



WP3

Development

Lead Organisation of WP3: P4 (UBL-B&H)

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P1 (UB-Serbia); P2 (UNS-Serbia); P3 (UNI-Serbia); P4 (UBL-B&H); P5 (UNSA –B&H); P7 (BOKU-Austria); P8 (UNSCM – North Macedonia); P9 (UMRC - Italy)

Deliverable 3.3

Title : **Evaluation of syllabi**

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1 Introduction

Processes of soil erosion and torrential flood protection are increasingly in the focus of international research, as well as the subject of cooperation on international projects aimed at strengthening the capacity of society to cope with them.

The University of Niš - Faculty of Occupational Safety innovated existing curricula by introducing a new elective master degree course "**Soil erosion and torrential flood prevention**" at 1st year of master curriculum "Emergency Management", as well as by upgrading existing bachelor course "**Soil protection**" (obligatory, 3rd year of study at bachelor curriculum "Environmental Engineering"). Since there was no course dedicated to this issue within the existing Emergency management study program, it is quite justified to implement it as most of the negative adverse effects derived from natural hazards in the Republic of Serbia are caused by torrential floods. Given the above mentioned, new syllabus was introduced with new topics of interests, including the impact of different pressures to the soil erosion occurrence, characterization of soil erosion, mitigation measures as well as set of topics dedicated to the origins of the torrential floods, influential parameters, spatio-temporal characterization of torrential floods, magnitude of the events and preventive measures.

New syllabus is presented bellow.

Curriculum: Environmental Protection			
Course title: Soil protection			
Instructor(s): Tatjana D. Golubović			
Status of the course: Obligatory		Course code:	19.OZZS07
Number of ESPP: 6			
Requirement(s): -			
Course goal Acquiring knowledge about morphological, physical, chemical and biological properties of soil; soil pollution, sources and types of pollutants, the behavior and fate of pollutants in the soil, effects of pollutants on soil, living organisms and the environment; main categories of soil damages.			
Course outputs Students' competence and acquisition of skills for: <ul style="list-style-type: none"> • understanding the basic soil properties, • understanding the ways of soil pollution, • understanding the ways of soil degradation, • application of acquired knowledge in soil remediation, • application of acquired knowledge for sustainable soil management. 			
Course content Theoretical classes The basic soil terminology: soil definition, soil as a natural resource, soil functions. Soil genesis and classification: abiotic and biotic factors influencing soil formation, soil horizons, soil classification. Soil properties: solid, liquid and gaseous soil phase; physical soil properties (texture, porosity, color, bulk density); chemical soil properties (mineral and organic substances in soil, soil reaction, adsorptive properties, redox potential); biological soil properties. Soil pollution: definition, types and sources of pollution; behavior of pollutants in the soil; the entry of pollutants into the food chain; effects of pollutants on soil, living organisms and the environment; assessment of soil pollution. Soil damage categories: degradation, destruction, exclusion of land from production (soil erosion - term and classification, mechanism and basic factors of water and aeolian erosion, torrential floods and soil erosion, salinization and alkalization of soil, acidification, loss of soil organic matter, soil compaction, impact of landfills, landslides, construction of roads on the soil, etc.). Soil monitoring: goal, planning, the selection of monitoring sites and parameters, data processing and display. Soil remediation: remediation techniques for contaminated soils (physical, chemical, thermal and biological treatments (bioremediation and phytoremediation)). Sustainable agriculture: basic concepts, basic principles in organic agriculture, advantages and disadvantages. Legislation on soil protection. Practical classes Introducing students to classical and instrumental methods used for sampling and qualitative and quantitative analysis of basic parameters of soil quality (the content of CaCO ₃ , the content of soil organic matter, the content of total nitrogen and available phosphorus and potassium in soil, measurement of active and potential acidity - pH); Introducing students to classical and instrumental methods used for sampling and qualitative and quantitative analysis of potentially polluting substances in soil and plants (Pb, Ni, Cd, As, Hg, etc.).			
Readings [1.] T. Golubović (2011). Zagađivanje i remedijacija zemljišta-interni materijal za pripremu ispita.Niš: Fakultet zaštite na radu u Nišu. [2.] P. Sekulić, R. Kastori, B. Hadžić (2003). Zaštita zemljišta od degradacije. Novi Sad: Naučni institut za ratarstvo i povrtarstvo, Novi Sad. [3.] R. Kastori, J. Kadar, P. Sekulić, D. Bogdanović,N. Milošević, M. Pucarević (2006). Uzorkovanje zemljišta i biljaka nezagađenih i zagađenih staništa. Novi Sad: Naučni institut za ratarstvo i povrtarstvo, Novi Sad. [4.] R. Kadović, R., M. Knežević (2002). Teški metali u šumskim ekosistemima Srbije. Beograd: Šumarski fakultet Beograd, Univerzitet u Beogradu. [5.] I. A. Mirsal (2008). Soil Pollution: Origin, Monitoring and Remediation, 2nd edition. Berlin: Springer.			
Number of teaching hours (per week)			
Lectures	2	Practical classes	2
Other forms of teaching	-	SIR/IR	-
Other classes	-		-
Teaching methods Lectures, tutorials, calculus exercises, consultations			
Score (maximum points 100)			
Pre-exam obligations	Points	Exam	Points
activities during the lectures	5	written exam (practical part of the exam)	-
activities during the practical classes	5	oral exam (theoretical part of the exam)	40
colloquium 1	20		
colloquium 2	20		
seminary paper	10		

