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## WP2

# Development of curricula

Lead Organisations of WP2: **UNS - Serbia**

**Participating Organisation:** UB;UNI; UBL; UNSA; INSZASUM; BOKU;  
UNSCM; UNIRC;FRI-BAS

Deliverable 2.4

**Title :** Established new master programme

**Participating Organisation:** UB; UNS; UNI; UBL; UNSA



## PROJECT INFO

Project title	Soil Erosion and Torrential Flood Prevention: <i>Curriculum Development at the Universities of Western Balkan Countries</i>
Project acronym	SETOF
Project reference number	598403-EPP-1-2018-1-RS-EPPKA2-CBHE-JP (2018-2579/001-001)
Coordinator	University of Belgrade
Project start date	November 15, 2018
Project duration	36 months

## DOCUMENT CONTROL SHEET

Ref. No and Title of Activity	<b>2.4 Established new master programme</b>
Title of Deliverable:	<b>Syllabi of the compulsory subjects</b>
Institutions:	UNS, UB
Author/s of the deliverable	UB, UNS, UNI, UBL, UNSA
Status of the document:	final



<b>Study program:</b> Soil erosion and torrential flood prevention			
<b>Course title:</b> Land and water degradation			
<b>Teacher/teachers:</b> Miodrag Zlatić, Tatjana Golubović, Marijana Kapović Solomun, Katarina Lazarević			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 5			
<b>Requirement(s):</b> /			
<b>Course objective:</b> Acquiring knowledge about the basic types of land degradation, as well as the basic factors that cause degradation.			
<b>Course outcome:</b> Students' ability and skills to understand the positive and negative impacts of anthropogenic factors on natural resources.			
<b>Course content:</b>			
<i><b>Theoretical teaching</b></i>			
<ul style="list-style-type: none"> <li>• Basic factors of soil erosion by water and wind</li> <li>• Analysis of basic natural characteristics of torrential basins.</li> <li>• Anthropogenic factors of land degradation</li> <li>• Socio-economic factors of erosion processes in Serbia</li> <li>• Negative and positive effects of demographic development on natural resources</li> <li>• Risks of living in endangered and potentially endangered areas, and opportunities for sustainable management of soil and water resources</li> <li>• Perspectives of further demographic development/trends concerning natural resources</li> </ul>			
<i><b>Practical teaching</b></i>			
Use of audio-visual methods for processing content related to the concept, causes, and types of degradation processes. Preparation of a seminar paper in the field of land degradation.			
<b>Literature:</b>			
- Kostadinov, S. (1996): Torrential flows and erosion, Faculty of Forestry, University of Belgrade, Belgrade (in Serbian)			
- Zlatić, M. (2002): <i>Socio-Economic Aspects of Degradation and Soil Management for Sustainability in Mountainous Regions</i> ; Key note paper: International Year of Mountains Conference: "Natural and Socio-Economic Effects of Erosion Control in Mountainous Regions, Proceedings, pp 497-516, Belgrade/Vrujci Spa.			
- Zlatić M., Kostadinov S., Dragović N., Tomićević J., Todosijević M., Radovanović A., Đuričić Lj. (2005): Approach to soil and water conservation according to the WOCAT methodology, Faculty of Forestry, University of Belgrade, Belgrade (in Serbian)			
- Zlatić M. (2010): <i>Socio-Economic Issues of Sustainable Land Management in Serbia</i> , Global Change Challenges for Soil Management, Editor: Zlatić, M., Advances in Geoecology, Volume 41, Catena Verlag, Reiskirchen.			
<b>Number of teaching hours (per week)</b>	<b>Theoretical classes: 3</b>	<b>Practical classes: 2</b>	
<b>Teaching methods:</b> Lectures, auditory exercises, consultations			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Activity during the lectures	<b>10</b>	oral exam	<b>60</b>
Activity during exercises	<b>10</b>		
colloquium	<b>20</b>		



