program

Name of study program and title

Master Academic Studies – PROTECTION FROM NATURAL DISASTERS

Title: Master of Natural Disaster Protection

The purpose of the study program

Frequent occurrences of natural disasters, both in the world and in our area, are becoming one of the most important world problems and factors of the further sustainable development of human civilization. Natural disasters have become a source of permanent threat to the community and the environment as a whole. The damage they cause exceeds all acceptable measures. We are witnessing that exposure to the effects of natural disasters (droughts, floods, landslides, earthquakes) has been greatly increased due to the low level of knowledge of the cause of the occurrence, mechanisms of action and protection.

Risk management means thinking ahead of time about potential events that can occur, the effects and consequences that institutions can face in the future, and take timely measures to minimize risks, thereby avoiding or reducing adverse effects. Effective risk management allows making better decisions, better planning and optimizing available funds, addressing priorities, and avoiding future problems that can occur in the operation of public sector institutions. To notice key risks and take appropriate measures in a timely manner, it is also important to avoid all financial effects that will necessarily arise in order to solve problems or consequences of the activated risks.

The particular problem of the countries in transition is that they imperatively seek educated experts who will be ready and educated in economic and industrial systems, public enterprises and state institutions to solve complex complex problems in the field of risk management of natural disasters / catastrophes, primarily on the basis of preventive action in order to achieve an acceptable level of risk in case of unwanted events.

The purpose of master studies in the field of protection against natural disasters is the education of experts for protection against natural disasters. Master students with advanced knowledge will be directly involved and, more importantly, will improve the process of identification, analysis and risk assessment, and in accordance with the acquired competencies, be able to participate in the development of strategies to prevent and mitigate current and future risks by aligning them with the best EU practices. Modernized classrooms with the latest equipment, software for performing simulations and estimation of natural disasters, and literature, will enable students to acquire practical knowledge that can be immediately applied.

Master Academic Studies The protection against natural disasters should enable students to concretize and expand their knowledge based on understanding the basic principles in the area of protection from natural disasters, mastering additional professional knowledge for the implementation of modern technical systems, gaining the ability to integrate knowledge that in each the concrete case should be applied in the course of the realization of the study program to be introduced in research independent and creative work.

The purpose of the study program in the area of protection against natural disasters is the education of students for the profession of a specialist professional engineer protection against catastrophic events in accordance with the basic needs of the society. The study program Protection against natural disasters is designed to provide the acquisition of competences and qualifications that are socially justified and useful. It is based on a contemporary curriculum and contemporary curriculum that tracks trends and flows in the field of protection against catastrophic events.

Master Academic Studies Protection against natural disasters lasts one year (two semesters). The title of master protection against natural disasters is obtained. The total number of hours of active teaching differs in relation to the selected module and elective subjects. All elective courses are defined within this study program and are selected from the list of offered electives.

The study program provides an accessible and modern, high quality education that will meet students 'expectations and employers' needs. The realization of this conceived study program is trained by specialist engineers (master profession) in protection from natural disasters who have competence, comparability and competitiveness in European and world frames.

Objectives of the study program

Master Academic Study in the field of Protection from Natural Disasters is accentuated on earthquakes, floods and landslides, and droughts, which are most often natural disasters in our area. In order to plan and perform successful rescue activities, knowledge in the field of civil engineering about damage to buildings during the operation of various natural disasters (earthquakes, floods and torrents, landslides) is necessary, which can lead to minor, medium and significant damage to structures, and ultimately to demolition. For the rehabilitation of the environment it is necessary to know the testing and monitoring of environmental parameters and remedial measures. The master program is highly represented by modern methods of prediction and monitoring of disorders or accidents - modeling, simulation and GIS technology. Students are primarily trained in preventive planning and action, risk assessment, decision making and operational action in conditions of catastrophic events, as well as planning and implementation of rehabilitation activities.

The aim of the study program Protection from Natural Disasters is to achieve competencies and academic skills in the field of risk management from disasters. By attending a study program, students can develop creative abilities to consider problems and the ability to stand up to

independent critical thinking, developing teamwork skills, cooperating and mastering specific theoretical as well as applied skills.

The aim of the study program is to educate and train students for rapid inclusion in immediate work related to risk management from disasters. The student should acquire the basics of knowledge to understand the mechanisms of natural disasters, such as earthquakes, landslides, floods and torrents, and the planning of measures and activities with the aim of reducing the negative effects on humans and the environment, and to master the techniques and procedures for the application of acquired knowledge in practice. The aim of the study program is to master the methodology of an integrated approach to the creation of a sustainable, environmentally non-violent built environment. Furthermore, the aim of the study program is the ability to include all previously acquired knowledge in the domain of planning and all other aspects of the construction profession through recognizing and respecting the interdependence of the various parts that make up the whole of the new space in interaction with the given environment.

The aim of the study program is to train a student to apply methods and current knowledge about natural hazard / hazard and risk assessment by integrating research and practical application on concrete construction structure or facility - special risk analysis and decision making. It will be familiar with various methods of analysis, techniques and tools for assessing sensitivity, and will be able to apply knowledge about different materials and their application to constructions either for prevention or for strengthening.

One of the special goals that is in accordance with the aims of education of experts at the Faculty of Civil Engineering at the University of Sarajevo is to develop students' awareness of the need for permanent education, to develop the ability to recognize, accept and understand topographic data models and algorithms as prerequisites for their implementation in topographic geoinformation systems.

The aim of the Master Study is to introduce students to selected methods of field research and monitoring and to train students to understand the problems of flooding and propagation of large waters and ways to reduce negative impacts on humans and the environment, then using modern tools in forecasting large waters and their role in flood protection. The aim of the study program is the education of master students for team work, with the development of the ability to present scientific results to the professional and general public, as well as the formation of a master student who is able to engage in scientific research work.

Competencies of graduated students

Requirements for employees dealing with risk management from natural disasters are broad and demanding. They should have knowledge and understanding of science from natural risks empowered by applied and practical skills. The competencies of graduate students (master)

involve a combination of knowledge, skills and attitudes and the ability to effectively apply them in the context of work responsibilities.

Given the complex theme of natural disasters, future curricula and programs should combine knowledge of natural phenomena, specific modern and innovative technologies and multiple social needs. New curricula should provide knowledge and deeper understanding of science in relation to natural risks, while strengthening applied and practical skills, recognizing that measures to address natural disasters are part of a wider scope and must be taken into account in planning processes. Their actions must be included in neighboring and regional plans and be part of sustainable and environmentally friendly solutions.

Due to the fact that the responsible decision-makers (eg, the minister, the mayor, etc.) are not usually experts in the field of natural disasters, a new profile of experts who would be trained in the curriculum in question could significantly contribute to making better decisions or preparing relevant information for their adoption. Master studies enable students to acquire knowledge and competencies that enable them to participate in: designing in the field of protection against catastrophic events; Develop elaborate on hazard zones; elaboration of flood protection plans, evacuation plans, rehabilitation plans; risk assessment of threats from natural disasters and catastrophic events and insurance damage assessment, in various companies aimed at the safety of citizens, and the like.

Learning outcomes of the master program Protection from natural disasters to students provides the following competencies:

- Implementation and development of the concept of integrated risk management from natural disasters,
- Determine the structure and content of the rehabilitation plans with an overview of construction measures for the rehabilitation of terrains, facilities and infrastructure,
- Building resistance to natural disasters,
- Mastering the methods of preventing, mitigating and remedying the appearance of terrain instability and damaging geotechnical structures in different geotechnical conditions,
- Assessment of seismic hazard, reduction of seismic risk, and management of such risk,
- Mastering methods for preventing, mitigating and remedying the emergence of hydrological hazards such as droughts and floods,
- Management of water resources in conditions of natural disasters,
- The legal regulation of emergency situations caused by natural disasters and the legal regime of human rights during emergencies,
- Innovation activities and team work in emergency management,
- Permanent education and development of the knowledge system in the area of risk management from natural disasters.

By completing the study program of Master Academic Studies, students acquire the competency for inclusion in specialist academic and doctoral academic study programs in the same or related fields of study.

Quality, contemporary and international compatibility of the study program

Due to the fact that natural disasters can have a huge impact on different sectors, which are subject to different laws, managing natural disasters requires knowledge of applicable national legislation, i.e. Institutional framework for action in situations of natural disasters. It is crucial to know the institutions and authorities responsible for the development and implementation of international, state, entity, cantonal and / or municipal laws and contacts with relevant persons.

In addition, awareness of EU legislation (eg EU Flood Directive, EU Water Framework Directive, bilateral or multilateral agreements, and other directives and documents) is necessary to meet international legal requirements. The development of such complex master programs that includes civil protection, emergency management, disaster risk reduction, risk reduction and prevention requires holistic and multidisciplinary approaches and will thus fulfill the commitment of higher education to the society in terms of contributing to a sustainable and sustainable society.

The new curricula will be integrated into national efforts to regulate and improve risk management and protection from natural disasters through a national legislative, strategic and institutional framework that are in the process of aligning with EU strategies and legislation in the context of the accession of Western Balkan countries (WB).

Objectives, contents of the course and activities of learning new master programs will be realized in accordance with previously defined competencies and rules and regulations on accreditation standards and procedures. Upon completion of the new curriculum, participants will acquire certain competencies to perform their duties, functions and responsibilities in an efficient, efficient and proactive way. The study program, while respecting the specifics of the educational space and the needs for university education in BiH, has been harmonized with European standards regarding enrollment conditions, duration of studies, conditions for transition to the next year, acquisition of diploma and study methods, in particular with the outcome of study programs, that is, with competencies of master students.

The study program is in line with contemporary world trends and the state of the art, science and arts in the respective educational and scientific field and is comparable to similar programs at foreign higher education institutions, and especially within the European educational area. The study program is comparable and harmonized with the study programs of the following scientific and educational institutions:

- The University of Manchester, MSc International Disaster Management <http://www.manchester.ac.uk/study/masters/courses/list/09910/msc-international-disaster-management/course-details/>

- Kingston University London, Hazards & Disaster Management Masters (MSc) <http://www.kingston.ac.uk/postgraduate-course/hazards-disaster-management-msc/>
- Bauhaus-Universität Weimar, Natural Hazards and Risks in Structural Engineering (MSc) <https://www.uni-weimar.de/en/civil-engineering/studies/master-degree-programmes/natural-hazards-and-risks-in-structural-engineering-master-of-science/>
- University of Twente, Netherland, Msc Applied Earth Sciences- Natural Hazards, Risk And Engineering <https://www.utwente.nl/en/education/master/programmes/geo-information-science-earth-observation/specialization/applied-earth-sciences-natural-hazards-risk-engineering/#spatial-information-for-effective-disaster-risk-management>
- University of Copenhagen, Master of Disaster management http://www.mdma.ku.dk/programme_layout/

5.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Natural disasters and catastrophes	2+2+0	5
2.	M	Risk management from natural disasters	2+2+0	5
3.	M	Spatial planning in the function of reducing the risk of disasters	2+2+0	5
4.	E	Elective subject 1	2+2+0	5
5.	E	Elective subject 2	2+2+0	5
6.	E	Elective subject 3	2+2+0	5
		Protection and rescue system in natural disasters		
		Water - environmental problems in case of natural disasters		
		Water protection and sustainable development		
		In-situ testing and monitoring		
		Evaluation and reinforcement of existing structures		
		Earthquakes and numerical modeling of structures		
		Rehabilitation of objects of cultural and historical heritage		
		Durability of material as a preventive measure		
		Cartography		
		Topographic / cartographic models		
		Spatial databases and IPPs		
		Remote surveys		
		Information and communication technologies for risk management from natural disasters		

SECOND SEMESTER				
7.		Research in the field of master work	0+20+0	15
8.		Master thesis		15
Total			12+32+0	60

5.3 Subject specification

Study programme: PROTECTION FROM NATURAL DISASTERS
Level: Master Academic Studies
The name of the course: Natural disasters and catastrophes
Lecturer (Name, middle name, last name): Đenari Čerimagić, Naida Ademović, Emina Hadžić, Adis Skejić, Hata Milišić
Course status: mandatory
Number of ECTS: 5
Prerequisites: no
Course objective The aim of the course is to raise knowledge about natural disasters, and to achieve the recognition and prevention of the consequences of natural disasters.
Learning outcomes Understanding the mechanisms for reporting natural disasters, such as earthquakes, landslides, floods and floods, and planning measures and activities to reduce negative effects on people and the environment.
Content <i>Theoretical teaching</i> <ul style="list-style-type: none"> - Introduction to Natural disasters and disasters. - Climate change and their impact on the occurrence of natural disasters and disasters. - Understanding the mechanism of natural disasters and catastrophes, and getting acquainted with methods and techniques to reduce the negative effects of earthquakes, landslides, floods and torrential rains on humans and the environment. - The consequences of natural disasters and disasters. - Litosphere disasters: tectonic movements, volcanism, asteroids, comets and meteorites. - Seismism: seismic rejonization, seismic hazard, seismic risk, protection measures. - Geomorphologic disasters: landslides, techniques and protective measures. - Rocks, soil rupture, protection measures - Climatic disasters: intense precipitation, storm-gradient disasters, drought, protection measures. - Frost, frost, fog, snow and ice, electrical discharges and storm winds. - Water disasters: floods on floodwaters, torrential floods. - Coastal floods caused by atmospheric and geomorphological causes, avalanches and protection measures. - Protection against natural disasters and disaster management - The most significant natural disasters in BiH - mapping. <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Preparation of seminar work in the area of natural disasters and disasters. Presentation and defense of seminar papers in the field covered by the theoretical content of the course
Literature 1. Natural Hazards, Journal of the International Society for the Prevention and Mitigation of Natural

Hazards, <https://link.springer.com/journal/11069>, 1989-2017.

- Goudie A. (2006): The Human Impact on the Natural Environment. Blackwell publishing, USA.
- Abbott P. (2008): Natural disasters. McGraw-Hill Higher education.
- Uitto, Juha Ilari, Puri, Jyotsna, van den Berg, Rob D. (Eds.) Evaluating Climate Change Action for Sustainable Development and Mitigation of Natural Hazards Springer, 2017
- Alcira Kreimer, Margaret Arnold, Anne Carlin (Editors) Globalization and Urban Development The World Bank, 2003.
- Mark Pelling The Vulnerability of Cities: Natural Disasters and Social Resilience 1st Edition Earthscan from Routledge, 2003.
- Edward A. Keller Duane E. DeVecchio, Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes 4th Edition Routledge, 4 edition, 2014.

Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Lectures, exercises, research work, consultations, project or seminar work.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	10	written exam	30	
practical teaching		oral exam		
colloquia	30			
seminar paper	30			

Study programme: PROTECTION FROM NATURAL DISASTERS
Level: Master Academic Studies
The name of the course: Risk management from natural disasters
Lecturer (Name, middle name, last name): Emina Hadžić, Naida Ademović, Hata Milišić, Adis Skejić, Nusret Drešković, Slobodanka Ključanin
Course status: mandatory
Number of ECTS: 5
Prerequisites: no
Course objective
Acquiring theoretical and practical knowledge in the field of risk management from natural disasters. Special determination of the structure and content of the rehabilitation plans with an overview of construction measures for the rehabilitation of terrains, facilities and infrastructure.
Learning outcomes
Students are trained to identify and manage risks from natural disasters with the optimal use of available resources, with appropriate software support
Content
<i>Theoretical teaching</i>
Types and nature of catastrophes. Characteristic features of emergency situations and disasters. Common Characteristics of Disasters. Major disaster agent - increased vulnerability. Risk categories. Assessment of risk and vulnerability. Basic components of risk assessment. GRIP (Global Framework for Risk Identification). National Risk Assessment - NRA. Disaster management. Main activities of the management cycle. Measures and activities before the disaster. Measures and activities after the disaster. General Characteristics of Disasters, General Countermeasures and Special Issues for Emergency Management. Disaster Risk Reduction (SROK) as a process, scientific discipline and social phenomenon. Implementation of SROK. Preventing major accidents involving hazardous substances. Seveso directive - history, goals, conditions and scope. New technologies in decision-making in hazard management. Normative-legal framework (how Legislation promotes reducing the risk of disaster at the community

level). International cooperation and assistance in protection and rescue (National, regional and subregional platform for SROK).

Practical teaching

Preparation of seminar papers in the field of risk management from natural disasters. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.

Literature

1. Birkmann, J., Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies, UNU press, 2004.
2. S.N. Ghosh, Flood Control and Drainage Engineering, CRC Press, New York.
3. Flood Risk Management: Hazards, Vulnerability and Mitigation Measures, Springer Netherlands 2006.
4. Paul B. Sayers, Flood Risk: Planning, Design and Management of Flood Defence Infrastructure, Institution of Civil Engineers (ICE), 2012.
5. http://www.msb.gov.ba/PDF/HRA_BHS_Final21122015.pdf
6. <http://fucz.gov.ba/procjena-ugrozenosti-federacije-bih-od-prirodnih-i-drugih-nesreca/>

Number of classes of active teaching 60

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
30	30			

Teaching methods

Lectures, exercises, research work, consultations, project or seminar work.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	30
practical teaching		oral exam	30
colloquia			
seminar paper	30		

Study programme: PROTECTION FROM NATURAL DISASTERS

Level: Master Academic Studies

The name of the course: Spatial planning in the function of reducing the risk of disasters

Lecturer (Name, middle name, last name): Dženana Bijedić, Emina Hadžić, Denis Zvizdić, Slobodanka Ključanin, Nusret Drešković

Course status: mandatory

Number of ECTS: 5

Prerequisites: no

Course objective

The aim of the course is to achieve the recognition and prevention of the emergence of natural risks triggered by ruthless human interventions in the given environment.

Learning outcomes

Mastering the methodology of an integrated approach to creating a sustainable, environmentally non-violent built environment. Ability to include all previously acquired knowledge in the field of planning and all other aspects of the construction profession through recognizing and respecting the interdependence of the various parts that make up the whole of the new space in interaction with the given environment.

Content

Theoretical teaching

Space and its phenomenology - planning models and tools; natural, built and given environment - mutual interactions between the enclosed and newly constructed areas, the risks of physical contamination in the process of construction; water and soil - the effects of construction on the risks of both water and soil.

<i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Preparation of seminar work in spatial planning in the function of risk management from natural disasters. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.				
Literature 1. Bijedić, Dž, ARHITEKTURA: Holizam umjesto optimalizacije - Integralni pristup u arhitektonskom stvaralaštvu, Acta architectonica et urbanistica, Univerzitet u Sarajevu, Sarajevo. 2012. 2. Natural Hazards, Journal of the International Society for the Prevention and Mitigation of Natural Hazards, https://link.springer.com/journal/11069 , 1989-2017. 3. Seth Stein, Jerome L. Stein, Playing against Nature: Integrating Science and Economics to Mitigate Natural Hazards in an Uncertain World (Wiley Works), American Geophysical Union, 2005. 4. Burby, R.J. Cooperating with Nature: Confronting natural hazards with land-use planning for sustainable communities, Joseph Henry Press, Washington, D.C. 1998.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Lectures, exercises, research work, consultations, project or seminar work.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	30
practical teaching			oral exam	30
colloquia				
seminar paper		30		

Study programme: PROTECTION FROM NATURAL DISASTERS	
Level: Master Academic Studies	
The name of the course: Protection and rescue system in natural disasters	
Lecturer (Name, middle name, last name): Hata Milišić, Emina Hadžić, Naida Ademović, Adis Skejić	
Course status: elective	
Number of ECTS: 5	
Prerequisites: no	
Course objective The objective of the course is to master the basic knowledge for successful action in the framework of the protection and rescue system in case of natural disasters. Students get acquainted with theoretical achievements, legal bases and practice of achieving protection and rescue in case of natural disasters, general models and systems of protection and rescue, forms of management and management, organization, preparation of participation of citizens, legal entities, public institutions and local self-governments in protection and saving from danger and the consequences of natural disasters.	
Learning outcomes After passing the exam, students will be trained to identify the elements of the protection and rescue system in case of natural disasters, as well as to understand the place and role of the protection and rescue system in the national security system. Participants will have a more rational approach to solving tasks in practice and will be able to plan and implement more effectively and efficiently their protection and rescue tasks in case of natural disasters.	
Content <i>Theoretical teaching</i> Introduction to the subject. Conception of protection and rescue systems. Emergencies in case of natural disasters (earthquakes, landslides, landslides, floods, fires, droughts, epidemics). Modern national protection and rescue systems and international organizations. BiH Protection and Rescue System and	

Legal Basis. Place of protection and rescue system in the national security system. Planning and financing of protection and rescue systems. Strengths of the protection and rescue system in case of natural disasters. Methodology for making estimates of BiH's vulnerability in case of natural disasters. Management of the system of protection and rescue in case of natural disasters. Tasks of Civil Protection in case of natural disasters. Tasks of the Army of BiH in providing assistance to civilian authorities in case of natural disasters and civil-military cooperation. International cooperation in the field of protection and rescue in case of natural disasters.