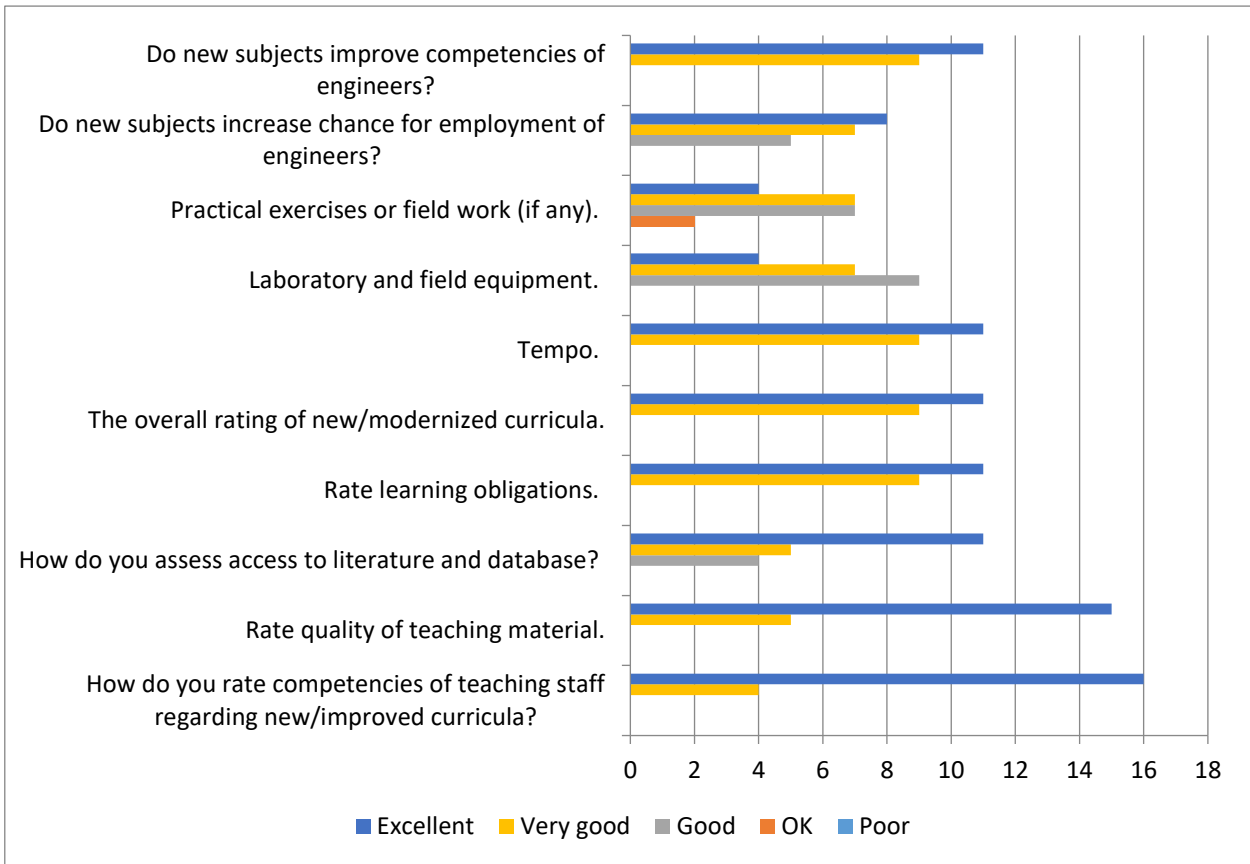
Curriculum: Emergency management									
Course title: Soil erosion and torrential flood protection									
Instructor(s): Dejan M. Vasović									
Status of the course: Elective		Course code:	19.MUVS04						
Number of ESPP: 6									
Requirement(s): -									
Course goal Acquiring knowledge about soil erosion, torrential flows and torrential floods, as well as the most important factors of soil and water degradation and the environment as a whole, acquaintance with methods, facilities and technologies for the regulation of torrential flows and torrential basins and defense measures against torrential floods.									
Course outputs Enhanced ability of students to acquire scientific and professional knowledge of water and aeolian soil erosion processes, torrential flows and torrential floods for: <ul style="list-style-type: none"> • soil erosion assessment and protection measures planning, • torrential flood risk assessment, and • planning adaptation measures facing changing climatic conditions. 									
Course content									
Theoretical classes 1. Concept and classification of soil erosion: definition of soil erosion, division - surface and subsurface species. 2. Mechanism of water and aeolian erosion: analysis of the structural connections of soil-rock mass and mechanisms of action of exogenous forces. 3. Basic factors of water and aeolian erosion: determination of natural (soil composition, vegetation cover, terrain slope, precipitation amount and distribution, wind intensity ...) and social factors (interventions on vegetation cover, agro-ecological activities, urbanization...) of water and aeolian erosion. 4. Processes and forms of water and aeolian erosion: process of destruction of soil-rock mass, forms: denudation, abrasion, fluvial, aeolian, glacial, karst erosion. 5. River flows and river basins: characterization of river basins with a view to identifying river basins where river flows can be formed. 6. Analysis of natural characteristics of torrential basins and erosion areas: meteorological-hydrological determinants, soil composition, terrain elevation, vegetation cover. 7. Hydrology of torrential flows: calculation of expected volume flows in relation to the basin area, rainfall intensity and runoff coefficient, flow modelling. 8. Sediment transport in torrents: formation and properties of river sediment, towed sediment, critical velocity. 