<b>Study program:</b> Soil erosion and torrential flood prevention			
<b>Course title:</b> Integrated torrential basin management			
<b>The teacher/teachers:</b> Muhamed Bajrić, Miodrag Zlatić, Ranka Erić			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 5			
<b>Requirement:</b> /			
<b>Course objective:</b> Preparing students to acquire the necessary theoretical and practical knowledge about sustainable management of torrents as natural resources, to be involved as future experts in the processes of creating practical policies related to resource management in general and torrent management in particular. Acquiring knowledge for integrated basin management for successful harmonization of development of agriculture, forestry, and water management on the principles of sustainability, i.e. preservation of natural resources from degradation, applying modern methods which are worldwide used.			
<b>Course outcome:</b> Students' ability to identify and characterize multiple aspects of sustainable torrent management, analyze key drivers of management policy and the most important stressors to which torrents are exposed, and assess and apply methods to balance competing interests in managing these streams as natural resources. Acquired knowledge is necessary for integrated river basin management, i.e. for successful harmonization of the main economic branches - agriculture, forestry, and water management.			
<b>Course content:</b> Concept and classification of natural resources (Resources: the meaning of the term, the historical development of resource theories, classification of resources. Natural resources - concept and classification. Parameters for the classification of natural resources. Potential of natural resources. Evaluation of natural resources. The efficiency of natural resources use. Management of natural resources ( The concept of management in environmental protection.Natural resource management. The approach in natural resource management - exploitation approach; utilitarian approach; conservation approach; ecological approach.Decoupling.Integral management of natural resources). Principles and principles of natural resource management. Development and definition of integrated natural resource management. The concept of integrated management. Strategies and techniques for implementing integrated natural resource management. Development and implementation of multilateral strategies and agreements. Approaches and concepts for integrated natural resource management. Ecosystem approach to sustainable management. DPSIR approach CBNRM approach - Community participation in natural resource management. Effects of integrated watershed management. Long-term environmental effects. Long-term economic effects. Cost-benefit analysis. Application of the concept of sustainable river basin management. European Water Framework Directive - river basin management plan. Consultations with the active participation of students, preparation of seminar paper, a critique of seminar paper between students.			
<b>Literature:</b> - Milutinović, S. (2020): Management of natural resources, Niš: Faculty of Occupational Safety (in Serbian) - Editor: Zlatić, M. (2010): <i>Global Change - Challenges for Soil Management</i> , Advances in Geocology, Volume 41, Catena Verlag, Reiskirchen. - Editors: Zlatić, M. and Kostadinov, S. (2014): <i>Challenges: Sustainable Land Management – Climate Change</i> , ADVANCES IN GEOECOLOGY 43, A Cooperating Series of the International Union of Soil Science (IUSS), ISBN 978-3-923381-61-6, US-ISBN 1-59326-265-5, CATENA VERLAG GMBH, Reiskirchen. - Editors: Zlatić, M. and Kostadinov, S. (2018): <i>Soil and water resources protection in the changing environment</i> , Catena, Soil Science, Advanced in GeoEcology 45, ISBN 978-3-510-65418-5, US-ISBN 1-5932			
<b>Number of teaching hours (per week)</b>		<b>Theoretical classes: 3</b>	<b>Practical classes: 2</b>
<b>Teaching methods:</b> Lectures/consultations with the active participation of students, preparation of seminar paper, a critique of seminar paper between students			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Activity during the lectures	<b>10</b>	oral exam	<b>50</b>
seminar paper	<b>40</b>		