Practical teaching

Audio-visual exercises that accompany theoretical lessons; Preparation of seminar work in the area of Protection and Rescue System in case of natural disasters. Presentation and defense of seminar papers in the field covered by the theoretical content of the course. Educational visit to the Sector for Protection and Rescue of the Ministry of Security of Bosnia and Herzegovina (Operational Communication Center BiH-112), Federal Administration of Civil Protection of the Federation of Bosnia and Herzegovina and the Cantonal Civil Protection Administration.

Literature

1. Babić, B., Komazec, N.: Sistem zaštite i spasavanja, Beograd, 2017
2. Toth, I.: Upravljanje zaštitom i spašavanjem u katastrofama (U: Mjere i sredstva za zaštitu od terorizma, zbornik radova). - Zagreb: Visoka škola za sigurnost na radu/IPROZ, 2001.
3. Z. Milutinović: Rukovođenje u katastrofama: Zbornik tema za obuku struktura zaštite i spasavanja u BiH, Sarajevo 2003. godine.
4. R. Stojanović: Zaštita i spašavanje ljudi u vanrednim situacijama, VIZ, Beograd, 1984. god.
5. Okvirni zakon o zaštiti i spašavanju ljudi i materijalnih dobara od prirodnih ili drugih nesreća u Bosni i Hercegovini, ("Službeni glasnik BiH", br. 50/08).
6. Mega gradovi - Smanjenje ranjivosti na prirodne katastrofe, Institut civilnih inženjera, 1995.
7. Federalna uprava civilne zaštite: Procjena ugroženosti BiH od prirodnih i drugih nesreća, Sarajevo 2011.
8. Zbornik radova "Hrvatska platforma za smanjenje rizika od katastrofa, Zagreb 2011.
9. <http://www.msb.gov.ba/PDF/zastita%20i%20spasavanje%20u%20bih%202010.doc1.pdf>

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
2		3	2	

Teaching methods

Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents.

Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of emergency management models and independent research work. During the course of the course, the student is obliged to elaborate an emergency management model through seminar work. Knowledge testing is done through a written exam. The requirement for entering the exam is successfully defended seminar work.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	40
practical teaching	20	oral exam	
colloquia			
seminar paper	30		

Study programme: PROTECTION FROM NATURAL DISASTERS

Level: Master Academic Studies

The name of the course: Water - environmental problems in case of natural disasters

Lecturer (Name, middle name, last name): Emina Hadžić, Suvada Jusić, Amra Serdarević

Course status: elective				
Number of ECTS: 5				
Prerequisites: no				
Course objective Introduction to concepts and mastering methods and methodologies for water resources protection and hydrotechnical facilities in case of natural disasters. Introduction to the problems: protection of water sources, provision of adequate water supply and waste water disposal, as well as problems of waste landfill waters, as well as waste management methods, with emphasis on construction and demolition waste, which often arises as a major problem in case of floods, torrents, earthquakes and other natural disasters.				
Learning outcomes Understanding the issues of Integrated Water Resources Management and Environmental Management; getting acquainted with the principles of establishing a water supply system with emphasis on the conditions caused by natural disasters, collecting and draining wastewaters in conditions of natural disasters; principles and methods of waste management and adequate exclusion in case of natural disasters. Understand how to reduce harmful effects on humans and the environment.				
Content <i>Theoretical teaching</i> Integrated Water Resources Management. Protection of water resources. Supplying and channeling the settlement with water. Waste management. <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Preparation of seminar work in the field of water and environmental problems in case of natural disasters. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.				
Literature 1. E.Hadžić, Osnove zaštite podzemnih voda, GFSA, 2013. 2. S.Jusić, Osnove modeliranja pripreme vode za piće, GFSA, 2016. 3. A.Serdarević, Upravljanje čvrstim otpadom, GFSA, 2016. 4. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science (3rd Edition) [PAPERBACK],Amazon, 2015. 5. J. Margeta,Vodoopskrba naselja,Sveučilište u Splitu,2010.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Lectures, exercises, research work, consultations, project or seminar work.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching		oral exam		30
colloquia	30			
seminar paper	30			
Study programme: PROTECTION FROM NATURAL DISASTERS				
Level: Master Academic Studies				
The name of the course: Water protection and sustainable development				
Lecturer (Name, middle name, last name): Emina Hadžić, Hata Milišić				
Course status: elective				
Number of ECTS: 5				

Prerequisites: no			
Course objective To master methods and methods of protection against harmful effects of water, to prevent damage, to reduce the risk of negative effects of water. Introduction to the problem of harmful effects of water on people, objects and the general environment, and implementation of measures and activities for reducing harmful effects.			
Learning outcomes Understanding the problem of flooding and propagation of large waters and ways to reduce negative impacts on humans and the environment. Use of modern tools in forecasting large waters and their role in flood protection. After completing the course, students should: <ul style="list-style-type: none"> - Understand and explain the main problems of flood management; - Understand and explain the conditions for the occurrence and spread of floods; - Identify the appropriate methodology for a particular problem; - Use your practical experience in the process of modeling the flood, step by step (geometry, bathymetry, boundary conditions, model parameters, etc.) needed to perform a practical study with MIKE11 or HEC-RAS package. 			
Content <i>Theoretical teaching</i> River morphology. Watercourses as an element of the water management system. Floods and flood risks. Hydrological aspects of the flood defense problem. Retention and analysis of retention work. The role of retention in addressing the problem of flood protection. Morphodynamic analysis of the watercourse. Approach the problem of local instability of the trough. Maintenance of water management facilities as a measure of flood protection. The strategy of living with floods. Computer models of flood wave propagation (MIKE 11, HEC-RAS). <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Creation of software tasks - flood modeling using software packages MIKE11 or HEC-RAS. Presentation and defense of program tasks.			
Literature <ol style="list-style-type: none"> 1. Peter Wynn ,Hydraulics for Civil Engineers (ICE Textbook series), 2014 2. Howard H. Chang, Fluvial Processes in River Engineering Krieger Publishing Company, 1988. 3. Maged M. El Osta, Mohamed Sh. El Sabri and Milad H.M, Estimation of flash flood using surface water model and GIS technique in Wadi El Azariq, East Sinai, Egypt Journal : Natural Hazards and Earth System Sciences, 2016. 4. Hubert Chanson,Hydraulics of Open Channel Flow: An Introduction - Basic Principles, (Second Edition) 2nd EditionButterworth Heinemann, 2004. 5. By Ning Chien and Zhaohui Wan,Mechanics of Sediment Transport,American Society of Civil Engineers, 1999. 6. Zeleňáková, Martina Zvijáková, Lenka,Using Risk Analysis for Flood Protection Assessment, Springer, 2017. 			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 30	Other form of lectures:	
Study and research work:			
Teaching methods Lectures, exercises, research work, consultations, project or seminar work.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	30
practical teaching		oral exam	
colloquia	30		

seminar paper	30		
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Study programme: PROTECTION FROM NATURAL DISASTERS			
Level: Master Academic Studies			
The name of the course: In-situ testing and monitoring			
Lecturer (Name, middle name, last name): Adis Skejić			
Course status: elective			
Number of ECTS: 5			
Prerequisites: no			
Course objective Introduce students with selected simple and more complex methods of field research of soil and monitoring movements of terrains and structures on potentially unstable terrain. Understanding the main advantages and disadvantages of certain testing and monitoring techniques. Preparation of test and tracking reports with interpretation of results.			
Learning outcomes Understanding the principles of field testing techniques and understanding monitoring techniques. Independent interpretation of testing and monitoring results.			
Content <i>Theoretical teaching</i> Overview of selected techniques used to test and monitor ground and rock movements on slopes and potentially unstable slopes. Exploratory racks. Bores. Level of groundwater and measurement of water level and pressure. Penetration tests. Monitoring of landslides and potentially unstable slopes. Simple practical observation techniques. Advanced observation techniques (monitoring). Reverse analysis for confirmation of monitoring results. Procedures for detecting ground shifts or damage to the building. Emergency relief measures for unstable terrain. Measures of permanent rehabilitation of buildings and facilities. <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step. Creating physical models to understand the concepts of testing and observation techniques.			
Literature 1. Dunnicliff, J. Geotechnical instrumentation for monitoring field performance. John Wiley & Sons, 1993. 2. Grubić Nenad, Stabilnost kosina i sanacija klizišta, Građevinski fakultet Sarajevo, 2006. 3. Smolczyk, U. (Ed.). Geotechnical Engineering Handbook, Procedures (Vol. 1,2,3). John Wiley & Sons, 2003.			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 30	Other form of lectures:	
Study and research work:			
Teaching methods Presentation of theoretical foundations and practical problems. Practical examples are explained step by step. Creating physical models to understand the concepts of testing and observation techniques.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	30
practical teaching	10	oral exam	20
colloquia	30		
seminar paper			

Study programme: PROTECTION FROM NATURAL DISASTERS
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Level: Master Academic Studies			
The name of the course: Evaluation and reinforcement of existing structures			
Lecturer (Name, middle name, last name): Naida Ademović			
Course status: elective			
Number of ECTS: 5			
Prerequisites: no			
Course objective Empowering the student to apply methods and current knowledge of natural hazards / hazards and assess the condition of a particular structure after the impact of the earthquake and the possible reinforcement method. Within this course, practical applications will be carried out on the concrete construction structure or facility. Students will be able to apply modern appropriate building modeling software into dynamic models and be able to evaluate the characteristics of the seismic response depending on the design method; they will be able to recognize the breakdown mechanisms and defects in design, and to assess the appropriateness of the reinforcement measures.			
Learning outcomes Ability to assess the condition of existing buildings Knowledge of earthquake damages, causes and lessons learned; Ability to propose a reinforcement of the construction.			
Content <i>Theoretical teaching</i> Introduction to earthquakes, Causes of earthquakes and damage to structures, Lessons learned from previous earthquakes, Behavior of structures in earthquake activity, Different types of damage depending on the type of construction and materials, Identification of representatives of certain types of buildings; assessment of damaged structures, rehabilitation strategies and reconstruction techniques; Modes of reinforcement of structures <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step. Preparation of seminar paper. Presentation and defense of seminar papers in the field covered by the theoretical content of the course			
Literature 1. Editors: Alper Ilki, Faruk Karadogan, Sumru Pala, Ercan Yuksel, Seismic Risk Assessment and Retrofitting With Special Emphasis on Existing Low-Rise Structures, Springer 2009. 2. Edited by Barry Goodno, Ph.D., P.E., Improving the Seismic Performance of Existing Buildings and Other Structures, American Society of Civil Engineers, 2009.			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 30	Other form of lectures:	
Study and research work:			
Teaching methods Lectures and discussions, analyzes of concrete cases on the ground, drawing conclusions and mentoring at the individual level.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	50
practical teaching		oral exam	
colloquia	20		
seminar paper	20		
Study programme: PROTECTION FROM NATURAL DISASTERS			
Level: Master Academic Studies			
The name of the course: Earthquakes and numerical modeling of structures			

Lecturer (Name, middle name, last name): Naida Ademović				
Course status: elective				
Number of ECTS: 5				
Prerequisites: no				
Course objective The aim is to provide a clear and effective introduction to the fundamental principles of earthquake and seismic behavior, design and analysis. The principles of behavior are related to the EC8 through examples, tutorials and formed discussion. It will be possible to apply the analysis of different constructions. Upon completion of this course, students will be able to: understand damage from earthquakes and their causes, perform conceptual design of structures in earthquake zones, conduct structural analysis using an equivalent static method according to EC8, understand seismic calculation of buildings according to EC8, prices of certain details necessary for seismic structural analysis according to EC8.				
Learning outcomes Ability to design earthquake resistant structures in accordance with EC8, Knowledge of soil and geotechnical aspects, Knowledge of seismic analysis methods, Knowledge of equivalent static method, Knowledge of the principles of conceptual design of earthquake-resistant buildings, Respecting design and details in accordance with EC8.				
Content <i>Theoretical teaching</i> Soil movement & geotechnical aspects (earthquake measurement, soil types, response spectrum), Behavior Requirements & Compliance Criteria; Seismic analysis (selection of calculation method, modeling, calculation using response spectra, equivalent static analysis with examples, THA with examples, design safety assessment, basic principles of conceptual design of buildings and details of reinforcement <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step. Preparation of seminar paper. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.				
Literature 1. Anil K.Chopra, Dynamics of Structures: theory and application to earthquake engineering, Prentice-Hall Inc., 2001. 2. Villaverde,Roberto, Fundamental concepts of earthquake engineering, CRC Press, 2009. 3. Edited by W.F. Chen E.M. Lui, Earthquake engineering for structural design, CRC Taylor and Francise, 2006.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Presentations of the theoretical basis and practical problems.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	50
practical teaching			oral exam	
colloquia		20		
seminar paper		20		

Study programme: PROTECTION FROM NATURAL DISASTERS				
Level: Master Academic Studies				
The name of the course: Rehabilitation of objects of cultural and historical heritage				
Lecturer (Name, middle name, last name): Naida Ademović				
Course status: elective				
Number of ECTS: 5				
Prerequisites: no				
Course objective Develop an understanding of the mechanical and constructive behavior of masonry structures due to the action of different loads. Identify the various scientific tools available for assessing the condition and diagnosis of constructive changes in historical constructions. Develop a framework for selecting appropriate repairs or reinforcement strategies to damage the construction of cultural and historical heritage. Develop a framework for the selection of appropriate materials for the repair and strengthening of historic buildings. Students will be able to apply knowledge about different materials and their application to constructions either for prevention or for strengthening.				
Learning outcomes Ability to perform the calculation of historical buildings with an emphasis on seismic activity. Knowing damage to earthquakes, causes and lessons learned. Knowledge on the main characteristics of composite materials, geotextiles and polymers.				
Content <i>Theoretical teaching</i> Introduction to cultural heritage and historical buildings. Need, criteria and methodology for interventions. Existing information about buildings. Constructive assessment of the building. Repair and Reinforcement. Quality of intervention work. <i>Practical teaching</i> Audio-visual exercises that accompany theoretical lessons; Preparation of seminar paper. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.				
Literature 1. Editors: Alper Ilki, Faruk Karadogan, Sumru Pala, Ercan Yuksel, Seismic Risk Assessment and Retrofitting With Special Emphasis on Existing Low-Rise Structures, Springer 2009. 2. Edited by Barry Goodno, Ph.D., P.E., Improving the Seismic Performance of Existing Buildings and Other Structures, American Society of Civil Engineers, 2009. 3. Edited by Michael Forsyth Department of Architecture and Civil Engineering University of Bath, Structures & construction in historic building conservation, Blackwell Publishing, 2007.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods Presentations of the theoretical basis and practical problems.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	50
practical teaching			oral exam	
colloquia		20		
seminar paper		20		

Study programme: PROTECTION FROM NATURAL DISASTERS				
Level: Master Academic Studies				
The name of the course: Durability of material as a preventive measure				
Lecturer (Name, middle name, last name): Azra Kurtović				
Course status: elective				
Number of ECTS: 5				
Prerequisites: no				
Course objective				
Introducing students with the significance and selection of building materials from the aspect of sustainability				
Learning outcomes				
Students will be able to perform the proper selection of building materials prior to the construction of objects for the purpose of preventing natural disasters based on knowledge of the properties of materials that are closely related to the durability of the structure.				
Content				
Theoretical teaching				
The notion of durability of building materials. Getting to know the properties of the material in order to select before building construction (preliminary examination). Material properties are closely related to sustainability (structural, technological, rheological, exploitation, chemical, fire resistance). Aging material. Concrete conditions for the exploitation of the building (climate and microclimate conditions, degree of aggressiveness of the environment). Observation and maintenance of built-in materials in the building				
Practical teaching				
Audio-visual exercises that accompany theoretical lessons; Preparation of seminar paper. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.				
Literature				
1. A. Kurtović, Kamen u graditeljstvu, Građevinski fakultet, 2014.				
2. A.M.Neville & J.J.Brooks, Concrete technology. Longman Scientific & Technical, 2010.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:	
Teaching methods				
Presentations of the theoretical basis and practical problems.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	40
practical teaching			oral exam	
colloquia		30		
seminar paper		20		

Study programme: PROTECTION FROM NATURAL DISASTERS			
Level: Master Academic Studies			
The name of the course: Cartography			
Lecturer (Name, middle name, last name): Slobodanka Ključanin			
Course status: elective			
Number of ECTS: 5			
Prerequisites: no			
Course objective			
Basic knowledge of cartographic design and cartographic presentation methods (analogue, digital and			

virtual) and procedures for creation, reproduction and maintenance of maps.

Learning outcomes

Understanding cartographic principles. Independent use of spatial data and preparation of topographic and / or thematic maps

Content

Theoretical teaching

Mapping process. Hardware and software in cartography. Modeling geospatial objects, attributes, vectors, and raster data. Cartographic modeling. Basic geometric-graphic elements. Cartographic signs. Factors that affect cartographic generalization. Cartographic procedures of generalization. Mode cartographic generalization. Modeling relief and 3D objects. Cartographic reproduction. Digital mapping procedures and repeat procedures. A set of data for user use. Use of cards. How to maintain mapping

Practical teaching

Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step.

Literature

1. Frangeš, S. Opća kartografija (rukopis), <https://www.scribd.com/document/50616903/opca-kartografija>, 2003.

2. Lovrić, P. Opća kartografija, Sveučilište u Zagrebu, 1988.

3. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, a.J., Guptill, S.C, Elements of Cartography, New York, J. Wiley and Sons, 1995.

Number of classes of active teaching

Lectures:30

Exercises:30

Other form of lectures:

Study and research work:

Other

Teaching methods

Presentation of the theoretical basis and practical problems. Practical examples are explained step by step. Build physical models to validate results obtained by numerical models.

Grade (maximum number of credits 100)

Pre-exam requirements

credits

Final exam

credits

activity during lectures

5

written exam

50

practical teaching

5

oral exam

colloquia

20+20

seminar paper

Study programme: PROTECTION FROM NATURAL DISASTERS

Level: Master Academic Studies

The name of the course: Topographic / cartographic models

Lecturer (Name, middle name, last name): Slobodanka Ključanin

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Developing the ability to recognize, accept and understand topographic data models and algorithms as prerequisites for their implementation in topographic geoinformation systems

Learning outcomes

Understanding and acquiring skills to work independently with:
Digital Field Modeling (DTM); Interpolation and reconstruction of surface display techniques; DMR (Digital Relief Modeling) applications, Topographic modeling; Geodata processing tools.

Content

Theoretical teaching

Terminology. Spatial Information Systems, Topographic Information System (TIS), Geographic Information System (GIS). Definitions: for GIS, for databases; Data model. Definitions of TIS and its key components. Data in the topographic database. Structure and design of topographic models. Object definition. Real objects, abstract objects. Geometry. Topology. Object dimensions. Types of spatial models. 2D, 2.5 D and 3D models. Mutual conversions. Modeling Geospatial Data. Importance of data quality. Quality of data and understanding of quality. Elements of data quality. Standards and international organizations. Different methods of collecting spatial data. Structuring Spatial Data. Basic vector algorithms. Delunay Triangulation and Voronoi Diagrams. Interpolation and curve approximation. Relief models from 3D triangles. Spatial Data Sharing: INSPIRE - Infrastructure for Spatial Information in the European Union. Purpose, objectives and principles of the INSPIRE directive. Data included in the INSPIRE Directive. INSPIRE Geoportal. Spatial data topics of a specific INSPIRE directive. National Spatial Data Infrastructure (NIPP). Infrastructure of Spatial Data of the Federation of BiH (IPPFBiH). National Geoportal.

Practical teaching

Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.

Literature

1. Zhilin Li, Quing Zhu, Christopher Gold, Digital Terrain Modeling – Principles and Methodology, Digital Terrain Modeling – Principles and Methodology, 2005.
2. ENVI, Surveying - Introduction to Topographic Modeling,
http://www.ce.memphis.edu/1101/notes/surveying/Surveying_5_topo_modeling.pdf
3. Alberto Pistocchi, Digital Elevation Models, Topographic Controls, and Hydrologic Modeling in GIS, John Wiley & Sons, Inc., 2014.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
30	30			

Teaching methods

Presentation of the theoretical basis and practical problems. Practical examples are explained step by step. Creating specific data models from available spatial data.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam	50
practical teaching	5	oral exam	
colloquia			
seminar paper	40		

Study programme: PROTECTION FROM NATURAL DISASTERS

Level: Master Academic Studies

The name of the course: Spatial databases and IPPs

Lecturer (Name, middle name, last name): Slobodanka Ključanin

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Getting acquainted with various methods for accessing spatial data sets collected from competent institutions in the Federation of Bosnia and Herzegovina

Learning outcomes

After completing this course, the student will:

1. have sufficient knowledge in the spatial databases and spatial data infrastructure.
2. Basic and applied knowledge about principles, methods, implementation and operational management of spatial databases and spatial data infrastructure.
3. Know about the EU and national standards on FDI.

Content

Theoretical teaching

Database models and data modeling, Relational, Object Oriented, Relational, Object Oriented Extensions, and XML models and databases, Spatial Data Models and Spatial Database Systems, Spatial Query Languages, Spatial Storage and Indexing, Query Processing and Optimization, Spatial Networks, Project management and spatial database implementation Resource spatial data and decision support systems, Spatial database system spatial, Spatial data sources (public, open access, commercial), Spatial Data Infrastructure (SDIs) - basics, components, SDI development background, Standards in Geomatics and Development of FDI, Spatial Data Infrastructure and Policy Development in Europe, INSPIRE Data Specifications, National Spatial Data Infrastructure.