9. Principles and systems for the regulation of torrents and torrential basins: prevention principle, principle of impact reduction, multi-purpose systems on the basin. 10. Methods and facilities for the regulation of torrents: technical and biotechnical anti-erosion works, facilities for receiving and transformation of large waters, regulation works inside and outside the riverbed. 11. Protection against torrential floods: modification of the water regime, regulation structures on torrential flows. 12. Ecological bases for the regulation of torrential flows: renaturalization of river basins and river beds.									
Practical classes Determination of basic factors of water and aeolian erosion. Estimation of soil losses due to water and aeolian erosion. Torrential flows and basins. Analysis of natural characteristics and parameters of torrential basins important for the genesis of soil erosion, runoff and sediment transport. Hydrological calculations in torrential flows (large waters). Hydraulic calculations in torrential flows (medium and maximum water velocities, equilibrium and equilibrium falls). Calculation of sediment transport.									
Readings [1.] Vasović Dejan (2020). Erozijska zemljišta i zaštita od bujičnih poplava (interni materijal za pripremu ispita). Niš: Univerzitet u Nišu, Fakultet zaštite na radu Nišu [2.] Kostadinov Stanimir (2008). Bujični tokovi i erozija. Beograd: Univerzitet u Beogradu, Šumarski fakultet [3.] Ristić Ratko, Malošević Dragan (2011). Hidrologija bujičnih tokova. Beograd: Univerzitet u Beogradu, Šumarski fakultet [4.] Veljković Nebojša i dr. (2015). Vode Srbije - u vremenu prilagođavanja na klimatske promene (urednik), Beograd: Agencija za zaštitu životne sredine Republike Srbije [5.] Ristić Ratko i dr. (2018). Vodič za održivo upravljanje zemljištem na lokalnom nivou u Republici Srbiji(recenzent). Beograd: Agencija za zaštitu životne sredine Republike Srbije									
Number of teaching hours (per week)									
Lectures	2	Practical classes	2	Other forms of teaching		SIR/IR	-	Other classes	-
Teaching methods Lectures, auditory (calculation) exercises, consultations. Interactive work with students.									
Score (maximum points 100)									
Pre-exam obligations	Points	Exam	Points						
activities during the lectures	5	written exam (practical part of the exam)	20						
activities during the practical classes	5	oral exam (theoretical part of the exam)	20						
seminary work	20								
colloquium	15								
colloquium	15								