<b>Study program:</b> Soil erosion and torrential flood prevention			
<b>Course title:</b> Torrential flood prevention			
<b>The teacher/teachers:</b> Ratko Ristić, Muhamed Bajrić, Dejan Vasović, Siniša Polovina, Ranka Erić			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 6			
<b>Requirement:</b> /			
<b>Course objective:</b> Introduction to methods, facilities, and technologies for the regulation of torrents and torrential basins and protection against torrential floods.			
<b>Course outcome:</b> Acquired knowledge about methods, facilities, and technologies for regulating torrents and for torrential flood protection			
<b>Course content:</b> <i>Theoretical teaching</i> Principles for the regulation of torrent flows and torrent basins. Systems for the regulation of torrent flows and torrent basins. Biological, biotechnical, and technical works. Methods and facilities for the regulation of torrents. Longitudinal and transversal objects. Static and hydraulic calculations for facilities for regulating torrents. Rehabilitation of ravines and landslide processes. Torrential flood protection. Basics for Ecological regulation of torrents. <i>Practical teaching</i> During the exercises and professional practice, students will make a study in the form of a project for the regulation of the torrent with all the necessary calculations and drawings. Within the subject, field classes will be held, according to the planned program.			
<b>Literature:</b> - Kostadinov, S. (2008): Torrential flows and erosion, part III: Regulation of torrential flows, Faculty of Forestry, Belgrade (in Serbian) - Đeković, V. (1997): Designing for torrential flows regulation. Faculty of Forestry, Belgrade (in Serbian) - Koboltschnig G. et al. (2012): <i>INTERPRAEVENT (International Research Society)</i> -2012. Proceedings, Vol. 1&Vol. 2 (ISBN: 978-3-901164-19-4), Grenoble, France. Pg. 1-1126.			
<b>Number of teaching hours (per week)</b>	<b>Theoretical classes: 2</b>	<b>Practical classes: 3</b>	
<b>Teaching methods:</b> Lectures, exercises, seminar paper, fieldwork			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Activity during the lectures	<b>8</b>	written exam	<b>45</b>
practical teaching	<b>13</b>	oral exam	<b>10</b>
colloquium	<b>14</b>		
Seminar paper	<b>10</b>		



<b>Study program:</b> Soil erosion and torrential flood prevention			
<b>Course title:</b> Soil erosion protection			
<b>The teacher/teachers:</b> Radovan Savić, Tijana Vulević, Siniša Polovina, Katarina Lazarević			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 6			
<b>Requirement:</b> /			
<b>Course objective:</b> Acquisition of knowledge about soil erosion, torrents, and torrential floods, as significant factors of land and water degradation and the environment.			
<b>Course outcome:</b> Acquired knowledge about the processes of soil erosion (water and wind erosion), torrents, and torrential floods, as well as the hydrology of torrents (water flow and sediment transport).			
<b>Course content:</b>			
<i><b>Theoretical teaching</b></i>			
Concept and classification of soil erosion. Mechanism of water and wind erosion. Basic factors of water and wind erosion. Processes and forms of water and wind erosion. Calculation of soil losses due to water and wind erosion. Hydrological cycle and water balance. Runoff process (runoff hydrograph, surface, subsurface and underground runoff), factors influencing runoff formation (climatic, physical-geographical, anthropogenic and vegetation cover influence), precipitation, infiltration, evaporation and transpiration and interception. Torrential flows and torrential basins. Analysis of natural characteristics of torrent basins and erosion areas. Hydrology of torrents. Sediment transport in torrents.			
<i><b>Practical teaching</b></i>			
Determining the basic factors of water and wind erosion. Calculation of soil losses due to water and wind erosion. Analysis of natural characteristics and parameters of torrent basins important for the genesis of soil erosion, water runoff and sediment transport. Calculation of maximum flow. Calculation of sediment transport in torrents.			
<b>Literature:</b>			
- Kostadinov S. (1996): Torrential flows and erosion. Faculty of Forestry, Belgrade (in Serbian)			
- Ristić R., Malošević D. (2011): Hydrology of torrents, Faculty of Forestry, Belgrade (in Serbian)			
- Boardman J.; Poesen J. (2006): <i>Soil Erosion in Europe</i> . John Wiley&Sons, England.			
- Harmon S.R, Doe W.W. (2001): <i>Landscape Erosion and Evolution Modelling</i> . Kluwer Academic/Plenum Publishers, NewYork.			
- Imeson A. et al., (2006): <i>SCAPE (Soil Conservation and Protection in Europe) - The way ahead</i> (ISBN: 90-75312-06-7), Heiloo, Holland.			
- Morgan, R.P.C. (1990): <i>Soil Erosion and Conservation</i> . Longman, Scientific&Technical, with JohnWiley&Sons, NewYork.			
- El-Swaify W.C., Moldenhauer W.C., and Andrew Lo (1983): <i>Soil Erosion and Conservation</i> . Soil Erosion – Society of America. Ankeny, Iowa, USA			
- Harmon R.S., and Doe III W.W. (2001): <i>Landscape Erosion and Evolution Modeling</i> . Kluwer Academic/Plenum Publishers/NewYork, Boston, Dordrecht, London, Moscow.			
<b>Number of teaching hours (per week)</b>		<b>Theoretical classes: 3</b>	<b>Practical classes: 2</b>
<b>Teaching methods:</b> Lectures, exercises, seminar paper, fieldwork			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Activity during the lectures	<b>8</b>	written exam	<b>45</b>
practical teaching	<b>13</b>	oral exam	<b>10</b>
colloquium	<b>14</b>		
Seminar paper	<b>10</b>		