Practical teaching

Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step.

Literature

1. Shashi Shekhar, Sanjay Chawla, Spatial Databases – A tour, Prentice Hall, 2003.
2. Yeung, Albert K.W., Hall, G. Brent, Spatial Database Systems – Design, Implementation and Project Management, Springer, 2007.
3. Global Spatial Data Infrastructure (CSDI) Association, The SDI Coolbook.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
30	30			

Teaching methods

Presentation of the theoretical basis and practical problems. Practical examples are explained step by step. Creating specific data models from available spatial data.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam	50
practical teaching	5	oral exam	
colloquia	20+20		
seminar paper			

Study programme: PROTECTION FROM NATURAL DISASTERS

Level: Master Academic Studies

The name of the course: Remote surveys

Lecturer (Name, middle name, last name): **Admir Mulahusić**

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

Basic knowledge and skills on remote research developed. Understanding the physical basics of remote research. Introducing detection techniques with sensors on satellites and planes. Theory and practice of data processing.

Learning outcomes

Candidates acquire enough knowledge to use remote research for many purposes. By knowing the methods of remote research, sensors and their properties, they can interpret and qualitatively evaluate the data obtained by the methods of remote research.

Content

Theoretical teaching

- Definition of remote research
- A brief historical survey of remote research
- Electromagnetic radiation
- Interaction with the atmosphere
- Interaction with the surface
- Remote sensing systems
- Resolution of recording systems
- Optical sensors
- Radar
- Lidar
- Satellite Earth Observation Systems
- Transferring and receiving data
- Interpretation of footage
- Visual interpretation
- Pre-recordings
- Improving images
- Transformation of images
- Classification of images
- Integration of data
- Examples of usage.

Practical teaching

Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step.

Literature

1. Oštir K., Mulahusić A., Daljinska istraživanja, GFSA, UNSA, 2014.
2. Campbell J.B., Wynne R.H., Introduction to Remote Sensing (5th Edition), The Guilford Press, 2011.

Number of classes of active teaching

Other

Lectures: 30	Exercises: 30	Other form of lectures:	Study and research work:
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Teaching methods

Lectures and discussions, analyzes of concrete cases on the ground, drawing conclusions and mentoring at the individual level.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam	50
practical teaching	5	oral exam	
colloquia	20+20		
seminar paper			

Study programme: PROTECTION FROM NATURAL DISASTERS

Level: Master Academic Studies

The name of the course: Information and communication technologies for risk management from natural disasters

Lecturer (Name, middle name, last name): **Nusret Drešković**

Course status: elective

Number of ECTS: 5

Prerequisites: no

Course objective

- Introduction of students with modern geoinformatics and communication technologies and their

application in risk management from natural disasters;

- Introducing students with modern geoinformatics systems for collecting basic data and their automatic processing in order to monitor the dynamics and intensity of certain types of natural disasters;
- Introducing students with modern GIS based web services and their potentials for automatic monitoring and information with target groups of users in the centers for monitoring of natural disasters and alerts.

Learning outcomes

- Acquiring knowledge of students on the methodology of geoinformatic modeling in monitoring the dynamics and intensity of natural disasters;
- Acquiring students' knowledge of modern systems for automatic data collection and monitoring the intensity of the process at all stages of development according to the type of natural disaster;
- Acquiring knowledge of students about modern systems for automatic collection, processing and transfer of data according to types of natural disasters.
- Acquiring knowledge of students on the establishment of modern GIS thematic databases by types of natural disasters

Content

Theoretical teaching

Geoinformatics and Communication Systems (ICT) - definitions, organizational structure and general application in modern technologies for risk management from natural disasters. Database of natural disasters - collection, preparation for processing, geoprocessing, geo-visualization and thematic archiving. Geoinformatics software and their application for risk management of natural disasters - software version for desktop and GIS server. Automated systems for measuring and monitoring the intensity of natural disasters in all phases of their development and destructive action. Informatics systems for early warning, warning and information on the occurrence, development and intensity of natural disasters and protection measures. Use of ICT in mitigating the consequences of disasters. Using ICT in risk assessment, for disaster response. Use of ICT in disaster recovery and reconstruction. Earth observation technology to investigate collapsed structures. Establishment of national ICT networks to manage disaster risk and reduce risk. Theoretical basis for the application of geoinformation models for the prediction of certain types of natural disasters.

Practical teaching

Audio-visual exercises that accompany theoretical lessons; Practical examples are explained step by step. Preparation of seminar paper. Presentation and defense of seminar papers in the field covered by the theoretical content of the course.

Literature

1. Đug S., Drešković, N., Odžak, S. Daljinska istraživanja – principi i primjena u prirodnim naukama. Univerzitetski udžbenik. Univerzitet u Sarajevu. Sarajevo 2015
2. Heywood, I., Cornelius, S., Carver, S. An Introduction to Geographical Information Systems. Pearson Education Limited, 2006.
3. Burrough, P.A., McDonnel, R.A. Principi geoinformacionih Sistema - drugo izdanje, Oxford University Press (Prevod sa engleskog), 2006.
4. Lead Author: Asian Disaster Preparedness Center, ICT for Disaster Risk Management - A learning resource on ICT for development for institutions of higher education United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development, 2016.
5. John Twigg, Disaster Risk Reduction Humanitarian Policy Group Overseas Development Institute, 2015.
6. Group of authors - Second section, Role of information and communications technology in the implementation of the Hyogo Framework for Action, Economic and Social Commission for Asia and the Pacific, 2010.
7. Stephan Baas et al., Disaster risk managementsystems analysis, A guide book Food and Agriculture Organization of the United Nations, Rome, 2008.

8. Chanuka Wattegama, ICT for Disaster Management, Asia-Pacific Development Information Programme, 2007.			
9. OECD group authors, Technology to manage natural disasters and catastrophes OECD, https://www.oecd.org/sti/outlook/e-outlook/stipolicyprofiles/newchallenges/2012			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 30	Other form of lectures:	
Study and research work:			
Teaching methods			
Oral lectures and power point presentations of theoretical foundations and practical problems. Practical examples and a key step-by-step study. Development of geoinformation models of spatial development of natural disasters and creation of accompanying GIS databases.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	5	written exam	40
practical teaching	5	oral exam	
colloquia	30		
seminar paper	20		

5.4 Link between competencies and subjects

		MANDATORY SUBJECTS		
		OP1	OP2	OP3
Generic competencies	communication	x	x	x
	critical thinking	x	x	x
	scenario modeling	x		x
	creativity	x	x	x
	initiative	x	x	x
	prediction of solutions and consequences	x	x	x
	collaboration	x	x	x
	working in multidisciplinary team	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x		x
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x		x
	social and civic responsibility	x	x	x
	development of professional ethics and responsibility	x	x	x
	effective leadership	x	x	x
	strategic thinking	x	x	x
	identification and analysis of problems in NDRM	x		x
	experience-based critical decision making	x	x	x
	staying up-to-date with technological development	x		x
	holistic and proactive approach to NDRM situations	x	x	x
	clearly and unambiguously transfer	x	x	x

	knowledge to the professional and wider public			
Subject-specific competencies	understanding of climate changes and natural disasters	x		x
	awareness of the complex and overlapping nature of disaster	x		x
	mastering of methods, procedures and processes of risk identification	x		x
	understanding the causes and consequences of disasters	x	x	x
	devising strategies and developing methodology and methods of emergency as part of NDRM	x	x	x
	optimizing and managing available resources in emergency as part of NDRM systems	x	x	x
	statistical data processing in order to define and make adequate conclusions	x	x	x
	integrated management in natural disaster situations	x		x
	understanding of civil protection mechanism and institutional framework in NDRM	x	x	x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x		x
	natural disasters analysis and risk assessment	x		x
	knowledge about prevention, mitigation, response and recovery operations	x	x	x
	applying ICT in NDRM	x		x
	development of human resources in NDRM	x	x	x
	applying specialized civil engineering fields in NDRM	x	x	x
	protection of critical infrastructure in natural disaster situations	x	x	x
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods	x		x
	cognizant of the needs of special populations	x	x	x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x		x

		ELECTIVE SUBJECTS												
		IP1	IP2	IP3	IP4	IP5	IP6	IP7	IP8	IP9	IP10	IP11	IP12	IP13
Generic competencies	communication	x	x	x	x									
	critical thinking	x	x	x	x	x	x	x	x	x	x	x	x	x
	scenario modeling				x			x						
	creativity	x	x	x	x	x	x	x	x	x	x	x	x	x
	initiative	x		x	x	x	x	x	x	x	x	x	x	x
	prediction of solutions and consequences	x		x	x									
	collaboration	x	x	x	x	x	x	x	x	x	x	x	x	x
	working in multidisciplinary team	x	x	x	x	x					x	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x	x	x	x	x	x	x	x	x	x	x	x	x
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x	x	x	x	x	x	x	x	x	x	x	x	x
	social and civic responsibility	x	x	x	x	x	x		x					
	development of professional ethics and responsibility	x	x	x	x	x	x	x	x	x	x	x	x	x
	effective leadership	x	x											
	strategic thinking	x	x	x	x									
	identification and analysis of problems in NDRM	x		x	x	x	x	x	x	x	x	x	x	x
	experience-based critical decision making			x	x	x	x	x	x	x				
	staying up-to-date with technological development	x		x	x	x	x	x	x	x	x	x	x	x
	holistic and proactive approach to NDRM situations	x		x	x		x							
	clearly and unambiguously transfer knowledge to the professional and	x	x	x	x	x	x	x	x	x	x	x	x	x

	wider public													
Subject-specific competencies	understanding of climate changes and natural disasters	x	x	x	x	x	x	x						
	awareness of the complex and overlapping nature of disaster	x	x	x	x	x	x	x			x	x	x	x
	mastering of methods, procedures and processes of risk identification	x		x	x		x	x						
	understanding the causes and consequences of disasters	x	x	x	x		x	x		x				
	devising strategies and developing methodology and methods of emergency as part of NDRM		x	x	x									
	optimizing and managing available resources in emergency as part of NDRM systems	x		x	x									
	statistical data processing in order to define and make adequate conclusions	x	x	x	x	x	x	x	x	x	x	x	x	x
	integrated management in natural disaster situations	x		x	x									
	understanding of civil protection mechanism and institutional framework in NDRM	x	x	x	x									
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation			x	x	x	x	x	x	x				

natural disasters analysis and risk assessment	x		x	x		x	x	x						
knowledge about prevention, mitigation, response and recovery operations	x	x	x	x										
applying ICT in NDRM	x		x	x	x	x	x	x	x	x	x	x	x	x
development of human resources in NDRM		x	x											
applying specialized civil engineering fields in NDRM			x	x	x	x								
protection of critical infrastructure in natural disaster situations			x	x	x	x	x	x	x	x	x	x	x	x
understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods			x	x	x	x	x	x	x	x	x	x	x	x
cognizant of the needs of special populations	x	x	x	x				x						
evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x		x	x		x								

MS1 - Natural disasters and catastrophes

MS2 - Risk management from natural disasters

MS3 - Spatial planning in the function of reducing the risk of disasters

ES1 - Protection and rescue system in natural disasters

- ES 2 - Water - environmental problems in case of natural disasters
- ES 3 - Water protection and sustainable development
- ES 4 - In-situ testing and monitoring
- ES 5 - Evaluation and reinforcement of existing structures
- ES 6 - Earthquakes and numerical modeling of structures
- ES 7 - Rehabilitation of objects of cultural and historical heritage
- ES 8 - Durability of material as a preventive measure
- ES 9 - Cartography
- ES 10 - Topographic / cartographic models
- ES 11 - Spatial databases and IPPs
- ES 12 - Remote surveys
- ES 13 - Information and communication technologies for risk management from natural disasters

6. University of Banja Luka (UBL)

6.1 Description of the study program

Name of study program and title

Master Academic Studies – NATURAL DISASTERS RISK MANAGEMENT

Title: Master of protection and rescue

The purpose of the study program

The purpose of the master's degree program “Natural Disasters Risk Management” is that after graduation, students master advanced concepts in civil defense, security sciences and related disciplines; know the key settings of more important theories about emergency situations caused by natural disasters, as well as the processes and actors of protection and rescue; to be able to describe the most important phenomena and problems, classify them and link them to related problems and phenomena; to govern the basic methods and procedures for collecting, systematizing and analyzing data; to be able to independently expand their knowledge and transfer them to others.

The study program has a clearly defined purpose and role in the education system, accessible to the public. By establishing a new study program, it will respond to the demands of the developing society and the achievements of civil protection, and provide a modern, highly-qualified approach to protection and rescue in emergencies caused by natural disasters. Considering the great social needs for this personnel profile, it may be considered that the opening of a new study program would be of particular social importance to the Republic of Srpska. In this study, applying the Bologna principles in education, it will be educated profiles in the field of civil protection for the highest levels of complex tasks. This would enable the level of citizen security to be raised at all levels of society and government.

Finally, the purpose of this study program is to clearly define the possibilities for continuing further scientific training, especially in the third cycle of studies (doctoral studies) and for monitoring scientific achievements in the field of security and criminality, all in the function of creating a quality scientific education profile for execution of security and criminal affairs in the broadest sense of the word.

Objectives of the study program

The main goal of the study program of the Master Academic Studies is the education of appropriate civil protection experts belonging to the scientific field from the field of Security and Criminology, at the master level, who will be trained for performing complex and managerial tasks as well as training for further scientific - research.

Master study program "Natural Disasters Risk Management" aims to establish a balance of theoretical and practical knowledge so that education is based on science and focused on practice (hence, the requirement is to strike a balance between the adopted theoretical knowledge and the developed practical skills), to enable the continuation of the third cycle of studies, as well as up-dating during the working life, to provide personnel who will be able to monitor, analyze and interpret the phenomena caused by natural disasters and the way of reacting.

Additionally, the objectives of the study program include the development of creative abilities and the mastering of the specific practical skills required for those profiles and security systems. In this way, the goal of improving the state of protection and rescue and raising it to a higher level is achieved, which implies a higher level of efficiency and effectiveness of personnel in tasks related to security and performance of managerial functions in civil protection systems for which there is an increasing need. In this way, which is the primary goal of this study program, there will be a greater degree of security of people and property, the safety of the economy and society as a whole and greater efficiency and professionalism of personnel in civil protection, both in the organizational and functional sense. Therefore, this study program provides a significant contribution to the increase in the number of residents with a higher level of education.

Competencies of graduated students

During the aforementioned studies in the second cycle of studies, students will improve the knowledge and special skills acquired in the first cycle of studies. Students who complete academic master studies will have general and specific competencies that relate to the following general abilities: familiarization with natural phenomena that can cause disasters and cause a state of emergency; realistic assessment of information and relevant facts about emergencies; exchange of data and other relevant information and ideas with appropriate experts and institutions in the country and abroad; application of modern scientific methods and means of protection and rescue; ability to legally and efficiently perform tasks in the state and non-state civil protection sector; respecting standards and ethical norms of the profession; permanent training and skills for permanent self-education in the profession.

Also, students who complete academic master studies have the following specific skills: basic knowledge of security and protection and their application in solving complex problems in emergency situations caused by natural disasters; integration of adopted multidisciplinary knowledge (in the field of security, legal, economic, technical and other sciences) in carrying out complex security and protection tasks; justified and correct application of legal powers; the ability to use modern technical means in civil protection; management of organizational units of the state and non-state civil protection sector and the use of information and other modern technologies in protection and rescue.

In the realization of the goals and tasks of Master Academic Studies, the main focus is on scientific-methodological training of students for studying problems in the field of security and protection. This will be achieved by studying certain educational-scientific content and methodology of scientific research of security phenomena and their linking with new and deepened teaching content from those fields. Students deepen and complement the knowledge gained in studies in order to apply acquired knowledge and skills to solve specific problems and at the same time prepare and train for further scientific and research work.

Outcomes of the learning process

Study program of the second cycle provides:

- high scientific and professional level of studies in accordance with modern and future development of safety in the field of security and criminalistics;
- study, develop and deepen the old contents at a higher level than previous education, and in a function of professional performance of senior management in various subjects of the security and civil protection system;
- direct students to independent and creative scientific and professional work during the studies;
- acquisition of special knowledge and competences, in relation to the graduated security and criminal lawyer, which are reflected in additional knowledge from a certain narrower scientific field, security and protection;
- training of candidates to perform independently and professionally various tasks;
- candidates acquire skills and adopt techniques of learning / analyzing relevant literature that will enable them to continue their studies in a way that will be marked only by routing and autonomy;
- training candidates for further individual and collective scientific and research work.

Quality, contemporary and international compatibility of the study program

The study program is comprehensive and possesses the necessary compatibility with other related study programs.

Thus, we formally and structurally harmonized it with more accredited foreign programs in terms of enrollment conditions, duration of studies, graduation and study methods.

The UBL quality assurance system consists of:

Ensuring the quality of the study program

- The process of analyzing the attractiveness data of the existing study program,
- The process of revision of the study program,
- The process of developing new study programs,
- The process of introducing a new subject,

- The process of analyzing the completion of studies,
- The process of analyzing data on employment upon completion of studies,
- The process of interviewing graduated students.

Ensuring and improving the quality of the teaching process

- Defining the rules and criteria for grading students,
- The procedure on student's appeal for evaluation,
- Analysis of the success of the exam,
- Analysis of the number of students and teachers,
- Evaluation of teaching and teachers by students,
- Self-evaluation of teachers.

Ensuring the quality of resources to support students

- Procedure for continuously improving and increasing resources to support learning,
- Evaluation of the work of the student service,
- Procurement of compulsory literature from all subjects from which classes are delivered,
- Subscription to scientific bases with complete text in the field of law,
- Subscription to reference scientific journals.

Ensuring the quality of scientific and research activity of teaching staff

- The strategy of scientific work,
- Creating a positive environment for researching and strengthening the scientific profile of the institution.

The study program has been harmonized with European standards regarding enrollment conditions, duration of studies, conditions for transition to the next year, acquisition of diploma and study methods.

As examples of the close comparability of the study program of the second cycle of studies, Natural Disasters Risk Management, the following accredited higher education institutions from the countries of the environment are listed:

- Faculty of Security, University of Belgrade, Serbia,
- Academy of criminalistic and police studies in Belgrade, Serbia,
- Faculty of Security, University of Kiril and Methodius, Skopje, FYR Macedonia,
- Faculty of Security Studies, University of Maribor, Slovenia.

This study program is in line with established standards for accreditation. It is realized in accordance with the following standards:

- there is an ECTS score system,

- the mobility of students and teachers is stimulated in the framework of cooperation with the relevant European universities,
- a system of comparability of diplomas with similar study programs of European universities was introduced, which is particularly evident through the addition of diplomas.