2 Overview of modernized/new syllabi on existing study programmes

1. Name of the course	Soil protection
2. Curriculum name	Environmental Protection
3. Curriculum type	Basic academic studies (Bachelor)
4. Course type	3 rd year of study, obligatory
5. Status	Upgraded existing bachelor degree course; Submitted for the accreditation process in April 2020
7. Expected schedule of course implementation	Autumn 2020

Total of 20 students are interviewed.

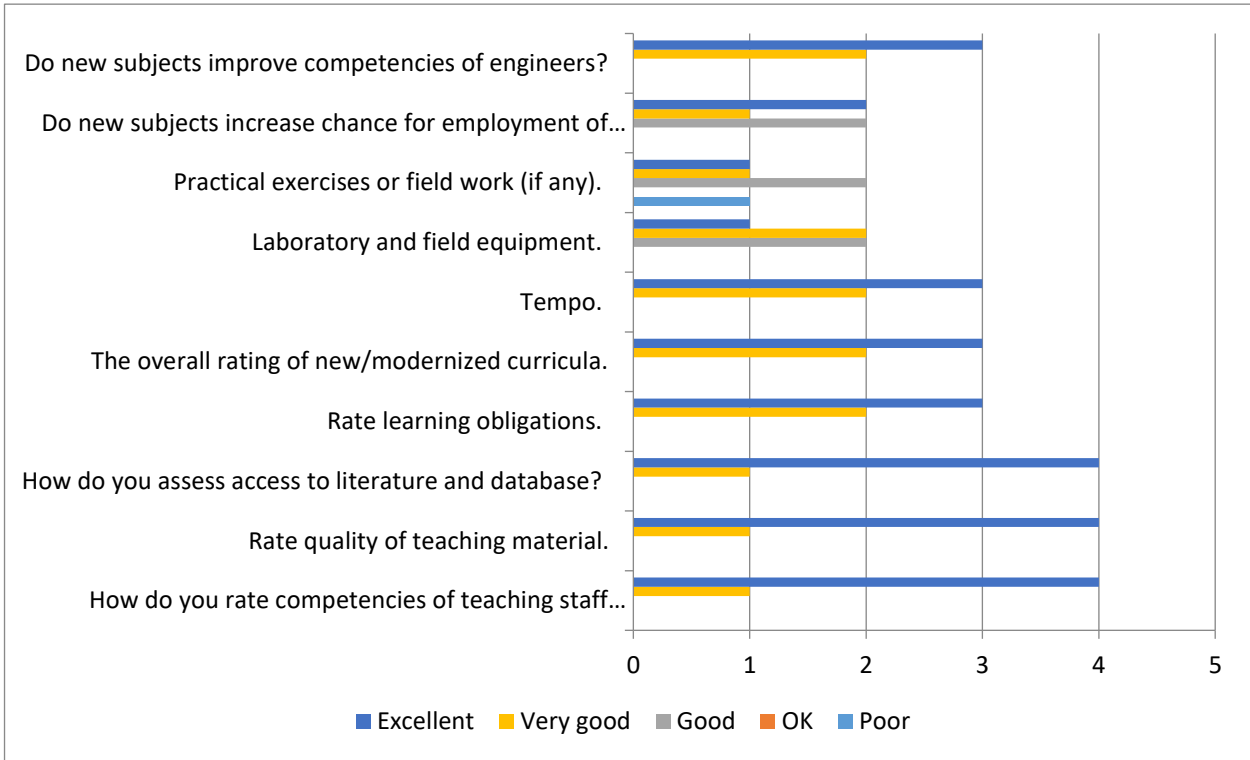
Question	Poor	OK	Good	Very good	Excellent
How do you rate competencies of teaching staff regarding new/improved curricula?				4	16
Rate quality of teaching material.				5	15
How do you assess access to literature and database?			4	5	11
Rate learning obligations.				9	11
The overall rating of new/modernized curricula.				9	11
Tempo.				9	11
Laboratory and field equipment.			9	7	4
Practical exercises or field work (if any).		2	7	7	4
Do new subjects increase chance for employment of engineers?			5	7	8
Do new subjects improve competencies of engineers?				9	11
Final comment and recommendations:					