<b>Study program: Soil erosion and torrential flood prevention</b>			
<b>Course title:</b> STUDY RESEARCH WORK			
<b>The teacher/teachers:</b> Mentor			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 6			
<b>Requirement:</b> The student chooses a mentor and decides on a scientific field following its affinities in agreement with the head of the Master's study.			
<b>Course objective:</b> Enabling students to find, collect, process, and use the data they need when preparing a diploma (master) thesis in a specific area within the study program.			
<b>Course outcome:</b> The student is trained for independent preparation of a diploma (master's) thesis in the field of soil erosion protection and flood prevention.			
<b>Course content:</b> The content of the course is directly related to the courses selected within the master's program. The student works independently on collecting data relevant to the research topic, which includes: work in the library on literature review, work in the computer laboratory on data collection, work in the laboratory on experiments, fieldwork on data collection, independent work on processing and systematization of collected data, as well as other ways of study and research work. The student prepares a study that contains a database of collected data (list of literature, copies of data, field notes, photographs, etc.).			
<b>Literature:</b>			
<b>Number of teaching hours (per week)</b>	<b>Theoretical classes:</b>	<b>Practical classes: 10</b>	
<b>Teaching methods:</b>			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
preparation of study work	40	Defense of study work	60



<b>Study program: Soil erosion and torrential flood prevention</b>			
<b>Course title:</b> PROFESSIONAL PRACTICE			
<b>Teacher/teachers:</b> teachers and associates in the study program			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 6			
<b>Requirement:</b> enrolled in the second semester of study			
<b>Course objective:</b> Acquiring practical knowledge and skills in the field of soil erosion and flood prevention. Students will gain their own practical experience and be able to work in practice.			
<b>Course outcome:</b> Students acquire practical knowledge in the field of soil erosion and flood prevention. Connecting previously acquired theoretical knowledge and skills with their own practical experiences acquired through practical work, for application in practice in jobs equivalent to master's academic studies.			
<b>Course content:</b> Active students' participation in all phases of production practice, technical-organizational practice, and work practice. Professional practice is realized within the joint master's program.			
<b>Literature:</b>			
<b>Number of teaching hours (per week)</b>	<b>Theoretical classes:</b>	<b>Practical classes: 10</b>	
<b>Teaching methods:</b> Professional practice is performed as a block of teaching in the teaching bases of the holding study program Universities (the University of Belgrade, Faculty of Forestry; the University of Novi Sad, Faculty of Agriculture; the University of Niš, Faculty of Occupational Safety), and partner institutions (the University of Banja Luka, Faculty of Forestry, and the University of Sarajevo, Faculty of Forestry) as well as in the laboratories of the faculty. Students keep a professional practice diary during their internship.			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
activity		defense of professional practice diary	40
professional practice diary	60		





<b>Study program: Soil erosion and torrential flood prevention</b>			
<b>Course title:</b> DEVELOPMENT OF THE MASTER THESIS			
<b>Teacher/teachers:</b> teachers and associates in the study program			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 12			
<b>Requirement:</b> Passed all exams given in the curriculum of master's academic studies and approved the topic of the master's thesis by the Council of the Department as provided by the Rulebook on the preparation of the master's thesis.			
<b>Course objective:</b> Enabling students to present adequately relevant data based on collected literature and performed research, as well as to explain the importance of research conducted through research work.			
<b>Course outcome:</b> By writing a master's thesis, the student independently and creatively applies the theoretical and practical knowledge, acquired during the studies, using scientific and professional literature.			
<b>Course content:</b> Based on the research (data collection), the student prepares a master's thesis in the form containing the following chapters: Title page, Contents, Abstract and keywords in Serbian and English, Introduction, Task and research content, Description of the applied methodological procedure, Description of the research object, Theoretical part and (or) Experimental part, Review of results and discussions, Conclusion, Summary in Serbian language (up to 3 pages), Literature review and Appendices.			
<b>Literature:</b>			
<b>Number of teaching hours (per week)</b>	<b>Theoretical classes:</b>	<b>Practical classes:</b>	
<b>Teaching methods</b> Consultations with the mentor and members of the Commission			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
assessment of thesis structure	50	assessment of thesis writing technique	50