6.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Methodology of scientific research	3+1+0	6
2.	M	Natural disasters risk management	3+1+0	5
3.	M	Natural disasters and catastrophes	3+1+0	6
4.	M	Protection and rescue system in natural disaster	3+1+0	5
5.	E	Elective subject 1	2+1+0	4
6.	E	Elective subject 2	2+1+0	4
		Protection of critical infrastructure in natural disasters		
		Prevention and suppression of crime in conditions of natural disasters		
		Law regarding emergency situations caused by natural disasters - Legal framework for risk management		
		Information and communication technologies in support of natural disasters risk management		
		Crisis management and communication in natural disasters		
		Environmental safety and natural disaster		
		Competence and role of the police in natural disasters		
SECOND SEMESTER				
7.		Research in the field of master work	300	20
8.		Master thesis		10
Total			12+6+26	60

6.3 Subject specification

Study programme: NATURAL DISASTERS RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Methodology of scientific research				
Lecturer (Name, middle name, last name): Saša V. Mijalković				
Course status: mandatory				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
Acquiring knowledge about the basics of scientific research methodology.				
Learning outcomes				
The acquired knowledge enables the independent implementation of scientific research, the preparation of final study papers and professional and scientific texts, the application of scientific research methods in carrying out security activities, more efficient assessment of the state of security and the forecasting of threats to security at certain geospatial resources and participation in teams for the development of doctrinal, planning documents related to risk management in natural disasters.				
Content				
Theoretical teaching				
Science and scientific knowledge, theory and language (conceptual-categorical apparatus) of science; basic understanding of the scientific method; logical basics of the methodology; method and methodology of investigation of phenomena (systems of security) and processes (challenges, risks and threats, measures, activities and activities of protection and rescue) in the field of security; research of natural disasters and social phenomena in conditions of natural disasters; preparation of methodological framework and design of research; organization and realization of research; production of scientific work; verification of research.				
Practical teaching				
Production of instruments in the function of applying empirical methods of scientific research.				
Literature				
1. Srđan Milašinović, Saša Milojević: Projektovanje i realizovanje naučnih istraživanja, Kriminalističko-policijska akademija, Beograd, 2016.				
2. Saša Mijalković, Marija Popović: Uvod u studije bezbednosti: metodološko-istraživačke i teorijske osnove bezbednosti, Kriminalističko-policijska akademija, Beograd, 2015 i 2016.				
3. Novak Milošević, Saša Milojević, Osnovi metodologije bezbednosnih nauka, Policijska akademija, Beograd, 2001.				
Number of classes of active teaching				Other
Lectures: 45	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods				
Lecture, modified lectures, presentations, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching		20	oral exam	50
colloquia				
seminar paper		20		

Study programme: NATURAL DISASTERS RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Natural disasters risk management				
Lecturer (Name, middle name, last name): Dane R. Subošić				
Course status: mandatory				
Number of ECTS: 5				
Prerequisites: no				
Course objective				
Students understand the risk management methodology.				
Learning outcomes				
Students' ability to apply a risk management methodology.				
Content				
Theoretical teaching				
Content and scope of risk management, Establishment of risk management context, Risk identification, Analysis (determination of 1. frequency and vulnerability, 2. criticality and damage) and risk assessment, Risk assessment methods (concept and division), Checklists, Preliminary Hazard Analysis, Structured interviewing and sharing ideas, Delphi technique, brainstorming, panel / technique of the nominal group, SWIFT with what-if structure, Human Resourage Analysis (HRA), Analysis of the main cause (analysis of individual loss), Scenario analysis, Toxicological risk assessment, Analysis Analysis of causes and effects, FMEA (FMECA), Reliability Analysis, Analysis of imperceptible errors, HAZOP Hazard and Operability Studies, HACCP Hazard Analysis and Critical Control Points, LOPA, Analysis of the Error Tree, Analysis of the Tree of Errors level of protection, Markov's analysis, Monte Carlo analysis, Bayesian analysis, Single-criterion and multi-criteria m risk assessment ethics, decision making and implementation of risk treatment decisions.				
Practical teaching				
Application of risk management standards on concrete examples.				
Literature				
1. Subošić, D, Daničić M.: Bezbjednosni menadžment - organizacija i odlučivanje. Fakultet za bezbjednost i zaštitu, Banja Luka, 2012.				
2. Subošić, D; i dr. Procena rizika u zaštiti lica, imovine i poslovanja, priručnik za obuku, Kriminalističko-policijska akademija, Beograd, 2016.				
3. Stevanović, O.: Bezbednosni menadžment, Kriminalističko-policijska akademija, Beograd, 2016.				
4. Kekić, D. Upravljanje bezbednosnim sistemima u uslovima zaraznih (kontagioznih) epidemija, Kriminalističko-policijska akademija, Beograd, 2016.				
5. Savić, S.; Stanković, M. Teorija sistema i rizika, Akademska misao, Beograd, 2012.				
Number of classes of active teaching				Other
Lectures: 45	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods				
Lecture, modified lectures, presentations, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching		20	oral exam	50
colloquia				
seminar paper		20		

Study programme: NATURAL DISASTERS RISK MANAGEMENT
Level: Master Academic Studies
The name of the course: Natural disasters and catastrophes
Lecturer (Name, middle name, last name): Radislav Tošić
Course status: mandatory
Number of ECTS: 6
Prerequisites: no
Course objective The goal is to learn about the emergence of natural disasters, their consequences, and to find a way to protect them.
Learning outcomes Getting to know about natural disasters as a result of the action of natural processes that are partly modified by anthropogenic action. Getting to know about negative natural happenings through natural disasters on Earth. One of the learning outcomes is a systematic approach to studying this issue, as well as getting to know natural disasters as constraints in planning, regulation and protection of the environment.
Content <i>Theoretical teaching</i> <ul style="list-style-type: none"> - The concept, the distribution of natural disasters and disasters. - The consequences of natural disasters and disasters. - Litosphere disasters: tectonic movements, volcanism, asteroids, comets and meteorites. - Seismism: seismic rejonization, seismic hazard, seismic risk, protection measures. - Geomorphologic disasters: landslides, techniques and protective measures. - Rocks, soil rupture, protection measures - Climatic disasters: intense precipitation, storm-gradient disasters, drought, protection measures. - Frost, frost, fog, snow and ice, electrical discharges and storm winds. - Water disasters: floods on floodwaters, torrential floods. - Coastal floods caused by atmospheric and geomorphological causes, avalanches and protection measures. - Fire, forest fires, main causes of the occurrence, consequences and measures of protection. - Biological disorders: epidemics, epizootic diseases, epiphytonosis. - Measures of protection, prevention and suppression of epidemics. - Protection against natural disasters and disaster management - The most significant natural disasters on the territory of Republika Srpska and BiH - mapping
Literature <ol style="list-style-type: none"> 1. Dragičević S., Filipović D. (2009): Prirodni uslovi i nepogode u planiranju i zaštiti prostora. Geografski fakultet, Beograd. 2. Goudie A. (2006): The Human Impact on the Natural Environment. Blackwell publishing, USA. 3. Abbott P. (2008): Natural disasters. McGraw-Hill Higher education. 4. Radislav Tošić, Slavoljub Dragičević, Matija Zorn, Novica Lovrić: Landslide susceptibility zonation: A case study of the municipality of Banja Luka (Bosnia and Herzegovina), Acta Geographica Slovenica, Vol. 54, No. 1, pp. 189 - 202, 2014. 5. Radislav Tošić, Slavoljub Dragičević, Snežana Belanović, Ilija Brčeski, Novica Lovrić: Considerations on reservoir sedimentation and heavy metals content within the Drenova reservoir (B&H), Carpathian Journal of Earth and Environmental Sciences, Vol. 8, No. 4, pp. 175 - 184, 2013. 6. Radislav Tošić, Marijana Kapović, Novica Lovrić, Slavoljub Dragičević: Assessment of soil erosion potential using RUSLE and GIS: A case study of Bosnia and Herzegovina, Fresenius Environmental Bulletin, Vol. 22, No. 11a, pp. 3415 - 3423, 2013. 7. Slavoljub Dragičević, Minucsér Mészáros, Snežana Djurdjic, Dragoslav Pavić, Ivan Novković, Radislav Tošić: Vulnerability of National Parks to Natural Hazards in the Serbian Danube Region, Polish Journal

- of Environmental Studies, Vol. 22, No. 4, pp. 1053 - 1060, 2013.
8. Marijana Kapović, Radislav Tošić, Milan Knežević, Novica Lovrić: Assessment of soil properties under degraded forests: Case study Javor Mountain in Republic of Srpska, Archives of Biological Sciences, Vol. 65, No. 2, pp. 631 - 638, 2013.
 9. Radislav Tošić, Slavoljub Dragičević, Novica Lovrić: Assessment of soil erosion and sediment yield changes using Erosion Potential Model - Case study: Republic of Srpska (BiH), Carpathian journal of Earth and Environmental Sciences, Vol. 7, No. 4, pp. 147 - 154, 2012.
 10. Radislav Tošić, Dragana J. Todorović, Slavoljub S. Dragičević, Ištvan S. Bikit, Sofija Forkapić, Branislav Blagojević: Radioactivity and measurements of sediment deposition rate of the Drenova reservoir (B&H), Nuclear Technology and Radiation Protection, Vol. 27, No. 1, pp. 52 - 56, 2012.
 11. Radislav Tošić, Slavoljub S. Dragičević, Ištvan S. Bikit, Sofija Forkapić, Dušan Mrđa, Nataša Todorović, Branislav Blagojević: Estimating the soil erosion and deposition rate using ¹³⁷Cs tracer method in the catchment of Drenova reservoir (B&H), Nuclear Technology and Radiation Protection, Vol. 27, No. 3, pp. 247 - 253, 2012.
 12. Radislav Tošić, Slavoljub Dragičević, Stanimir Kostadinov, Nada Dragović: Assessment of soil erosion potential by the USLE method: Case study, Republic of Srpska - B&H, Fresenius Environmental Bulletin, Vol. 20, No. 8, pp. 1910 - 1917, 2011
 13. Slavoljub S. Dragičević, Marija P. Martinović, Mikica Z. Sibinović, Ivan D. Novković, Radislav S. Tošić, Stefana Lj. Babović: Recent Changes of the Erosion Intensity Caused by Socio-Demographic and Land Use Changes in Knjaževac Municipality, Serbia, Catena Verlag Advances in Geoecology 43, pp. 271- 286, 2014.
 14. Radislav Tošić, Novica Lovrić, Slavoljub Dragičević: Land use changes caused by bank erosion along the lower part of the Bosna river from 2001 to 2013, Glasnik Srpskog Geografskog Društva, Vol. 94, No. 4, pp. 49 - 58, 2014.
 15. Slavoljub Dragičević, Radislav Tošić, Milomir Stepić, Nenad Živković, Ivan Novković: Consequences of the River Bank Erosion in the Southern Part of the Pannonian Basin: Case Study - Serbia and the Republic of Srpska, Forum Geografic, Vol. 12, No. 1, pp. 5 - 15, 2013.
 16. Radislav Tošić, Slavoljub Dragičević, Novica Lovrić, Ivica Milevski: Multi-hazard assessment using GIS in the urban areas: Case study - Banja Luka Municipality, B&H, Glasnik Srpskog Geografskog Društva, Vol. 93, No. 4, pp. 41 - 50, 2013.
 17. Radislav Tošić, Slavoljub Dragičević, Miodrag Zlatić, Mirjana Todosijević, Stanimir Kostadinov: The impact of socio-demographic changes on land use and soil erosion (Case study: Ukrina River Catchment), Geographical Reviews, Vol. 46, pp. 69 - 78, 2012.
 18. Slavoljub Dragičević, Ivan Novković, Ivana Carević, Nenad Živković, Radislav Tošić: Geohazard Assessment in the Eastern Serbia, Forum Geografic, Vol. 10, No. 2, pp. 10 - 19, 2011.
 19. Slavoljub Dragičević, Ratko Ristić, Nenad Živković, Stanimir Kostadinov, Radislav Tošić, Ivan Novković, Ana Borisavljević, Boris Radić: Floods in Serbia in 2010 - Case Study: The Kolubara and Pcinja River Basins, Geomorphological impacts of extreme weather: Case studies from central and eastern Europe, Springer Geography, Springer Science+Business Media, Dordrecht, pp. 155 - 169, 2013.
 20. Slavoljub Dragičević, Nenad Živković, Mirjana Roksandić, Stanimir Kostadinov, Ivan Novković, Radislav Tošić, Milomir Stepić, Marija Dragičević, Borislava Blagojević: Land Use Changes and Environmental Problems Caused by Bank Erosion: A Case Study of the Kolubara River Basin in Serbia, Environmental Land Use Planning - InTech, Rijeka, pp. 3 - 20, 2012.

Number of classes of active teaching				Other
Lectures: 45	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods Forms of teaching are lectures, exercises, independent works under the mentorship of teachers and associates, regular consultation and e-consultation, discussions on concrete cases from the immediate environment.				
Grade (maximum number of credits 100)				

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching	20	oral exam	50
colloquia			
seminar paper	20		

Study programme: NATURAL DISASTERS RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Protection and rescue system in natural disaster			
Lecturer (Name, middle name, last name): Predrag Čeranić			
Course status: mandatory			
Number of ECTS: 5			
Prerequisites: no			
Course objective Acquiring basic knowledge about subjects, means and tactics of searching and rescuing persons and property in conditions of natural disasters.			
Learning outcomes Students' ability to perform expert tasks in assessing, deciding, developing plans, organizing, imposing measures, controlling, analyzing, reporting and managing search and rescue interventions in natural disasters.			
Content <i>Theoretical teaching</i> Objective and tasks of studying the subject; Managing, coordinating and integrating the strengths of a unique system of protection and rescue in natural disasters; Emergency Situations; Planning measures for removing the consequences of natural disasters; Organization and coordination of the operation of forces and means of protection and rescue system; Significance and content of information, background and technical security of actions of protection and rescue; Departure and movement of rescuers in the search and rescue zone; Surviving and orientation of rescuers in the field; Scouting in the zone of the resulting disaster; Organizing and conducting actions for the search and rescue of the victims; Transportation of injured persons; Raising and transferring the burden of performing search and rescue actions; Search and rescue in: ruins; air, road, rail and river / sea traffic; removing the consequences of disasters in the transport of dangerous goods; Search and rescue in case of fire; Search and rescue under conditions of radioactive contamination; Search and rescue in flood and torrential conditions; Search and rescue in the conditions of the discharge of dangerous chemical substances; Search and rescue in the conditions of the epidemic and quarantine; Search and rescue in the mountains; Search and rescue operations by helicopter; Evacuation and care of the population: Psychological support for victims and survivors; International co-operation in repairs and rescue operations; The role of police, military and emergency medical aid in natural disasters.			
Literature 1. Mlađan, D.: Bezbednost u vanrednim situacijama, Kriminalističko-policijska akademija, Beograd, 2015.			
Number of classes of active teaching			Other
Lectures: 45	Exercises: 15	Other form of lectures:	
Study and research work:			
Teaching methods Lecture, modified lectures, presentations, exercises.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	

practical teaching	20	oral exam	50
colloquia			
seminar paper	20		

Study programme: NATURAL DISASTERS RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Protection of critical infrastructure in natural disasters			
Lecturer (Name, middle name, last name): Dragan Mlađan			
Course status: elective			
Number of ECTS: 4			
Prerequisites: no			
Course objective			
Acquiring knowledge about the process of planning critical infrastructure protection in the conditions of different types of crisis and emergency situations.			
Learning outcomes			
Acquired knowledge enables independent implementation and realization of activities in the process of critical infrastructure protection in the conditions of different types of crisis and emergency situations			
Content			
<i>Theoretical teaching</i>			
Defining the term "critical infrastructure". Content and scope of risk management from the destruction of critical infrastructure. Risk identification and classification. Quantitative methods of risk assessment. Analysis of the scenario and analyzes of the tree of errors and events, analysis of causes and consequences, analysis of the impact on social resources. Application of standards on individual cases. Theory teaching: The aim and tasks of studying the subject. Concept, mission, goals, tasks of protection and rescue system. Entities, forces and means of protection and rescue system (state, local self-government, economic and other legal entities, citizens and their associations). Organization and structure of the protection and rescue system. Management, coordination and integration of the forces of protection and rescue systems in natural disasters. MUP Emergency Situations Department. Civil Protection System. Emergency headquarters. Identification and identification of the causes of the death of the injured and injured. Research the causes (forensics) of the development of events and the identification of facts and responsibilities. System of recovery from emerging natural disasters. System of international cooperation in the area of protection and rescue in natural disasters.			
<i>Practical teaching</i>			
Development of plans for organizing and coordinating measures, activities and activities of the entities and protection and rescue forces in concrete situations of critical infrastructure protection. Development of plans for organizing and coordinating measures, activities and activities of crime prevention and suppression undertaken by the police in concrete situations of critical infrastructure protection.			
Literature			
1. Mlađan, D.: „Bezbednost u vanrednim situacijama“, udžbenik, Kriminalističko-policijska akademija, Beograd, 2015.			
2. Mlađan, D.: „Sprečavanje i suzbijanje požara, havarija i eksplozija“. Beograd: Kriminalističko-policijska akademija, 2009.			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 15	Other form of lectures:	
Study and research work:			
Teaching methods			
Lecture, modified lectures, presentations, exercises.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits

activity during lectures	10	written exam	
practical teaching	30	oral exam	60
colloquia			
seminar paper			

Study programme: NATURAL DISASTERS RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Prevention and suppression of crime in conditions of natural disasters			
Lecturer (Name, middle name, last name): Mile Šikman			
Course status: elective			
Number of ECTS: 4			
Prerequisites: no			
Course objective Acquiring knowledge about emergent forms of serious forms of crime in conditions of natural disasters and the possibilities of their prevention and suppression, in accordance with strategies, laws and by-laws.			
Learning outcomes Ability of students to perform prevention and suppression of severe forms of crime in conditions of natural disasters, that is, to predict the possibility of abuse of circumstances caused by natural disasters.			
Content <i>Theoretical teaching</i> Legal and political-strategic framework, subjects and general principles for the prevention and suppression of serious forms of crime in conditions of natural disasters; forms of manifestation of serious forms of crime in conditions of natural disasters (economic crime and environmental crime as causes of natural disasters, corruption, fraud related to the collection of voluntary contributions, fraud with contracting and execution of works, fraud with prices of goods in the area of natural disaster, fraud related to property protection, identity theft, property and violent crime in the context of natural disasters - theft, serious theft, sexual exploitation, trafficking in human beings and human organs, domestic violence, etc.); characteristics of perpetrators of criminal offenses; characteristics of victims and objects of attack of perpetrators of crimes; measures and actions in the field of situational prevention of serious forms of crime in conditions of natural disasters; Criminal law prevention of serious forms of crime in conditions of natural disasters; specificity of carrying out of evidence actions in conditions of natural disasters, providing protection and support to victims of serious forms of crime in conditions of natural disasters.			
<i>Practical teaching</i> Analysis of international and national regulations governing the prevention and repression of severe forms of crime in natural disasters, as well as the analysis of good practice examples.			
Literature 1. Šikman, M. (2011). Organizovani kriminal. Banja Luka: Visoka škola unutrašnjih poslova. 2. Vuković S. (2014). Prevencija kriminala, drugo izmenjeno i dopunjeno izdanje. Beograd: Kriminalističko-policijska akademija (udžbenik).			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 15	Other form of lectures:	
Study and research work:			
Teaching methods Lecture, modified lectures, presentations.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	

practical teaching		oral exam	50
colloquia	20		
seminar paper	20		

Study programme: NATURAL DISASTERS RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Law regarding emergency situations caused by natural disasters - Legal framework for risk management			
Lecturer (Name, middle name, last name): Slađana Mirjanić			
Course status: elective			
Number of ECTS: 4			
Prerequisites: no			
Course objective			
Acquiring knowledge about the international legal and national legal regulation of emergency situations caused by natural disasters, as well as the legal regime of human rights during emergencies.			
Learning outcomes			
Acquired knowledge of the rights, duties and responsibilities of various entities in emergency situations enables effective participation in the emergency protection and rescue system caused by natural disasters, as well as the realization and protection of human rights in such circumstances.			
Content			
<i>Theoretical teaching</i>			
Forms of emergency: emergency and emergency situations; The concept and character of emergency situations; Causes of the declaration of an emergency; Principles of the Emergency Situation Regime: (principle of protection and rescue, the principle of the right to protection, the principle of solidarity, the principle of the public, the principle of accountability, the principle of gradualness); Comparative emergency rights models; Characteristics of emergency situations caused by natural disasters; International legal sources of rights of emergency situations; Interstate cooperation: European cooperation mechanisms, regional cooperation, bilateral agreements; International humanitarian aid. The right of emergency situations in the Republic of Serbia; Legal framework of the protection and rescue system; Realizing and protecting human rights in emergencies; Human Rights Restrictions in Emergencies; The right to protection and conservation of the environment.			
<i>Practical teaching</i>			
Analysis of legal regulations; analysis of the jurisprudence of the European Court of Human Rights; case study.			
Literature			
1. Simović, D., Zekavica, R., Policija i ljudska prava, Kriminalističko-policijska akademija, Beograd, 2012. 2. Petrović-Mrvić N., Todić D., Mlađan D. (ur.), Elementarne nepogode i vanredne situacije, Institut za uporedno pravo, Beograd 2014.			
Number of classes of active teaching			Other
Lectures: 30	Exercises: 15	Other form of lectures:	
Study and research work:			
Teaching methods			
Lecture, modified lectures, presentations.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures		written exam	
practical teaching	20	oral exam	50
colloquia			
seminar paper	30		

Study programme: NATURAL DISASTERS RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Information and communication technologies in support of natural disasters risk management				
Lecturer (Name, middle name, last name): Boban R. Milojković				
Course status: elective				
Number of ECTS: 4				
Prerequisites: no				
Course objective Acquiring knowledge about characteristics, possibilities and ways of using information, telecommunication and geoinformation technologies in supporting decision making in risk management from natural disasters.				
Learning outcomes Students' ability to apply technologies for effective and efficient decision support in all phases of management (in prevention and mitigation, preparation, response and recovery) by natural disasters.				
Content <i>Theoretical teaching</i> Information Systems: Basic concepts; Components IS; The technological basis IS. Computer networks. Formation of relevant databases. Early detection and warning systems (excitation). Emergency communication systems: Communicating with vulnerable persons and the entire population; Establishment of command centers for emergency management; Systems for communicating participants in actions with the command center; Mobile command and control centers; Mobile applications; Functional systems in emergency situations. Remote detection (Satellite, digital orthophoto, pycometric and lidar products); Unmanned aerial video systems; Global Navigation Satellite Systems; Systems for automatic tracking of faces and objects. GIS as support for decision-making in emergency situations caused by natural disasters: Fundamentals of GIS - concept, components, functions; GIS in the function of risk vulnerability assessment and in the preparation of response plans in case of natural disasters; GIS in the function of more efficient protection of people and property during and after the manifestation of natural disasters; GIS in the function of analyzing the consequences of natural disasters. <i>Practical teaching</i> Case studies of the use of information, telecommunication and geoinformation technologies in cases of natural disasters. Case studies of establishing functional communication systems in conditions of natural disasters.				
Literature 1. Popović Brankica, Kuk Kristijan (2017). Informacioni sistemi, Kriminalističko-policijska akademija, Beograd. 2. Milojković Boban (2013). Policijska topografija, Kriminalističko-policijska akademija, Beograd.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods Lecture, modified lecture, presentation, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching		30	oral exam	60
colloquia				
seminar paper				