1. Name of the course	Soil erosion and torrential flood protection
2. Curriculum name	Emergency management
3. Curriculum type	Master academic studies
4. Course type	1 st year of study, elective
5. Status	New master degree course; Submitted for the accreditation process in April 2020
6. Expected schedule of course implementation	Autumn 2020

Total of 5 students are interviewed.

Question	Poor	OK	Good	Very good	Excellent
How do you rate competencies of teaching staff regarding new/improved curricula?				1	4
Rate quality of teaching material.				1	4
How do you assess access to literature and database?				1	4
Rate learning obligations.				2	3
The overall rating of new/modernized curricula.				2	3
Tempo.				2	3
Laboratory and field equipment.			2	2	1
Practical exercises or field work (if any).	1		2	1	1
Do new subjects increase chance for employment of engineers?			2	1	2
Do new subjects improve competencies of engineers?				2	3
Final comment and recommendations:					



3 Results of evaluation by teachers on Bachelor/Master study programme/s

1. Name of the course	Soil protection				
Question	Poor	OK	Good	Very good	Excellent
How do you rate the quality of modernized study programme?					1
How do you rate competencies of teaching staff regarding improved study programme?					1
Are the new/modernized curricula attractive for students/engineers?					1
Rate quality of teaching material.					1
How do you assess access to literature and database?				1	
Rate learning obligations.					1
The overall rating of modernized study programme.					1
Rate modernized subjects compared to old ones.					1
Rate laboratory and field equipment.				1	
Rate practical exercises or field work (if any).				1	
Do new/modernized subjects increase chance for employment of engineers?					1
Do new/modernized subjects improve competencies of engineers?					1
Final comment and recommendations:					

1. Name of the course	Soil erosion and torrential flood protection
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Question	Poor	OK	Good	Very good	Excellent
How do you rate the quality of modernized study programme?					1
How do you rate competencies of teaching staff regarding improved study programme?					1
Are the new/modernized curricula attractive for students/engineers?					1
Rate quality of teaching material.					1
How do you assess access to literature and database?				1	
Rate learning obligations.					1
The overall rating of modernized study programme.					1
Rate modernized subjects compared to old ones.					1
Rate laboratory and field equipment.					1
Rate practical exercises or field work (if any).				1	
Do new/modernized subjects increase chance for employment of engineers?					1
Do new/modernized subjects improve competencies of engineers?					1
Final comment and recommendations:					

4 Conclusion

Bachelor and Master study - students

- Average rating of the improved master course “Soil protection” by students is **excellent (4.38)**.
- Average rating of the new master course “Soil erosion and torrential flood protection” by students is **excellent (4.80)**.

Teachers

- Teachers are mostly satisfied with improved and newly introduced curricula on the Bachelor and Master study. However, teachers are not satisfied with existing teaching material and the access to the databases. However, improved study programmes are evaluated as very good.