<b>Study program: Soil erosion and torrential flood prevention</b>			
<b>Course title:</b> MASTER'S THESIS			
<b>Teacher/teachers:</b> teachers and associates in the study program			
<b>Course status:</b> compulsory			
<b>Number of ECTS credits:</b> 8			
<b>Requirement:</b> Passed all exams given in the curriculum of master's academic studies. Procedure for applying for a topic and defense of a master's thesis is regulated by the internal Rulebook on the procedure for preparing and defending a master's thesis.			
<b>Course objective:</b> The aim of the master's thesis is the final examination of students in the ability to address issues in the field of design, research, and analysis of a wide range of biological/ecological and hydrological systems, defense against natural disasters, socio-economic and organizational aspects of natural resources protection. The master's thesis is conceptualized as an independent research work of students in a specific area within the study program: protection of water resources in hilly and mountainous areas, degradation and protection of land resources, prevention of natural disasters in terms of biological, environmental, economic and social consequences, and sustainable development management of degraded areas. Within the preparation of the master's thesis, the student's ability to reflect, notice, analyze and solve problems related to the broadest concept of sustainable management of soil and water resources, is monitored and evaluated.			
<b>Course outcome:</b> By preparing a master's thesis, students acquire knowledge, as well as subject-specific qualifications that are in the function of quality research tasks, professional and scientific achievements in the field of erosion and flood prevention. Based on the defined goals, the expected outcomes are selection and application of solutions, based on scientific research approach and knowledge of natural, biological-ecological and technical sciences, in the field of erosion and flood prevention; description, formulation, analysis, planning, and problem-solving following ecological principles that connect society with the natural environment for mutual benefit; design of sustainable systems in the field of erosion and flood prevention.			
<b>Course content:</b> The master's thesis is a research work in which student gets acquainted with the research methodology in the field of erosion and flood prevention. By preparing a master's thesis, the student has the task to synthesize the theoretical, research, and applied aspects of the chosen topic. Due to its complexity, the subject and content of the paper should correspond to the level and set goals of the master's thesis, and the topic should belong to erosion and flood prevention from the aspect of biological, ecological, economic, and social outcomes. After the research (data collection) the student prepares a master's thesis in the form containing the following chapters: Title page, Contents, Abstract and keywords in Serbian and English, Introduction, Task and research content, Description of the applied methodological procedure, Description of the research object, Theoretical part and (or) Experimental part, Presentation of results and discussions, Conclusion, Literature review, and Appendices. The master's thesis should be integrated and realized within the appropriate scientific research and development projects..			
<b>Literature:</b>			
<b>Number of teaching hours (per week)</b>	<b>Theoretical classes:</b>	<b>Practical classes:</b>	
<b>Teaching methods:</b> The student conducts theoretical, practical, and scientific research under the guidance of a mentor. For the preparation of the master's thesis, the student applies appropriate methods (applied mathematical and statistical methods and models from the domains of ecology, biometrics, economics, norms, and standardization), depending on the chosen topic of the paper. The topic of the paper is determined in agreement with the course teachers and the student applies for it following the Statute and regulations of the University of Belgrade, Faculty of Forestry, as the coordinator of the joint study program. After the research, the student systematizes the results and makes a written paper. The defense of the master's thesis is open to the public. The master's thesis is defended orally with an appropriate presentation.			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
evaluation of the quality of the content of the paper (evaluation of research and results, quality of the offered solution of the problem, conclusions, etc.)	60	evaluation of the defense and presentation of the paper	30
valuation of written paper (text quality, the value of appendices, etc.)	10		