Study programme: NATURAL DISASTERS RISK MANAGEMENT				
Level: Master Academic Studies				
The name of the course: Crisis management and communication in natural disasters				
Lecturer (Name, middle name, last name): Predrag Čeranić				
Course status: elective				
Number of ECTS: 4				
Prerequisites: no				
Course objective The objective of the course is to provide students with basic knowledge in the field of crisis management and communication in crisis situations. At the same time, insights and understanding of the whole process of crisis management, communication in these situations, as well as the ability to predict and analyze potential hazards, and to plan and implement the basic tools of crisis management in state institutions, business organizations and non-profit institutions are acquired.				
Learning outcomes After successfully mastered material and pass the exam students will acquire basic knowledge about crisis management, communication in crisis and disaster conditions, but also be able to use the basic tools of crisis management.				
Content <i>Theoretical teaching</i> Students are introduced to the concept of crisis and catastrophes caused by natural factors, basic characteristics and types of crisis situations, basic tools and procedures of crisis management, crisis communication, organization of crisis management systems at national and supranational level. Furthermore, the participants are introduced to the experience of individual countries in communicating and managing crises caused by natural disasters, as well as the most important crises in the contemporary international community and the ways and mechanisms for their resolution. <i>Practical teaching</i> Analysis of relevant international and national regulations; Case analysis from security practice, as well as case studies of specific crisis situations, crisis simulations.				
Literature 1. Milašinović, S., Kešetović, Ž.: Krizni menadžment, Beograd: Kriminalističko -policajska akademija, 2011.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods Lecture, modified lecture, presentation.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching	20	oral exam		50
colloquia				
seminar paper	20			

Study programme: NATURAL DISASTERS RISK MANAGEMENT			
Level: Master Academic Studies			
The name of the course: Environmental safety and natural disaster			
Lecturer (Name, middle name, last name): Ivica Radović			
Course status: elective			

Number of ECTS: 4				
Prerequisites: no				
Course objective Introduction to the system of environmental safety in the community, while respecting the principles of sustainable development. Preventive and reactive measures to prevent ecological risks and raising awareness of the importance of environmental safety in every segment of social life.				
Learning outcomes Ability to understand and act in preventing a wide range of security challenges and threats, primarily environmental hazards with political, economic and other implications related to the proper use of natural resources, control and prevention pollution.				
Content <i>Theoretical teaching</i> The notion of global security and ecological risks and threats. The role of the international community in solving the global ecological problems facing the planet Earth (global climate change, endangering biodiversity, overpopulation, inadequate use natural resources). Ecological safety - an integrated risk management system. Prevention and response in environmental accidents, natural and anthropogenic. Strategies and EU and UN doctrines on environmental security. <i>Practical teaching</i> Understanding the causes and conditions for the emergence of security challenges and threats, simulation scenarios chain events that lead to consequences (emergency situations), study and professional visits organizations for monitoring, studying and preventing environmental accidents in the country.				
Literature 1. Radović, I. Petrov, B. 2007. Raznovrsnost života I; Struktura i funkcija. Zavod za udžbenike i nastavna sredstva, 423 str., Beograd. (V izdanje). ISBN 86-17-12409-1; COBISS.SR-ID 120380940. 2. Pavlović, N., Radović, I. 2014. Osnovi ekologije. Prirodno-matematički fakultet, Univerziteta u Banjoj Luci. 310 str. ISBN 978-99955-21-31-8, COBISS-RS-ID 4087832. Banja Luka				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods Lecture, modified lecture, presentation, exercises.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching	30	oral exam		60
colloquia				
seminar paper				

Study programme: NATURAL DISASTERS RISK MANAGEMENT
Level: Master Academic Studies
The name of the course: Competence and role of the police in natural disasters
Lecturer (Name, middle name, last name): Dragomir Jovičić
Course status: elective
Number of ECTS: 4
Prerequisites: no
Course objective Acquiring knowledge about the role of the police before, during and after natural disasters, organization of work of the police in natural disasters, tasks of the police organization, and tactics of police treatment

in natural disasters.				
Learning outcomes				
Students' ability to conduct police unit management operations, at operational, tactical and strategic levels, before, during and after natural disasters.				
Content				
<i>Theoretical teaching</i>				
Legislation in the Republic of Serbia regulating the role of police in natural disasters; The role of foreign police in natural disasters; Tasks of the police in natural disasters (criminal police, traffic police, general jurisdiction police, special and special police units, border police); Cooperation with organizations relevant to police activities during the various phases of natural disasters (warning phase, mass engagement phase, reorganization phase, cleaning phase), Mutual cooperation between the police and fire-rescue services; Theoretical model of police response to natural disasters (before disasters, during disasters, and during the recovery phase); The role of police in the evacuation of natural disasters; A tactic of searching for land and buildings to locate missing and injured persons in natural disasters; Styles of leadership in the police during natural disasters.				
<i>Practical teaching</i>				
Analysis of relevant international and national regulations; Analysis of examples from security practice.				
Literature				
1. Jovičić Dragomir (2010). Organizacija i nadležnost policije. Banja Luka: Fakultet za bezbjednost i zaštitu.				
Number of classes of active teaching				Other
Lectures: 30	Exercises: 15	Other form of lectures:	Study and research work:	
Teaching methods				
Lecture, modified lecture, presentation of simulations, role play.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching	20	oral exam		50
colloquia				
seminar paper	20			

6.4 Link between competencies and subjects

		MANDATORY SUBJECTS			
		MS1	MS2	MS3	MS4
Generic competencies	communication	x			x
	critical thinking		x	x	x
	scenario modeling	x	x	x	x
	creativity		x	x	x
	initiative		x	x	x
	prediction of solutions and consequences	x	x	x	
	collaboration	x		x	x
	working in multidisciplinary team		x	x	x
	intensive use of ICT in acquiring knowledge and solving problems		x	x	x
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x	x	x	

	social and civic responsibility		x		x
	development of professional ethics and responsibility		x		x
	effective leadership				x
	strategic thinking	x		x	x
	identification and analysis of problems in NDRM	x	x	x	
	experience-based critical decision making		x	x	
	staying up-to-date with technological development	x	x	x	
	holistic and proactive approach to NDRM situations	x		x	x
	clearly and unambiguously transfer knowledge to the professional and wider public	x		x	x
Subject-specific competencies	understanding of climate changes and natural disasters		x		
	awareness of the complex and overlapping nature of disaster		x		x
	mastering of methods, procedures and processes of risk identification		x	x	
	understanding the causes and consequences of disasters		x	x	x
	devising strategies and developing methodology and methods of emergency as part of NDRM	x	x	x	x
	optimizing and managing available resources in emergency as part of NDRM systems	x	x	x	x
	statistical data processing in order to define and make adequate conclusions			x	
	integrated management in natural disaster situations		x		
	understanding of civil protection mechanism and institutional framework in NDRM		x	x	x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation		x		x
	natural disasters analysis and risk assessment		x	x	
	knowledge about prevention, mitigation, response and recovery operations		x	x	x
	applying ICT in NDRM		x		
	development of human resources in NDRM			x	x
	applying specialized civil engineering fields in NDRM		x	x	x
	protection of critical infrastructure in natural disaster situations			x	x
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods		x	x	
	cognizant of the needs of special populations		x		x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management		x	x	

		ELECTIVE SUBJECTS						
		ES1	ES2	ES3	ES4	ES5	ES6	ES7
Generic competencies	communication				x	x		x
	critical thinking	x	x	x	x	x		
	scenario modeling	x	x		x	x		
	creativity	x	x			x	x	
	initiative	x	x		x			x
	prediction of solutions and consequences	x	x	x	x			x
	collaboration	x	x	x	x	x		x
	working in multidisciplinary team	x	x	x	x	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x	x	x	x	x		
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge			x	x	x		
	social and civic responsibility			x		x	x	x
	development of professional ethics and responsibility	x	x	x		x	x	x
	effective leadership					x		
	strategic thinking			x		x		x
	identification and analysis of problems in NDRM	x	x	x	x	x	x	x
	experience-based critical decision making	x		x	x			
	staying up-to-date with technological development	x	x	x	x		x	
	holistic and proactive approach to NDRM situations			x	x			x
	clearly and unambiguously transfer knowledge to the professional and wider public	x	x	x	x	x		x
Subject-specific competencies	understanding of climate changes and natural disasters	x	x	x	x	x	x	x
	awareness of the complex and overlapping nature of disaster	x	x	x	x	x	x	x
	mastering of methods, procedures and processes of risk identification	x	x		x			
	understanding the causes and consequences of disasters	x	x	x	x	x	x	x
	devising strategies and developing methodology and methods of emergency as part of NDRM				x			x
	optimizing and managing available resources in emergency as part of NDRM systems			x	x			x
	statistical data processing in order to define and make adequate conclusions				x			
	integrated management in natural disaster situations				x			
	understanding of civil protection mechanism and institutional framework in NDRM				x	x	x	x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x	x	x		x	
	natural disasters analysis and risk assessment	x	x	x	x	x		
	knowledge about prevention, mitigation, response and recovery operations				x	x	x	x
	applying ICT in NDRM	x	x	x	x			
	development of human resources in NDRM				x	x	x	x
	applying specialized civil engineering fields in NDRM	x	x	x	x			

	protection of critical infrastructure in natural disaster situations	x	x	x	x			
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods			x	x		x	
	cognizant of the needs of special populations			x	x	x	x	x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x		x	x		x	

MS1 - Methodology of scientific research

MS2 - Natural disasters risk management

MS3 - Natural disasters and catastrophes

MS4 - Protection and rescue system in natural disaster

ES1 - Protection of critical infrastructure in natural disasters

ES2 - Prevention and suppression of crime in conditions of natural disasters

ES3 - Law regarding emergency situations caused by natural disasters - Legal framework for risk management

ES4 - Information and communication technologies in support of risk management from natural disasters

ES5 - Crisis management and communication in natural disasters

ES6 - Environmental safety and natural disaster

ES7 - Competence and role of the police in natural disasters

7. Technical College of Applied Sciences Urosevac - Leposavic (TCASU)

7.1 Description of the study program

Name of study program and title

Specialist vocational studies – RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE

Title: Specialist-professional engineer for protection of catastrophic events and fire safety

The purpose of the study program

The study program has clearly defined purpose and role in the educational system, available to public.

The purpose of the study program is the education of students for the profession of specialist-professional engineer in the field of disasters risk management and fire safety in line with the basic requirements of people. The study program Risk management of catastrophic events and fire is conceptualized to provide acquisition of competencies and qualifications which are socially justified and useful. It is based on the modern curriculum and modern syllabi that follows the trends and directions in the field of protection from catastrophic events and fire. The study program is based on adopted principles of national policy and strategy in the field of environmental protection, international, European and national regulations and standards and modern trends for the development of the system of protection from catastrophic events and fire.

In accordance with the school's mission, the study program provides modern and high-quality education which shall fulfill the expectations of students and requirements of the employers. The study program organized in such way aims to educate specialist- professional engineers in the field of disaster management and fire safety who are competent, comparable and competitive in the European and world context.

Objectives of the study program

The main objective of the study program is to educate professional engineers- specialist for protection against catastrophic events and fire through a theoretical and practical teaching in a quality, modern and accessible way. The objectives of the study program are in line with the educational goals and the school's social mission.

The objective of the study program is to educate experts that will gain required knowledge from fundamental scientific disciplines related to protection from catastrophic events and fire (natural disasters, sustainable development and environmental protection, management and development of human resources in protection) in order to form a realistic picture of processes

that occur in the nature, surroundings and environment, as well as traditional and specific engineering disciplines with the emphasis on the activities of prevention in disasters risk management and protection from catastrophic events and fire (natural disasters risk management, legal framework for risks management, protection and rescue, information and communication technologies in risk management, fire dynamics and expertise, fire detection systems).

One of the special goals, which is in line with the goals of education of professional engineers at TSACU is to develop awareness among students for the need of permanent education and environmental protection. The objective of the study program is the education of teamwork specialists, with the development of the ability to present scientific results to the professional and general public, as well as the education of a specialist who will be able to engage in scientific research work.

Competencies of graduated students

By mastering the study program, students acquire general and subject-specific skills that are in the function of high-quality professional, scientific and artistic activity.

After graduation, students acquire the following general competences:

- ability to acquire, interpret and use relevant information in the field of profession;
- ability to successfully solve complex problems in a partially new or unknown environment;
- ability to apply acquired knowledge and principles in a professional manner;
- ability to follow and critically accept new professional knowledge;
- ability to transfer and communicate ideas, problems and solutions;
- to respect ethical norms and responsibilities towards other social community;
- ability for team work.

After graduation, the student acquires the following subject-specific competence:

- the ability to analyze the causes and consequences of natural disasters;
- the ability to preventive action using modern information technologies and techniques;
- management of the system of protection against catastrophic events and fire;
- ability to systematically search, monitor and implement new regulations and standards in the field of protection against catastrophic events and fire;
- fire expertise.

By mastering the curriculum envisaged by the study program Risk management of catastrophic events and fire the student will be able:

- to solve problems efficiently in the uncertain conditions;

- to pass his/her ideas, opinions and attitudes to professional and wider social environment;
- to apply principles of work in the team;
- to communicate, orally and in written, with professional and social community;
- to make literary review independently;
- to analyze, evaluate and elaborate the principles of application of law, technical regulations and standards from the field of protection from disasters and fire;
- to apply principles, systems and procedures of preventive protection against the disasters and fire;
- to define activities in the implementation of procedures for drafting the risk assessment acts and to propose appropriate measures;
- to plan necessary time and resources for implementation of protection measures against disasters and fire.

Quality, contemporary and international compatibility of the study program

The study program is in compliance with contemporary world trends and state of the profession, science and arts in the appropriate educational and scientific field and is comparable with similar programs at the foreign higher education institutions, especially within the European education area.

The study program of specialist professional studies Disasters risk management and fire safety enables students to acquire contemporary professional knowledge necessary for education of professional engineers- specialists in the area of protection against disasters and fire.

By mastering the study program, the student acquires knowledge, skills and abilities that provide realization of competencies and learning outcomes needed by economy and the development of the society as a whole.

The study program is harmonized with the contemporary and current scientific and professional knowledge, and is comparable with the study programs of protection against disasters and fire which exist at colleges and faculties in our vicinity. The fundamental principles of harmonization are:

- each course lasts one semester,
- credit system,
- elective courses,
- students' practical work, and
- objectives and outcomes of studying, that is, the knowledge and skills that student acquires after the completed studies are clearly defined.

Taking into account the specific characteristic of the profession Disasters risk management and fire safety in Serbia, respecting the experiences of relevant world university institutions which

are longer engaged in the education of experts in this field, the study program Risk management of catastrophic events and fire of specialist studies has been established and defined and its profile is recognized as sublimation of study programs of the following university institutions:

- Middlesex University, (OHS), London (www.mdx.ac.uk);
- University of Natural Resources and Life Sciences, Vienna (www.boku.ac.at/en/);
- University of Edinburgh, GB (www.see.ed.ac.uk/postgraduate/taughtdeg/SFSE/);
- Faculty of Technical Sciences, Novi Sad (www.ftn.uns.ac.rs);
- Faculty of Occupational Safety Nis (<http://www.znrfak.ni.ac.rs/>);
- Technical College of Applied Sciences, Novi Sad (www.vtsns.edu.rs).

7.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	English language – higher course	2+2+0	6
2.	M	Research methods and scientific communications	2+2+0	6
3.	M	Natural disasters	2+2+0	6
4.	M	Fire Dynamics and Expertise	2+2+0	6
5.	E	Elective subject 1	2+2+0	6
		Risks Management Legal Frameworks		
		Information and communication technologies in risk management		
SECOND SEMESTER				
6.	M	Fire Extinguishers and equipment	3+3+0	7
7.	M	Natural disasters risk management	3+3+0	7
8.	E	Elective subject 2	3+3+0	6
		Management and development of human resources in the protection		
		Sustainable development and environmental protection		
		Protection and rescue		
9.		Professional practice		2
10.		Specialist Thesis		8
Total			19+19+0	60

7.3 Subject specification

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE	
Level: Master Academic Studies	
The name of the course: English language – higher course	
Lecturer (Name, middle name, last name): Jelena D. Rajović	
Course status: mandatory	
Number of ECTS: 6	
Prerequisites: no	
Course objective Improving all language skills (reading, listening, writing and speaking). Expand vocabulary as a general language and languages in the field of protection against catastrophic events and fire.	
Learning outcomes After successfully mastering the material, the student will be able to: Speech: participates in the conversation and provides clear and detailed descriptions and presentations on a wide range of topics in everyday life and business situations, and to cite examples, expresses and argues their views, using more complex sentences, a more comprehensive general lexicon and the terminology of the profession. Listening: understands more complex sentences structure as well as lexicon and terminology of the profession. The student is able to follow lectures, more complex speeches related to business situations, presentations and presentations in the field of protection against catastrophic events and fires. Reading: understand information, questionnaires, instructions, requests, advice and attitudes as well as business correspondence expressed in a variety of language structures and phrases in written form; understands everything in writing about catastrophic events and fires. Writing: it uses a more diverse and complex language structure and phrases to accomplish more complex business correspondence regarding the profession (formal letters, instructions, questionnaires, requests, fax, e-mail) and is able to compile its CV.	
Content <i>Theoretical teaching</i> The basic task of theoretical teaching is to adopt and train tkz. four skills: understanding, reading, speaking, writing, and in order to improve the competence of using English in the profession: correspondence and oral communication. Also, the purpose of theoretical teaching is to acquire knowledge and to practice skills for wider use: applied software, mechanical and occupational safety, etc., as well as translating professional texts and training students for business communication in general. The textbook to be used in the classroom will be composed of texts with more complex vocabulary and more complex grammatical constructions (passive voice, direct and indirect speech etc.). <i>Practical teaching</i> - Enriching grammatical structures, vocabulary and English functions through four language skills (speaking, listening, reading and writing). - Simulating business situations through work in pairs or group (telephony, meetings, negotiations, presentations) - Getting acquainted with a broad vocabulary. - Translation and understanding of texts from the profession. - Discussions, case studies, problem solving	
Literature 1. Pursey P. M.A.R. (2006). Enviromental Issue Management, Utrecht University, The Netherlands. 2. Kostić D., (2009). ENGINEERING ENGLEESH, Mašinski fakultet Univerziteta u Beogradu. 3. Izbor tekstova struke (slobodan izbor, Internet, štampa...)	
Number of classes of active teaching	Other

Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Audit lectures and exercises				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	10	written exam	40	
practical teaching	20	oral exam		
colloquia	10			
seminar paper	20			

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE
Level: Master Academic Studies
The name of the course: Research methods and scientific communications
Lecturer (Name, middle name, last name): Dragana Z. Stanojević
Course status: mandatory
Number of ECTS: 6
Prerequisites: no
Course objective Introduction to the system of science, scientific knowledge and scientific and applied research. Training a student for research and development work, as well as communication in a scientific and research environment and a project team. Training a student to theoretically base and interpret research.
Learning outcomes By successfully completing the course, the student will be able to use information systems proficiently, functionally analyze research projects, make scientific logical consistent conclusions from the data, write critical reviews of relevant literature, plan research, prepare a research draft, apply experimental procedures, understand statistical analysis, choose appropriate collection techniques data, preparation of written concise research articles and reports, displays and discusses research results, adheres to ethical research frameworks in their field.
Content <i>Theoretical teaching</i> Introduction to methods of research and science: Fundamentals of scientific research. Ethical framework of scientific research. Philosophical Aspects of Research. Theory and Discovery. Sources of scientific information. Information systems, searchable, reliable scientific sources. Review of literature. Bibliographic databases. General methodology of research and research phase: General methods. Phase of research. Specificity of research in different fields. Differentiation of basic and applied research. Research plan. Selection of quantitative and qualitative methods. Defining the research problem and preparing the initial research plan. Research topics in the field of specialist work. Organization of scientific research. Team work in science. Experiment. Measurement and data collection. Data processing. Basics of statistics. Systematization and presentation of results. Scientific reporting. Scientific writing and communication: writing a research article. Writing a report. Criteria for the evaluation of the scientific article. Citing. Authorship. Intellectual rights. Fundamentals of Scientific Publishing. Scientific communication. Presentation and conferences, workshops. Development of the draft sketch / research draft. Presentation of the project. Research and management of research projects: Project management. Management of the research team. Communication in the team. Preparing research and claiming funds for the project. <i>Practical teaching</i> Collection of relevant publications for final work, search and selection. Making a research plan. Article development. Team skills. Communication skills in a professional environment. Development and

explanation of the project.				
Literature				
1. Šolaja, V. (1990). Metod naučnoistraživačkog rada, Maš. Fak. Beograd,				
2. Vargas-Quesada, B., Moya-Anegon, F. (2007). Visualizing the Structure of Science, (3 poglavlja).				
3. Kundačina, M., Bandur, V. (2009). Akademsko pisanje, Užice: Učiteljski fakultet (4 poglavlja).				
4. Bjekić, D. (2009). Metode istraživanja i naučna komunikacija, skripta, Tehnički fakultet, Čačak.				
5. Šušnjić, Đ. (2007). Metodologija-kritika nauke, Beograd: Čigoja štampa (2 poglavlja).				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods				
Audit lectures and exercises				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	50
practical teaching			oral exam	
colloquia		20		
seminar paper		20		
Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE				
Level: Master Academic Studies				
The name of the course: Natural disasters				
Lecturer (Name, middle name, last name): Jelena Đokić				
Course status: mandatory				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
Acquiring knowledge about natural disasters, their impact on people, and strategies for mitigating the consequences of natural disasters. Through case studies, students will be introduced to the specific nature of natural disasters from a scientific and human perspective.				
Learning outcomes				
After the passed exam, students will be trained to identify and classify risks to the population, vulnerability and vulnerability of people, and formulate, define and plan measures for protecting and saving people in conditions of catastrophic events.				
Content				
<i>Theoretical teaching</i>				
- In general, about natural disasters.				
- Tectonic plates and physical hazards.				
- Earthquakes.				
- Volcanoes.				
- Floods.				
- Slides.				
- Climate and climate change.				
- Fire				
Literature				
1. Keller, E. A., & Blodgett, R. H. (2007). Natural Hazards: Earth’s Processes as Hazards. Disasters, and Catastrophes: Pearson Prentice Hall, Upper Saddle River, NJ, USA.				
2. Hyndman, D., & Hyndman, D. (2016). Natural hazards and disasters. Cengage Learning.				
Number of classes of active teaching				Other

Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods				
Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam	credits	
activity during lectures	10	written exam		
practical teaching		oral exam		40
colloquia	30			
seminar paper	20			

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE				
Level: Master Academic Studies				
The name of the course: Fire Dynamics and Expertise				
Lecturer (Name, middle name, last name): Ljiljana M. Trumbulović-Bujić				
Course status: mandatory				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
Gaining knowledge of fire as a dynamic process that takes place in time and space. Acquiring knowledge that is necessary for determining the circumstances and causes that led to the occurrence of a fire.				
Learning outcomes				
Understanding fire dynamics as a basis for dealing with preventive, repressive and sanitary fire protection. Knowledge that enables the organization of fire and knowledge expertise that enables independent or team explanation of the causes and circumstances under which the fire occurred.				
Content				
Theoretical teaching				
Phases of development of fire. Basic parameters of the development of fire within certain development phases. Events that follow the dynamics of fire (flash-over, backdraft, blew ...). The dynamics of fire in time and space (both indoors and outdoors). Influence of environmental parameters on the development of fire. Fire thermodynamics. Definition of procedures and method of expertise. Study of possible causes that have led to a fire or explosion. Analysis of the appearance of materials, objects, parts of the building, means of transportation, etc. after a fire or explosion. Analysis of traces of fire and explosions (wood, glass, metal elements, constructive building elements of the building, ...), traces from outside and inside the building (roof structure, walls, doors, windows, electrical, gas, smoke installations). Methods for determining the center of fire or explosion. Phases of the work on the expertise. Photography and other registration techniques. Non-destructive and destructive physicochemical methods for testing labels in the laboratory. Complete reconstruction of the event and preparation of inspection records				
Literature				
1. Jovanović, D., & Tomanović, D. (2002). Dinamika požara. Fakultet zaštite na radu, Niš.				
2. B. Škrbić (2002). Poglavlje "Procesi sagorevanja" u knjizi Tehnologija proizvodnje i primene gasa. Univerzitet u Novom Sadu, Novi Sad, 2002.				
3. Busarčević M., Radmilac D., Krstić D., Cvetković Lj., Glušica B., Poljak Đ. (2001). Osnovi kriminalističkih veštačenja. MUP Republike Srbije, Beograd, 2001.				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods				

Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	30
practical teaching		oral exam	30
colloquia			
seminar paper	30		

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE				
Level: Master Academic Studies				
The name of the course: Risks Management Legal Frameworks				
Lecturer (Name, middle name, last name): Mirjana R. Galjak				
Course status: elective				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
The aim of studying subjects is that students master knowledge in the field of international and national regulations in the field of protection against catastrophic incursions.				
Learning outcomes				
Students gain knowledge about legal frameworks and relevant institutions that they need to participate in complex risk management processes from disasters.				
Content				
<i>Theoretical teaching</i>				
<ul style="list-style-type: none"> - Legal and regulatory framework for risk management of disasters. - Risk management institutions for catastrophic events. - Public awareness, education, training and research. - Risk management and sustainable development. - The role of government, non-governmental and international organizations. 				
Literature				
1. "Sl. glasnik RS", br. 111/2009, 92/2011 i 93/2012 . Zakon o vanrednim situacijama. 2. European Commission (2014). Overview of natural and man-made disaster risks in the EU. Commission staff working document, Brussels, 8.4.2014 SWD(2014) 134 final.				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	

Teaching methods			
Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	30		
seminar paper	20		

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE			
Level: Master Academic Studies			
The name of the course: Information and communication technologies in risk management			
Lecturer (Name, middle name, last name): Nenad A. Marković			
Course status: elective			

Number of ECTS: 6				
Prerequisites: no				
Course objective Acquiring knowledge about information and communication technologies and forms of communication in emergencies.				
Learning outcomes Possession of knowledge about organization, types and applications of information and communication technologies, as well as skills for their implementation and communication in emergencies.				
Content <i>Theoretical teaching</i> Information and communication technologies as the technological basis of information systems. Organizational Aspects of Information Systems. Technological aspects of information systems. Areas of application of information networks. Types of wireless communication systems. Evolution of the standards of mobile communication systems. Architecture of modern mobile systems. Satellite systems for global positioning. Computer networks. Network Architecture. Network hardware and software. Layered architecture of the communication network. Architecture OSI reference model. Topology of computer networks. LAN and WAN networks. Client-server model. E-mail, FTP, HTTP, WWW. Networks of the sensor. Environmental Monitoring Networks. Application of information and communication networks in protection against catastrophic events.				
Literature 1. Showalter, P. S., & Lu, Y. (Eds.). (2009). Geospatial techniques in Urban hazard and disaster analysis (Vol. 2). Springer Science & Business Media.				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements	credits	Final exam		credits
activity during lectures	10	written exam		
practical teaching		oral exam		40
colloquia	20			
seminar paper	30			

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE
Level: Master Academic Studies
The name of the course: Fire Extinguishers and equipment
Lecturer (Name, middle name, last name): Ljiljana M. Trumbulović-Bujić
Course status: mandatory
Number of ECTS: 7
Prerequisites: no
Course objective Acquiring knowledge about the types and properties of fire extinguishers, fire extinguishing processes and fire extinguishing equipment.
Learning outcomes Knowledge of the right choice and use of fire extinguishing agents and equipment, depending on the type of fuel, the type of fire and the place where it is located.
Content <i>Theoretical teaching</i>

Physical-chemical basis of the fire-extinguishing process. Definition and conditions for fire extinguishing. Types of fire extinguisher. Distribution of fire extinguishing agents (according to aggregate state, fire fighting mechanism, purposes - fire class, method of obtaining). Fire fighting by cooling, congestion, homogeneous and heterogeneous inhibition. Water as a fire extinguishing agent (physical and chemical properties, advantages and disadvantages, additives). Equipment for supplying and extinguishing fire with water. Foam as a fire extinguishing agent (definition, methods of obtaining, types of foam, physical and chemical properties, application possibilities and foam extraction equipment). Dust as a fire extinguishing agent (physical-chemical properties, types, mechanism of action and application possibilities). Fire extinguishing apparatus with powder. Carbon dioxide as a fire extinguishing agent (physical-chemical properties, mechanism of action, application possibilities). Fire extinguishing apparatus with carbon dioxide. New chemical ecological fire extinguishing agents (physical-chemical properties, mechanism of action, possibilities and methods of application). Inerts for extinguishing fire (types, physical and chemical properties, methods of application).

Literature

1. Mihajlović, Emina, Mlađan, D., Janković, Ž. (2008). Procesi i sredstva za gašenje požara. Fakultet zaštite na radu u Nišu, Niš.
2. Žarko Janković (2010). Oprema i uređaji za gašenje požara, autorizovani materijal za pripremu ispita, Fakultet zaštite na radu u Nišu.

Number of classes of active teaching

Lectures:	Exercises:	Other form of lectures:	Study and research work:	Other
3	3			

Teaching methods

Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	30		
seminar paper	20		

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE

Level: Master Academic Studies

The name of the course: Natural disasters risk management

Lecturer (Name, middle name, last name): Jelena Đokić

Course status: mandatory

Number of ECTS: 7

Prerequisites: no

Course objective

The objective of the course is to equip the student with methods and techniques of managing the risk of catastrophic events.

Learning outcomes

Acquiring knowledge from methods and techniques to manage risk from catastrophic events.

Content

Theoretical teaching

Catastrophic events and fires through history. History of fire risk management and events with catastrophic consequences. Introduction to risk functions and its basic components. Getting to know the risk management cycle from a catastrophic event. Introduction to institutional and legislative frameworks for managing the risk of fire and events with catastrophic consequences. Insurance and management of the risk of fire and events with catastrophic consequences. The role of information and

communication technologies in managing the risk of fire and events with catastrophic consequences
Advanced techniques that are used in the integrated risk management of catastrophic events. An integrated view of multicast situations.

Literature

1. Coppola, D. P. (2006). Introduction to international disaster management. Butterworth-Heinemann.
2. Birkmann, J., & Birkmann, J. (2006). Measuring vulnerability to natural hazards: towards disaster resilient societies (No. Sirsi) i9789280811353).
3. Keller, E. A., & Blodgett, R. H. (2007). Natural Hazards: Earth's Processes as Hazards. Disasters, and Catastrophes: Pearson Prentice Hall, Upper Saddle River, NJ, USA.

Number of classes of active teaching

Lectures: 3	Exercises: 3	Other form of lectures:	Study and research work:	Other
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Teaching methods

Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	30		
seminar paper	20		

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE

Level: Master Academic Studies

The name of the course: Management and development of human resources in the protection

Lecturer (Name, middle name, last name): **Vesna M. Nikolić**

Course status: elective

Number of ECTS: 6

Prerequisites: no

Course objective

Introducing students with the basic theoretical concepts of human resource management and development and understanding their interconnectedness and influence. Acquiring knowledge and skills for efficient human resources management and action for the development of human resources in the field of security and protection

Learning outcomes

Possession of a developed knowledge system on contemporary concepts, strategies and capabilities of human resources management; competencies - knowledge and skills for effective action for the development of human resources in the field of security and protection.

Content

Theoretical teaching

Management and development of human resources - conceptual, theoretical, historical, legal - ethical, etc. Dimensions; Human Resources Management as a Business Philosophy and Management Function; Needs, Impacts and Challenges of Human Resource Management; Strategic human resources management; Human resource planning; Analysis and design of work; Development of human resources (socialization, orientation of employees, performance, motivation, etc.); Human resource development management (assessment and evaluation of performance, relationships, training and organizational learning); Career development; Global changes and human resources development in the future - different approaches to the development of human resources and their implications for the development of human resources in the field of security and protection.

<i>Practical teaching</i> Review of current issues and issues of human resource management and development in the protection and consideration of their implications for the development of the security and protection system through the development and defense of the seminar. works.				
Literature 1. Nikolić, V. Upravljanje i razvoj ljudskih resursa u zaštiti, Udžbenik u pripremi, Fakultet zaštite na radu u Nišu, Niš. 2. Dessler, G. (2007). Osnovi menadžmenta ljudskih resursa, Beograd: Data status. (odr.pog). 3. Torrington, D., Hall, L., Taylor, S. (2004). Menadžment ljudskih resursa, Beograd: Data status (odr.pog.). 4. Nikolic, V. (2010). Organizational Learning - An Integrative Approach to Learning in the Workplace, Proceedings: International Conference of Dependability and Quality Management, Research Center of DQM, Beograd, pp. 59 -70. 5. Markic, M., Nikolic, V. (2010). Modern Approach To Occupational Safety Management, Proceedings, ICDQ Management, Research Center of DQM, Beograd, 2010., pp. 187-196.				
Number of classes of active teaching				Other
Lectures: 3	Exercises: 3	Other form of lectures:	Study and research work:	
Teaching methods Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching			oral exam	40
colloquia		30		
seminar paper		20		

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE	
Level: Master Academic Studies	
The name of the course: Sustainable development and environmental protection	
Lecturer (Name, middle name, last name): Vesna M. Nikolić	
Course status: elective	
Number of ECTS: 6	
Prerequisites: no	
Course objective Acquiring knowledge about the basic elements, characteristics and processes of the system of working and environment and their interconnection and conditionality; on the impact of human activities on the environment, basic elements and principles of environmental protection, preventive action and standards in this field; familiarizing students with the concept and strategy of sustainable development and adopting the basic postulates of sustainable development.	
Learning outcomes Knowledge about interaction between work and environment; competencies for professional action in protecting and improving the quality of the work and environment in the context of the concept and the start of sustainable development.	
Content <i>Theoretical teaching</i> Systematic approach to the study of the working and environment; Environmental system, business system, technological system, work environment system (elements, characteristics, processes, interactions); Man in the work and environment system; Negative impacts on the environment, pollutants and system degradation; Assessment of the impact of projects, plans, programs, policies	

bases and facilities and their activities on the environment and the preparation of appropriate documents; Environmental protection system and basic principles of protection; Standards in environmental protection; EU directives and recommendations in the field of environmental protection; National environmental regulations; Concept, strategies and indicators of sustainable development.

Literature

1. Anđelković, B. Osnovi sistema zaštite, Fakultet zaštite na radu, Niš.
2. Đukanović, M. (1991). Ekološki izazov, Elit, Beograd.
3. Ministarstvo za nauku (2011). Putokaz ka održivom razvoju, Nacionalna strategija održivog razvoja, Beograd.
4. Normativno-pravna regulativa iz oblasti zaštite životne sredine (službena glasila)
5. Autorizovana predavanja predmetnog nastavnika.

Number of classes of active teaching

Other

Lectures: 3	Exercises: 3	Other form of lectures:	Study and research work:
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Teaching methods

Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia	30		
seminar paper	20		

Study programme: RISK MANAGEMENT OF CATASTROPHIC EVENTS AND FIRE

Level: Master Academic Studies

The name of the course: Protection and rescue

Lecturer (Name, middle name, last name): Mirjana R. Galjak

Course status: elective

Number of ECTS: 6

Prerequisites: no

Course objective

The objective of the course is to acquire knowledge necessary for the protection and rescue of people in conditions of natural disasters, catastrophic events and fires.

Learning outcomes

After the passed exam, students will be able to identify and classify risks to the population, vulnerability and vulnerability of people, and formulate, define and plan measures for protecting and saving people in conditions of natural disasters, catastrophic events and fires.

Content

Theoretical teaching

The organization and manner of excitation of population in conditions of natural disaster and natural disasters (earthquakes, floods, landslides), technical and technological accidents (dangerous goods, terrorism) and large scale fire (in the open, on facilities, on flammable liquids, on means of transport, on industrial plants). Concept, concept and organization of rescue of population, material and cultural goods. Measures of protection and rescue. Preventive measures. Needs and possibilities for protection of people, material goods and the environment from the consequences of catastrophic events. Protective objects. Methodology of planning the need for shelters. Shelter maintenance. The concept and purpose of the evacuation of the population, the place from which the evacuation is carried out, the evacuation time, the elements of the evacuation. Planning and developing an evacuation plan. Rescue from the ruins. Strengths, means and equipment for protection against ruins. Planning and protection from

earthquakes and landslides. Defense Planning and Rescue. Measures of protection and rescue from natural disasters: wind, snow and city, and ionizing radiation, and chemical contamination. Measures for protection and rescue from open fire - forest fires. Protection and rescue equipment.

Literature

1. Canton, L. G. (2007). Emergency management: Concepts and strategies for effective programs. John Wiley & Sons.
2. Cooper, D. C. (Ed.). (2005). Fundamentals of search and rescue. Jones & Bartlett Learning.
3. Keller, E. A., & Blodgett, R. H. (2007). Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes: Pearson Prentice Hall, Upper Saddle River, NJ, USA.
4. Hyndman, D., & Hyndman, D. (2016). Natural hazards and disasters. Cengage Learning.

Number of classes of active teaching

Lectures: 3	Exercises: 3	Other form of lectures:	Study and research work:	Other
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Teaching methods

Lectures, presentations, creation and defense of seminar work, discussion and discussion, consultations.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	50
colloquia	20		
seminar paper	20		

7.4 Link between competencies and subjects

		MANDATORY SUBJECTS					
		MS1	MS2	MS3	MS4	MS5	MS6
Generic competencies	communication	x	x				x
	critical thinking	x	x	x	x	x	x
	scenario modeling		x		x		x
	creativity	x	x			x	x
	initiative	x	x			x	x
	prediction of solutions and consequences				x	x	x
	collaboration	x	x			x	x
	working in multidisciplinary team		x			x	x
	intensive use of ICT in acquiring knowledge and solving problems		x			x	x
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge		x	x	x	x	x
	social and civic responsibility			x	x		x
	development of professional ethics and responsibility	x	x	x	x		x
	effective leadership						x
	strategic thinking						x
	identification and analysis of problems in NDRM						x
	experience-based critical decision making		x	x		x	x
	staying up-to-date with technological development	x	x	x	x	x	x
	holistic and proactive approach to NDRM situations		x	x			x

	clearly and unambiguously transfer knowledge to the professional and wider public	x	x		x	x	x
Subject-specific competencies	understanding of climate changes and natural disasters			x			x
	awareness of the complex and overlapping nature of disaster			x			x
	mastering of methods, procedures and processes of risk identification			x			x
	understanding the causes and consequences of disasters			x			x
	devising strategies and developing methodology and methods of emergency as part of NDRM						x
	optimizing and managing available resources in emergency as part of NDRM systems						x
	statistical data processing in order to define and make adequate conclusions						x
	integrated management in natural disaster situations						x
	understanding of civil protection mechanism and institutional framework in NDRM						x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation			x			x
	natural disasters analysis and risk assessment						x
	knowledge about prevention, mitigation, response and recovery operations						x
	applying ICT in NDRM						x
	development of human resources in NDRM						x
	applying specialized civil engineering fields in NDRM						x
	protection of critical infrastructure in natural disaster situations			x			x
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods						x
	cognizant of the needs of special populations			x			x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management			x			x

		ELECTIVE SUBJECTS				
		ES1	ES2	ES3	ES4	ES5
Generic competencies	communication	x		x		x
	critical thinking	x		x	x	x
	scenario modeling		x	x	x	
	creativity	x	x	x	x	x
	initiative			x	x	x
	prediction of solutions and consequences		x	x	x	x
	collaboration	x	x	x	x	x
	working in multidisciplinary team	x	x	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems		x		x	
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge			x		

	social and civic responsibility	x	x	x	x	x
	development of professional ethics and responsibility	x		x	x	x
	effective leadership	x		x	x	x
	strategic thinking	x			x	x
	identification and analysis of problems in NDRM		x			
	experience-based critical decision making			x		x
	staying up-to-date with technological development		x	x	x	
	holistic and proactive approach to NDRM situations		x		x	x
	clearly and unambiguously transfer knowledge to the professional and wider public	x	x	x		x
Subject-specific competencies	understanding of climate changes and natural disasters	x	x		x	
	awareness of the complex and overlapping nature of disaster	x	x			
	mastering of methods, procedures and processes of risk identification		x			
	understanding the causes and consequences of disasters	x				x
	devising strategies and developing methodology and methods of emergency as part of NDRM					x
	optimizing and managing available resources in emergency as part of NDRM systems					x
	statistical data processing in order to define and make adequate conclusions		x			x
	integrated management in natural disaster situations					
	understanding of civil protection mechanism and institutional framework in NDRM	x				x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation		x			
	natural disasters analysis and risk assessment		x			
	knowledge about prevention, mitigation, response and recovery operations	x				x
	applying ICT in NDRM		x			
	development of human resources in NDRM	x				x
	applying specialized civil engineering fields in NDRM					x
	protection of critical infrastructure in natural disaster situations					x
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods		x			
	cognizant of the needs of special populations	x		x		x
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management		x		x	

MS1 - English language – higher course

MS2 - Research methods and scientific communications

MS3 - Natural disasters

MS4 - Fire Dynamics and Expertise

MS5 – Fire Extinguishers and equipment
MS6 – Natural disasters risk management
ES1 - Risks Management Legal Frameworks
ES2 - Information and communication technologies in risk management
ES3 - Management and development of human resources in the protection
ES4 - Sustainable development and environmental protection
ES5 - Protection and rescue

8. University of Defense in Belgrade – Military academy (UNID)

8.1 Description of the study program

Name of study program and title

Master Academic Studies – RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE

Title: Master manager of risk management in case of natural disasters

The purpose of the study program

The purpose of the study program of Master Academic Studies Risk management in the case of natural disasters is the education of students to gain the title of master manager of risk management in case of natural disasters in accordance with the basic needs of the society. The Risk Management Program in the case of natural disasters is designed to ensure the acquisition of competencies and qualifications that are socially justified and useful, as well as for continuing education in doctoral studies. This study program is fully in line with the general objectives and tasks of education at the Military Academy, that is, with the general objectives and tasks of education of officers in the Serbian Army and the education system in the Republic of Serbia.

The master program of master academic studies forms the officers, civil servants and other persons for carrying out the tasks of master managers of risk management in case of natural disasters both in the system of national security and defense of the Republic of Serbia and in the civil sector.

This study program provides specialized educational knowledge in the field of risk management in case of natural disasters and the basis for further work by research oriented students (candidates). The focus of the study program is on the integration of theoretical and research work with the aim of preparing students for the improvement of theoretical knowledge in the field of natural disasters, crisis management, implementation of operational research for making optimal decisions in crisis situations, methodology of scientific work, scientific and professional education in accordance with legal regulations as well as practical training for crisis prevention and management in emergency situations and natural disasters. The realization of this study program contributes to the improvement of environmental protection in accordance with the concept of sustainable development and gives the starting point for students for doctoral studies.

This study program should enable the development of critical thinking and the training of personnel trained in strategic thinking and the application of theoretical knowledge in order to effectively and effectively manages risk in the event of natural disasters and who will have competence, comparability and competitiveness in European and global frameworks.

The outcome of the education process is the knowledge, skills and competencies that enable students (officers and others) to apply acquired knowledge to solve problems, from the highest to the lowest level, in the areas of risk management in case of natural disasters, with creative and initiative approach, as well as managing the organizational units dealing with protection and rescue operations and decision-making in crisis situations.

Objectives of the study program

The objectives of the master's study program in the study of risk management in the case of natural disasters are the development of academic knowledge and skills, leadership and creative abilities and the achievement of the competencies necessary for taking over duties in the national security and defense system with a focus on training for leadership and managerial positions in order to solve specific problems in emergency situations.

The objectives of this study program are in full accordance with the mission and tasks of the Military Academy in which the program is being conducted, since this military higher education institution creates officers and other persons for all missions and tasks of the Serbian Armed Forces.

The development of creativity among students is encouraged in the process of using the geographic information system, application of methods of operational research and operational planning in the sphere of protection and rescue in case of natural disasters. In this way, in addition to the application of scientific knowledge, the development of the profession and the promotion of creativity in the field of emergency situations are encouraged.

The main goal of the study program is to educate students on the application of scientific, professional and practical achievements, knowledge and skills in the field of management natural disasters, in order to identify and use opportunities, and to solve concrete (practical) problems.

The specific objectives of the program are acquisition of knowledge and skills for:

- assessment of vulnerability of objects and people, protection and rescue plans, risk assessment act and plan of operation for support to civil authorities in case of natural disasters,
- protection of health and behavior in emergency situations and emergency situations,
- acquiring knowledge about information and communication networks and ways of using the geographic information system in case of natural disasters,
- security management in case of natural disasters,
- purification (RHB decontamination technology) in case of natural disasters,
- use of the organization of state administration and legislation in emergency situations,
- proactive activities and team work in case of natural disasters,
- permanent education in the field of management in case of natural disasters,

- identifying indicators that indicate the possibility of natural disasters and the application of preventive measures and activities.

The objectives of the Master Academic Studies study program are achieved by continuous and comprehensive study of contemporary theoretical and methodological approaches in the field of social science and humanities, by critically analyzing existing theoretical and methodological experiences in this field and by developing skills for managing and managing risks in case of natural disasters.

Competencies of graduated students

By mastering the study program of master academic studies Risk management in case of natural disasters students (officers and other persons) acquire general and subject-specific skills that are in the function of quality performance of leadership and managerial duties in emergency situations.

By mastering the study program, the student acquires the following general abilities:

- application of analytical-synthetic methods for understanding the problem of risk in case of natural disasters and predicting the solution of certain problems;
- mastering skills, methods, procedures and processes of research of managerial and other problems of risk management in case of natural disasters;
- systemic knowledge and understanding of the crisis management field that complements the acquired knowledge in upgrading and basic academic studies.
- ability for critical analysis, assessment and synthesis of new and complex risk management ideas;
- to take the lead position and apply professional ethics in your immediate work environment;
- the ability to transfer professional knowledge and ideas to colleagues, the broad academic community and the society as a whole;
- integration of knowledge, solving complex problems and judging based on available information that contains reflections on social and ethical issues related to the application of their knowledge.

By mastering the study program the student acquires the following subject-specific abilities:

- basic knowledge and understanding of professional-specialist knowledge, which complements the knowledge acquired on improvement and basic academic studies, and the application of such knowledge and skills in the field of risk management in case of natural disasters;
- solving concrete problems of risk management at different levels, methods of operational research and geographic information system through appropriate simulation models;

- linking previously acquired knowledge from the basis of natural disasters, crises, crisis management with acquired knowledge from risk management to address specific situations and problems of risk management in case of natural disasters;
- link basic knowledge from different fields and their application in the collection, analysis and interpretation of data necessary for decision-making and solutions in their professional duties;
- monitoring and application of current scientific and professional knowledge from crisis management, as well as the ability to transfer acquired knowledge to the military and general public;
- natural disaster analysis and connection with the emergency sector;
- proactive and teamwork in crisis management;
- mastering the methods of scientific research and design and
- the use of information and communication technology in analyzing global strategic trends, modern security challenges and forecasting the development of a security environment.

Quality, contemporary and international compatibility of the study program

Master study program is largely in line with the corresponding study programs in the European educational space, which successfully applied the Bologna reform and conduct the education of cadets and students in accredited areas:

- University of Edinburgh, GB <http://www.see.ed.ac.uk/postgraduate/taughtdeg/SFSE/>
- Faculty of Engineering, LTH, Lund, Sweden <http://www.lu.se/master-of-disaster-management-english>
- Ghent University, Ghent, Belgium <http://www.imfse.ugent.be/index.asp?p=582&a=582>

These study programs are according to plans and programs that are studied in a certain degree compatible and comparable with the proposed study program Risk management in case of natural disasters.

Differences in the thematic and program units of particular subjects have been targeted for the modern, modern and complete education of students from areas that are considered basic, while the subsequent direction of students achieves profiling of specific risk management issues in case of natural disasters through elective subjects. Elective courses can be chosen according to individual affinities and interests of students.

In addition, almost all elements of the study program, such as academic title, duration and value in the ESPB, the name and content of the offered courses, the ways of taking exams, learning outcomes and teacher competencies, are harmonized with both the higher education institutions and the relevant higher education institutions in the country.

8.2 Subjects

No.	Status	Subjects	Hours L+E+CS	ECTS
FIRST SEMESTER				
1.	M	Natural Disasters	2+3+0	6
2.	M	Natural Disasters Risk Management	3+2+0	6
3.	M	Protection and Rescue System in Natural Disaster Situations	2+3+2	8
4.	E	Elective subject 1	2+2+0	5
5.	E	Elective subject 2	2+2+0	5
		Operational research		
		Models to support decision-making in natural disasters		
		Organization of state administration in emergency situations		
		Application of GIS in risk assesment in Natural Disaster Situations		
SECOND SEMESTER				
6.	M	Methodology of scientific research in the field of security and defense	2+2+0	6
7.	E	Elective subject 3	2+3+0	6
		Operations for support to civilian authorities in Natural Disaster Situations		
		Security Management in Natural Disaster Situations		
		Asanation field and radiological, chemical and biological technologies		
8.		Study research work on the basis of master work	0+0+8	8
9.		Master thesis		10
Total			15+17+10	60

8.3 Subject specification

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Natural Disasters
Lecturer (Name, middle name, last name): Miroslav Talić, Elizabeta Ristanović
Course status: mandatory
Number of ECTS: 6
Prerequisites: no
Course objective
The aim of the course is to acquire theoretical and practical knowledge on natural disasters and natural

disasters as well as protection against natural disasters and natural disasters.			
Learning outcomes			
Trained MAS students to navigate in different situations during natural disasters.			
Content			
<i>Theoretical teaching</i>			
Conceptual definition of natural disasters; Challenges of Natural Disasters in the 21st Century; Global system for monitoring the risk of natural disasters; National monitoring; Climate change and natural disasters; Epidemics and / or pandemics as natural disasters and consequences of natural disasters; RHB accidents like natural catastrophes; Environmental monitoring in conditions of natural disasters; Crisis management in conditions of natural disasters (crisis identification, decision making, crisis management, crisis communication); Respondents and actors in case of natural disasters (state bodies, business entities, social organizations); The role and specific tasks of MO and VS in protection against natural disasters; Protection of critical infrastructure in conditions of natural disasters; International cooperation and international legal protection of persons in case of natural disasters: UN mechanisms and institutions; EU, regional organizations, humanitarian organizations; Socio-economic, political-security, health and psychological consequences of natural disasters; Prevention of natural disasters through capacity building and resource preparation.			
<i>Practical teaching</i>			
Field work: getting familiar with the operation of the risk monitoring system of natural disasters and natural actors; Practical introduction to the work of the Emergency Situations Department and experiences in the fight against floods and other natural disasters; Service 112 Creation of topographic maps for spatial distribution of natural disasters in the Republic of Serbia, Visit of RHMZ; A visit to the MMA and the Public Health Institute of RS, Milan Jovanovic Batut, the Nuclear Security Agency of RS, the entities MO and VS. Familiarization with the National Emergency Response Strategy and its practical application			
Literature			
<ol style="list-style-type: none"> 1. Jakovljević V., Cvetković V., Gačić J. (2015) Prirodne katastrofe i obrazovanje, Fakultet bezbednosti, Beograd 2. Jakovljević V. (2011) Civilna zaštita u Republici Srbiji. Fakultet bezbednosti, Beograd 3. Pine, J.C. (2009). Natural Hazards Analysis: Reducing the Impact of Disasters. Taylor Francis Publisher 4. Arjen Boin, Pol i Hart, Erik Štern, Ben Sandelijus. Politika upravljanja krizama-javno rukovođenje pod pritiskom. 5. Ilen Kelman. Disaster Diplomacy: can tragedy help build bridges among countries. 6. Coppola D and Maloney E. (2009). Communicating Emergency Preparedness- Strategies for Creating a Disaster Resilient Public. CRC Taylor and Francis Group 7. Cvetković V. (2016). Policija i prirodne katastrofe. Beograd, Zadužbina Andrejević. 8. Nacionalna strategija zaštite i spasavanja u vanrednim situacijama. Sl,glasnik R.Srbije 9. Kešetović, Ž. (2007). Krizni menadžment Beograd. Fakultet bezbednosti i službeni glasnik. 10. Sendai Framework for Disaster Risk Reduce.2015-2030.www.wedrr.org 11. Milosavljević B (2015). Međunarodna saradnja u oblasti smanjenja rizika od katastrofa, Pravni zapisi br.1. str. 52-84 			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 3	Other form of lectures:	
Study and research work:			
Teaching methods			
Lectures, group discussions, case studies.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	15	written exam	
practical teaching	15	oral exam	45

colloquia			
seminar paper	25		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE			
Level: Master Academic Studies			
The name of the course: Natural Disasters Risk Management			
Lecturer (Name, middle name, last name): Miroslav Talijan, Rade Slavković			
Course status: mandatory			
Number of ECTS: 6			
Prerequisites: no			
Course objective			
The aim of the course is to acquire theoretical and practical knowledge in the field of risk management in disaster relief.			
Learning outcomes			
Participants should have knowledge on the basis of which they can identify the risks of natural disasters, conduct analysis and risk assessment. They should propose measures for risk management in relation to the positive regulations and possibilities of the subjects of the protection and rescue system.			
Content			
<i>Theoretical teaching</i>			
Introduction to the subject. The concept of risk. Risk classification. Systemic risk approach. Situational approach to risk. Risk assessment. Risk management. Process character of risk. Implementation of risk assessment in organizational processes. Estimation of vulnerability.			
Literature			
1. Savić, S., Stanković, M.: Teorija sistema i rizika, Beograd, 2017			
2. Mlađan, D.: Bezbednost u vanrednim situacijama, Beograd, 2015			
3. Nikolić, V., Živković, N.: Bezbednost radne i životne sredine, vanredne situacije i obrazovanje, Niš, 2011.			
4. Keković, Z., Savić, S., Komazec, N., Milošević, M., Jovanović, D.: Procena rizika u zaštiti lica, imovine i poslovanja, Beograd, 2011.			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 2	Other form of lectures: 4	
Study and research work: 2			
Teaching methods			
Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents.			
Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of risk management models and independent research work. During the course of the course, the student is obliged to elaborate a model of risk management, creating a seminar paper. Knowledge checking is done through an oral exam. The requirement for entering the exam was successfully defended seminar work. The final exam is conducted verbally before a teacher.			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	20	written exam	
practical teaching	20	oral exam	30
colloquia			
seminar paper	30		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies

The name of the course: Protection and Rescue System in Natural Disaster Situations				
Lecturer (Name, middle name, last name): Miroslav Talijan, Rade Slavković				
Course status: mandatory				
Number of ECTS: 8				
Prerequisites: no				
Course objective The objective of the course is to master the basic knowledge for successful operation within the framework of the protection and rescue system in case of natural disasters. Students get acquainted with theoretical achievements, legal bases and practice of achieving protection and rescue in case of natural disasters, general models and systems of protection and rescue, forms of management and management, organization, preparation of participation of citizens, legal entities, public institutions and local self-governments in protection and saving from danger and consequences of natural disasters.				
Learning outcomes After passing the exam, students will be trained to identify the elements of the protection and rescue system in case of natural disasters, as well as to understand the place and role of the protection and rescue system in the national security system. Participants will have a more rational approach to solving tasks in practice and will be able to plan and implement more effectively and efficiently the tasks of protection and rescue in case of natural disasters.				
Content <i>Theoretical teaching</i> Introduction to the subject. Conception of the protection and rescue system. Emergencies in case of natural disasters (earthquakes, landslides, landslides, floods, fires, droughts, epidemics). Modern national protection and rescue systems and international organizations. The system of protection and rescue of the Republic of Serbia and the legal basis. Place of protection and rescue system in the national security system. Planning and financing of protection and rescue systems. Strengths of protection and rescue systems in case of natural disasters. Methodology for making assessment of the vulnerability of the Republic of Serbia in case of natural disasters. Management of the system of protection and rescue in case of natural disasters. Tasks of Civil Protection in case of natural disasters. Tasks of the Serbian Armed Forces in providing assistance to civilian authorities in case of natural disasters and civil-military cooperation. International cooperation in the field of protection and rescue in case of natural disasters. <i>Practical teaching</i> The contents of the DON include a teaching visit to the Sector for Emergency Situations of the Ministry of the Interior of the Republic of Serbia, with a focus on the examination of work and problems in the work of its Management, Risk Management Directorate and Administration for Fire and Rescue Units				
Literature 1. Babić, B., Komazec, N.: Integrisani sistem zaštite u vanrednim situacijama, Beograd, 2017 2. Mlađan, D.: Bezbednost u vanrednim situacijama, Beograd, 2015 3. Nikolić, V., Živković, N.: Bezbednost radne i životne sredine, vanredne situacije i obrazovanje, Niš, 2011 4. Babić, B., Komazec, N.: Sistem zaštite i spasavanja, Beograd, 2017 5. Bostrom, N., Čirković, M.: Rizici globalnih katastrofa, Smederevo, 2012 6. Savić, S., Stanković, M.: Teorija sistema i rizika, Beograd, 2017 7. Vasiljević, A.:Upravljanje rizicima, Biblioteka akademika, Novi Sad, 2012				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 	Other form of lectures: 3	Study and research work: 2	
Teaching methods Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents. Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of risk				

management models and independent research work. During the course of the course, the student is obliged to elaborate a model of risk management, creating a seminar paper. Knowledge checking is done through an oral exam. The requirement for entering the exam was successfully defended seminar work. The final exam is conducted verbally before a teacher

Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	20	written exam	
practical teaching	20	oral exam	30
colloquia			
seminar paper	30		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Operational research
Lecturer (Name, middle name, last name): Dragan S. Pamučar
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective Acquiring knowledge in the field of operational research, application of methods and techniques of operational research during planning and organization of work and realization of tasks from functional competence.
Learning outcomes The outcome of the course is to enable the cadets to apply methods and techniques of operational research for the planning and organization of work in the defense system
Content <i>Theoretical teaching</i> - Introduction to the subject; - Network planning; - Linear programming; - Massive service, - Multi-criteria decision making <i>Practical teaching</i> - Network planning techniques (CPM and PERT), - Linear programming model settings, - Simplex method (graphic method), - Simplex method (tabular procedure), - Transport task (Northwest corner method), - Transport task (Fogel method), - Transport task (Fogel-Kordin procedure), - Degeneration of transport problem, 9. Problem of assignment, - Massive service, - Multi-criteria decision making
Literature 1. Stojiljković M, Vukadinović S, Operaciona istraživanja, VIZ, 1984. 2. Petrić J, Kojić Z, Šarenac L, Operaciona istraživanja, Beograd, 1980 3. Pamučar D, Operaciona istraživanja - determinističke metode i modeli, RABEK, Beograd, 2017 4. Đorović B, Osnove menadžmenta u saobraćaju, Niš, 2006. 5. Nikolić I, Borović S, Višekriterijumska optimizacija, CVŠ VJ, Beograd, 1996. 6. Borović S, Milićević M, Zbirka zadataka iz operacionih istraživanja, Beograd, 2001.

7. Teodorović D, Fuzzy skupovi i primene u saobraćaju, Beograd 1994.				
Number of classes of active teaching				Other
Lectures: 2	Exercises: 2	Other form of lectures:	Study and research work:	
Teaching methods				
Teaching is carried out in dedicated cabinets, using appropriate teaching materials (multimedia presentations, etc.). Teaching is planned and realized on topics for continuity in monitoring and understanding of teaching contents. During the course of the teaching process, constantly check the level of knowledge of cadets and students. Exercise exercises in a classroom or cabinet, and plan them after processing (lecturing) the appropriate topic.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching			oral exam	30
colloquia		40		
seminar paper		20		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Models to support decision-making in natural disasters
Lecturer (Name, middle name, last name): Dragan S. Pamučar
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective The objective of the course is to enable students to improve the decision-making process through the application of models and decision-making methods in terms of certainty, risk and uncertainty, as well as the application of modern software tools to support decision-making
Learning outcomes The outcome of the course is the methodological ability of the trainees to independently identify and formulate the decision-making process, select and apply appropriate methods and tools for decision support
Content <i>Theoretical teaching</i> Basics of decision theory. Deciding on certainty, risk, uncertainty, and conflict situations. Multi-criteria decision making. Group decision making. Basics of fuzzy logic. Decision support systems. Expert systems. Models and methods for risk assessment. <i>Practical teaching</i> Subjective and objective methods of defining the weight coefficients of the criteria. Analytical hierarchical process. Method VIKOR. MAVAS method. TOPSIS method. PROMETHEE method. ELECTRE method. Matrix method of risk assessment. Multicellular decision methods. Models of group decision making. Fuzzy logic systems and adaptive neural networks.
Literature 1. Pamučar, D., Đorović, B.: Operaciona istraživanja: determinističke metode i modeli, RABEK, 2017. 2. Pamučar, D., Božanić D., Đorović B.: Fuzzy logic in decision making process in the Armed Forces of Serbia, LAMBERT Academic Publishing, Saarbrücken, 2011. 3. Mučibabić, S.: Odlučivanje u konfliktnim situacijama, Vojna akademija, Beograd, 2003 4. Čupić, M., Suknović M.: Odlučivanje, Fakultet organizacionih nauka, Beograd, 2010. 5. Suknović, M., Delibašić, B.: Poslovna inteligencija i sistemi za podršku odlučivanju, Fakultet

- organizacionih nauka, Beograd, 2010.
6. Keković, Z., Savić, S., Komazec, N., Milošević, M. i Jovanović, D.: Procena rizika u zaštiti lica, imovine i poslovanja, Centar za analizu rizika i upravljanje krizama, Beograd, 2011.
7. Nikolić, I., Borović, S.: Višekriterijumska optimizacija - metode, primena u logistici, softver, CVŠ VJ, 1996.
8. Borović, S., Milićević, M.: Zbirka zadataka iz odabranih oblasti operacionih istraživanja, Vojna akademija, 2001.

Number of classes of active teaching				Other
Lectures: 2	Exercises: 1	Other form of lectures:	Study and research work:	

Teaching methods

Teaching is carried out in cabinets, using appropriate teaching materials (multimedia presentations, etc.). Teaching takes place through lectures, exercises and independent work. During the course of the course, the student is obliged to prepare a seminar paper. Knowledge checking is done through an oral exam. The requirement for entering the exam is successfully defended seminar work.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures	10	written exam	
practical teaching		oral exam	40
colloquia			
seminar paper	50		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Organization of state administration in emergency situations
Lecturer (Name, middle name, last name): Boban Đorović, dr Goran Župac
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective
The objective of the course is to acquire theoretical and practical knowledge in the field of state administration in emergency situations in case of natural disasters.
Learning outcomes
Participants should have knowledge on the basis of which they can identify the factors of organization of state authorities in emergency situations. They need to differentiate the conditions and modes of organization according to the planning documentation and the situation that has arisen.
Content
<i>Theoretical teaching</i>
Introduction to the subject. The concept and theories of the organization. Goals of the organization. Functions of the organization. Models of organizational structures. Designing organizational structures. Organization of state administration. Rights and obligations of state authorities and competent services in accordance with the Law on Emergency Situations. Planning and specific work in emergency situations. Readiness-preparedness of state authorities. Authorized and qualified legal entities. Specificity of engagement of forces and means of protection and rescue. Relations with engaged companies. Treatment according to the plan of protection and rescue
Literature
1. Dulanović Ž, Ondrej J: Osnovi organizacije poslovnih sistema, Fakultet organizacionih nauka, Beograd, 2007.
2. Bulat V.: Teorija organizacije, ICIM, Kruševac 2001.

3. Đorović B, Pamučar D: Projektovanje organizacionih struktura-metode i modeli, Univerzitet odbrane, Vojna akademija, 2016.
4. Zakon o vanrednim situacijama, Službeni glasnik Republike Srbije broj 111/2009, 92/2011 i 93/2012.
5. Zakon o državnoj upravi, Službeni glasnik Republike Srbije broj 79/2005, 101/2007, 95/2010 i 99/2014.

Number of classes of active teaching				Other
Lectures: 2	Exercises:	Other form of lectures: 4	Study and research work: 2	

Teaching methods

Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents.

Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of the model of administration of the state administration body and independent research work. During the course of the course, the student is obliged to elaborate a model of administration of the state administration body through seminar work. Knowledge checking is done through an oral exam. The requirement for entering the exam was successfully defended seminar work. The final exam is conducted verbally before a teacher.

Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures	20	written exam	
practical teaching	20	oral exam	30
colloquia			
seminar paper	30		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Application of GIS in risk assesment in Natural Disaster Situations
Lecturer (Name, middle name, last name): Ljubomir J. Gigović
Course status: elective
Number of ECTS: 5
Prerequisites: no
Course objective
This course is designed to enable students to understand and understand the principles and concepts of GIS, with particular emphasis on the practical skills of applying GIS necessary to assess the risk of natural disasters.
Learning outcomes
Master the general knowledge of geographic information systems and methods of collecting, processing and analyzing geospatial data. Train students in practical modeling of graphic and non-data data in GIS applications, their linking, analysis and display. Enable students to successfully apply knowledge acquired through the study of this subject in risk management from natural disasters.
Content
<i>Theoretical teaching</i>
Definition of GIS, Structure and Elements of GIS, GIS Data Models, GIS Data Collection, Modeling and Design, GIS Analysis and Presentation.
<i>Practical teaching</i>
GIS data collection and design. Problem solving graphic data in GIS applications and solving specific tasks with practical analysis and display.
Literature
1. Gigović, Lj: Geografski informacioni sistemi, Medija centar Odbrana, Beograd, 2014.

2. Marković D., Prostorni informacioni sistemi, skripta VTA VJ, 1999.			
3. Kukrika M., GIS, Geografski fakultet, 2000.			
Number of classes of active teaching			Other
Lectures: 2	Exercises: 1	Other form of lectures:	
Study and research work:			
Teaching methods			
Teaching takes place through lectures and cabinet exercises. Knowledge testing is realized through program tasks. Requirements for taking the oral exam are program assignments (exercises).			
Grade (maximum number of credits 100)			
Pre-exam requirements	credits	Final exam	credits
activity during lectures		written exam	
practical teaching	50	oral exam	50
colloquia			
seminar paper			

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Methodology of scientific research in the field of security and defense
Lecturer (Name, middle name, last name): Srđan Blagojević
Course status: mandatory
Number of ECTS: 6
Prerequisites: no
Course objective
To enable students to acquire basic knowledge in the Methodology of Scientific Research, they get acquainted with scientific research methods and methods of their application in research of the field of security and defense.
Learning outcomes
The outcome of the course is the ability to independently research and research within teams in the field of security and defense, as well as the ability to present the results of scientific research, master work and scientific communications, and to adapt to the modern requirements of training individual, unit and senior officers for risk management in case of natural disasters .
Content
<i>Theoretical teaching</i>
1. Introduction to the subject, 2. Science and scientific knowledge, 3. The place and role of the methodology in the research of social phenomena and processes 4. Science about security and defense science, concept and classification 5. Methodology of scientific research of security phenomena and processes 6. Basic philosophical directions in research in the field of security and defense, 7. Basic methods of scientific knowledge and research 8. Open-minded methods, 9. Methods for data collection, 10. Specificity of research of operational problems, 11. Conceptualization of research, 12. Drafting of scientific ideas and research plans 13 Organization and realization of research, 14. Rules and procedures of academic writing, 15. Presentation of research results
<i>Practical teaching</i>
1. Application of basic methods of scientific knowledge and research; 2. Application of general-purpose methods; 3. Application of methods for data collection; 4 Research design: 4.1. Formulation of the research problem, 4.2. Operationalization of the subject of research, 4.3. Formulation of the hypothetical framework of research 4.4. Development of a methodological framework, 5.5. Development of a research plan; 5. Organization and realization of research; 6. Presentation of results and production of scientific publications
Literature

1. Termiz Dževad, Milosavljević Slavomir, Analitika, Lukavac 2008.
2. Milosavljević S, Radosavljević I., Osnovi metodologije političkih nauka, Beograd 2013.
3. Termiz Dž. Specifičnosti istraživanja bezbjednosne djelatnosti; Sarajevo, 2014.
4. Danilović N. Metod analize sadržaja dokumenata, Zadužbina Andrejević, Beograd, 2015.
5. Danilović N. Gordić M., Blagojević S., Savremeni sistemi bezbednosti, Zavod za udžbenike, Beograd 2015.

Number of classes of active teaching				Other
Lectures: 2	Exercises: 1	Other form of lectures:	Study and research work:	

Teaching methods

Teaching takes place through lectures and exercises. Exercises are auditory and solve tasks from individual chapters, provide additional explanations, and, for example, elaborate individual areas of theoretical instruction. During the course of the course, the student is obliged to develop a research project. Knowledge testing takes place through two colloquiums. The condition for the final exam is that the student places both colloquiums and successfully completes the research project. The final exam consists of an oral exam.

Grade (maximum number of credits 100)

Pre-exam requirements	credits	Final exam	credits
activity during lectures		written exam	
practical teaching		oral exam	30
colloquia	50		
seminar paper	20		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE
Level: Master Academic Studies
The name of the course: Operations for support to civilian authorities in Natural Disaster Situations
Lecturer (Name, middle name, last name): Rade Slavković
Course status: elective
Number of ECTS: 6
Prerequisites: no
Course objective The objective of the course is to acquire theoretical and practical knowledge from the use of the Serbian Armed Forces and to engage other parts of the Security System in support of civilian authorities in case of natural disasters.
Learning outcomes Trained MAS students to solve complex operational tasks to help civil authorities in case of natural disasters.
Content <i>Theoretical teaching</i> Introduction to the subject. Challenges, risks and threats to security at national, regional and global level. Operations to help civil authorities counter the internal threat to security, terrorism, separatism and organized crime. Operations to assist civil authorities in case of natural disasters, technical, technological and other disasters. <i>Practical teaching</i> In additional forms of teaching, students of SAS UO solve complex operational tasks of supporting the civilian authorities in countering the threats to security, in accordance with the Operational Planning and Operation Manual of the Command of the Serbian Armed Forces. By working independently, consulting with professors, students model complex operational tasks to assist civil authorities in countering security threats.

Literature				
1. Strategija nacionalne bezbednosti Republike Srbije, 2009.				
2. Strategija odbrane Republike Srbije, 2009.				
3. Doktrina Vojske Srbije, GŠ VS, Beograd, 2010.				
4. Slavković, R i drugi, Metodički priručnik za izvođenje primenjenog dela Operatike (strategijski i operativni nivo), Medija centar "Odbrana", Beograd, 2015.				
5. Doktrina operacija Vojske Srbije, GŠ VS, Beograd, 2012.				
6. Uputstvo za operativno planiranje i rad komandi u VS, GŠ VS, Beograd, 2014.				
7. Aplikacija bezbednosnog menadženta u suprotstavljanju i borbi protiv terorizma. Institut za kriminološka i sociološka istraživanja, Beograd 2010.				
8. Strategijske situacije, Vojna akademija, Katedra operatike.				
Number of classes of active teaching				Other
Lectures: 2	Exercises:	Other form of lectures: 4	Study and research work: 2	
Teaching methods				
Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents.				
Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of the model of operation and independent research work. During the course of the course, the student is obliged to develop two military operations as a project. Knowledge checking is done through an oral exam. The requirement to enter the exam successfully defended two military operations as a project. The final exam is realized orally before the teacher of the operative.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching		40	oral exam	30
colloquia				
seminar paper		20		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE				
Level: Master Academic Studies				
The name of the course: Security Management in Natural Disaster Situations				
Lecturer (Name, middle name, last name): Miroslav Talijan, Elizabeta Ristanović				
Course status: elective				
Number of ECTS: 6				
Prerequisites: no				
Course objective				
The aim of this course is to get acquainted with theoretical achievements and practice of implementing security management in case of natural disasters. Particular emphasis is placed on factors, principles and principles that influence the organization and functioning of security management and the content and performance of the duties of the security managers, ie its competencies and tasks, with special emphasis on the practice of exercising security management in special security states and in case of natural disasters.				
Learning outcomes				
After passing the exam, participants will be trained to identify the factors, principles and principles that influence the organization and functioning of security management, as well as to understand the position and role of the security manager in case of natural disasters. Participants will be able to analyze the implementation of the principles of the functioning of security management in the event of natural disasters and to respond adequately to the successful realization of security management in case of natural disasters.				

Content

Theoretical teaching

Introduction to the subject. Security as a management area. Basic theoretical settings of security management. Factors, principles and principles that influence and underpin the functioning and organization of security management. Content and tasks of security managers (roles of the security manager and activity of the security management process cycle). Organization, forms and methods of security management. Factors for the functioning and organization of security management and analysis of the manifestation in the security system of the Republic of Serbia. Principles of the functioning of security management and analysis of their application. Principles on the organization of security management in the Republic of Serbia. Realizing security management in special security situations and in case of natural disasters. Function and organization of security forces in case of natural disasters.

- Risk assessment of natural disasters (international and national standards)
- Risk management from natural disasters
- Crisis management in natural disasters (understanding crisis, crisis decision making, crisis communication, crisis as a catalyst for change, crisis management and foreign policy-disaster diplomacy, advancement of crisis management based on lessons learned)
- International and national legal framework for the system of prevention and protection against natural disasters in the Republic of Serbia
- Entities of the system of protection and rescue (state bodies, state administration bodies, business entities, citizens)
- The role of MOs and VSs in protection against natural disasters and response to natural disasters as part of the third VS mission
- The role of the non-governmental sector (Red Cross of the Republic of Serbia) in cases of natural disasters
- Training of subjects and forces of protection and rescue system
- Management of the Protection system and directions for further development
- Natural disasters and health security (health and social protection, diseases and injuries, prevention of infectious diseases, international cooperation and humanitarian aid, psychosocial support)
- Application of GIS in the management of natural disasters
- Management of the system of reconstruction and assistance in case of natural disasters
- Psychological consequences of natural disasters and implications for security management
- Socio-economic consequences and security risks of natural disasters
- Formal and non-formal education and learning in the function of security risk management of natural disasters

Practical teaching

Practical classes: Application of adopted risk assessment technologies, Case study; Crisis simulation; Visits to MOs and VSs in charge of emergency response and natural disasters (GS VS, MMA-SPM, CUK ABHO). Crisis communication. - a visit to the Public Relations Office of the MO, a visit to the news agency; GIS and its functioning; Provide interviews with operatives

Sector for Emergency Situations related to field treatment and management of emergency situations. Visit to the Center for simulation and distance learning VA and getting to know the simulation possibilities; Visit to the Red Cross of the Republic of Serbia

Literature

1. Talijan, M., Miroslav, Talijan, Momčilo: Opšti i bezbednosni menadžment, VŠUP, Banja Luka, 2011
2. Mlađan, D.: Bezbednost u vanrednim situacijama, Beograd, 2015
3. Nikolić, V., Živković, N.: Bezbednost radne i životne sredine, vanredne situacije i obrazovanje, Niš, 2011
4. Keković, Z., Savić, S., Komazec, N., Milošević, M., Jovanović, D.: Procena rizika u zaštiti lica, imovine i poslovanja, Beograd, 2011
5. Savić, S., Stanković, M.: Teorija sistema i rizika, Beograd, 2017

6. Doktrina Vojske Srbije, Medija centar "Odbrana", Beograd, 2012.				
Number of classes of active teaching				Other
Lectures: 2	Exercises:	Other form of lectures: 3	Study and research work:	
Teaching methods Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents. Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of risk management models and independent research work. During the course of the course, the student is obliged to develop a seminar paper in the field of security management in case of natural disasters. Knowledge checking is done through an oral exam. The requirement for entering the exam was successfully defended seminar work. The final exam is conducted verbally before a teacher.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		20	written exam	
practical teaching		20	oral exam	30
colloquia				
seminar paper		30		

Study programme: RISK MANAGEMENT IN CASE OF NATURAL CATASTROPHE	
Level: Master Academic Studies	
The name of the course: Asanation field and radiological, chemical and biological technologies	
Lecturer (Name, middle name, last name): Radovan M. Karkalić	
Course status: elective	
Number of ECTS: 6	
Prerequisites: no	
Course objective The objective of the course is to adopt fundamental and applied knowledge on RHB decontamination technology, with the focus on field assignment and PNHB security measures	
Learning outcomes Students should have knowledge based on which they can apply basic knowledge in the field of RHB decontamination technology, which enables them to solve the problems from the field of field clearing.	
Content <i>Theoretical teaching</i> Introduction to the subject. Theoretical RHB decontamination ramps. Materials for RHB decontamination. Analysis of matter for RHB decontamination. Radiological decontamination of samples. Chemical decontamination of samples. RHB decontamination at DkSt units of genera and services. RHB decontamination at DkSt ABHsl. Decontamination of land and buildings. Decontamination of clothing and equipment. Decontamination of food and water. Meat and hand tools for RHB decontamination. Removing the consequences of N and H accidents. The state and development of the means of RHB decontamination in other armed forces. Maintenance of funds for RHB decontamination.	
Literature 1. D. Ristić, Radiološka, hemijska i biološka dekontaminacija, udžbenik, SSNO-UABHO, VIZ, Beograd, 1981. 2. Mesna i priručna sredstva za zaštitu i dekontaminaciju, UABHO, VIZ, Beograd, 1976. 3. Zaštita i dekontaminacija InMs od NHB oružja, InU-92, VIZ, Beograd, 1984. 4. S. Jakšić, R. Biočanin, Uputstvo za RHB dekontaminaciju (privremeni materijal), ŠC ABHO, Kruševac, 1997.	

5. S. Jakšić, R. Biočanin, Obezbeđenje VJ od hemijskih udesa u miru, ŠC ABHO, 1996.				
Number of classes of active teaching				Other
Lectures: 2	Exercises:	Other form of lectures:	Study and research work: 2	
Teaching methods				
Teaching is planned and implemented on topics for continuity in monitoring and understanding of teaching contents.				
Teaching takes place through lectures, explanations, descriptions, discussions, elaboration of the RHB decontamination model during asanation. During the course of the course, the student is obliged to elaborate a procedure of assignment through seminar work. Knowledge checking is done through an oral exam. The requirement for entering the exam was successfully defended seminar work. The final exam is conducted verbally before a teacher.				
Grade (maximum number of credits 100)				
Pre-exam requirements		credits	Final exam	credits
activity during lectures		10	written exam	
practical teaching			oral exam	30
colloquia		30		
seminar paper		30		

8.4 Link between competencies and subjects

		MANDATORY SUBJECTS			
		MS1	MS2	MS3	MS4
Generic competencies	communication	x	x	x	x
	critical thinking	x	x	x	x
	scenario modeling		x		
	creativity	x	x	x	x
	initiative	x	x	x	
	prediction of solutions and consequences	x	x	x	
	collaboration	x	x	x	
	working in multidisciplinary team		x	x	x
	intensive use of ICT in acquiring knowledge and solving problems		x		x
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge		x		x
	social and civic responsibility	x	x	x	
	development of professional ethics and responsibility	x	x	x	
	effective leadership	x	x	x	x
	strategic thinking	x	x	x	x
	identification and analysis of problems in NDRM	x	x		
	experience-based critical decision making	x	x	x	x
	staying up-to-date with technological development	x	x		
	holistic and proactive approach to NDRM situations	x	x	x	x
	clearly and unambiguously transfer knowledge to the professional and wider public	x	x	x	x

Subject-specific competencies	understanding of climate changes and natural disasters	x	x		
	awareness of the complex and overlapping nature of disaster	x	x		
	mastering of methods, procedures and processes of risk identification	x	x		x
	understanding the causes and consequences of disasters	x	x	x	
	devising strategies and developing methodology and methods of emergency as part of NDRM		x	x	x
	optimizing and managing available resources in emergency as part of NDRM systems		x	x	
	statistical data processing in order to define and make adequate conclusions		x		x
	integrated management in natural disaster situations	x	x		
	understanding of civil protection mechanism and institutional framework in NDRM		x	x	
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x		
	natural disasters analysis and risk assessment	x	x		
	knowledge about prevention, mitigation, response and recovery operations	x	x	x	
	applying ICT in NDRM		x		
	development of human resources in NDRM		x	x	x
	applying specialized civil engineering fields in NDRM		x	x	
	protection of critical infrastructure in natural disaster situations	x	x	x	
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods		x		x
	cognizant of the needs of special populations	x	x	x	
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management	x	x		

		ELECTIVE SUBJECTS						
		ES1	ES2	ES3	ES4	ES5	ES6	ES7
Generic competencies	communication			x	x	x	x	x
	critical thinking	x	x	x	x	x	x	x
	scenario modeling		x			x	x	x
	creativity	x	x	x	x	x	x	x
	initiative		x			x	x	x
	prediction of solutions and consequences	x	x		x	x	x	x
	collaboration		x	x	x	x	x	x
	working in multidisciplinary team			x	x	x	x	x
	intensive use of ICT in acquiring knowledge and solving problems	x	x		x	x	x	
	solving complex multidisciplinary problems in theory and practice applying acquired knowledge	x	x		x	x	x	x
	social and civic responsibility			x		x	x	x

	development of professional ethics and responsibility	x	x	x		x	x	x
	effective leadership	x	x	x	x	x	x	x
	strategic thinking	x	x	x	x	x	x	x
	identification and analysis of problems in NDRM	x	x		x	x	x	
	experience-based critical decision making	x	x		x	x	x	x
	staying up-to-date with technological development	x	x		x	x	x	x
	holistic and proactive approach to NDRM situations	x	x		x	x	x	x
	clearly and unambiguously transfer knowledge to the professional and wider public	x	x	x	x	x	x	x
Subject-specific competencies	understanding of climate changes and natural disasters			x		x	x	x
	awareness of the complex and overlapping nature of disaster			x		x	x	
	mastering of methods, procedures and processes of risk identification	x	x		x	x	x	x
	understanding the causes and consequences of disasters			x		x	x	
	devising strategies and developing methodology and methods of emergency as part of NDRM	x	x			x	x	x
	optimizing and managing available resources in emergency as part of NDRM systems	x	x		x	x	x	x
	statistical data processing in order to define and make adequate conclusions	x	x			x	x	x
	integrated management in natural disaster situations	x	x			x	x	x
	understanding of civil protection mechanism and institutional framework in NDRM			x		x	x	x
	knowledge of the processes associated with risk assessments, land-use planning, structural mitigation	x	x		x	x	x	
	natural disasters analysis and risk assessment	x	x		x	x	x	x
	knowledge about prevention, mitigation, response and recovery operations			x		x	x	x
	applying ICT in NDRM	x	x		x	x	x	
	development of human resources in NDRM	x	x	x	x	x	x	x
	applying specialized civil engineering fields in NDRM	x	x	x		x	x	x
	protection of critical infrastructure in natural disaster situations			x		x	x	x
	understanding and using appropriate methods for research design regarding data collection and analysis, particularly focused on contemporary qualitative and quantitative methods	x	x			x	x	x
	cognizant of the needs of special populations			x		x	x	
	evaluation of the potential for more and worse disasters, and appreciate the need for a more proactive approach to disaster management					x	x	

MS1 - Natural Disasters

MS2 - Natural Disasters Risk Management

MS3 - Protection and Rescue System in Natural Disaster Situations

MS4 - Methodology of scientific research work

ES1 - Operational research

- ES2 - Models for support to decision making process
- ES3 - State administration organization and emergency legislation
- ES4 - Application of GIS in risk assesment in Natural Disaster Situations
- ES5 - Operations for support to civilian authorities in Natural Disaster Situations
- ES6 – Security Management in Natural Disaster Situations
- ES7 - Asanation (CBR decontamination technology)