



SETOF Soil Erosion and TOrrential Flood
*Prevention: Curriculum Development at the
Universities of Western Balkan Countries*

Soil erosion and Torrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

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- Project title: **Soil Erosion and Torrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries**
- Project acronym: **SETOF**
- Reference Number: **598403-EPP-1-2018-1-RS-EPPKA2-CBHE-JP**
- Programme: **Erasmus +**
- Key Action: **Cooperation for innovation and the exchange of good practice**
- Action: **Capacity Building in Higher Education**
- Action Type: **Joint Projects**
- Call for Proposals: **Call 2018 EAC/A05/2017**
- Duration of the project: **3 years /4 years**
- Start : **15.11.2018.**
- Budget of the project: **865.070,00 EUR**



Erasmus+



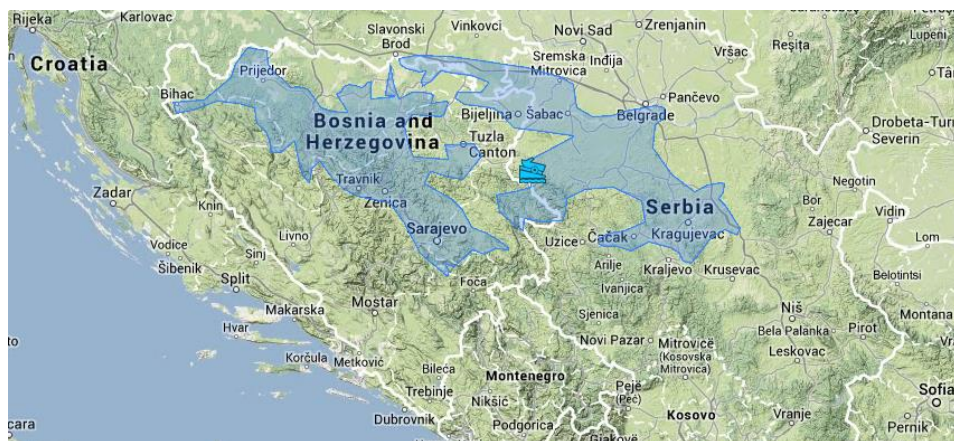
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The idea/reason of the project

- The floods that occurred in May 2014 in the Croatian territory, Bosnia and Herzegovina and Serbia have had disastrous consequences with great material damage and loss of human lives. In a drastic way, they once again reminded the country of the prevention of flash floods.





Wider Objective

- Improvement and modernization of curricula for the education of experts for prevention of torrential floods in the Western Balkan

The specific objectives

- Improvement of land protection from soil erosion and prevention of torrential floods in WB;
- Improvement of existing curricula and develop and implement new master curricula in the field of prevention from torrential floods, in compliance with the Bologna Declaration and EU good practices;
- Implementation of the improved knowledge for practical solutions to prevention against torrential floods through project designing and execution
- Increase education of local self-governments for soil erosion and torrential flood protection





Soil Erosion and TOrrential Flood
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SETOF Consorcium

Partner country institutions



- **University of Belgrade (UB)**



- **University of Novi Sad (UNS)**

- **University of Niš (UNI)**



- **University of Banja Luka (UBL)**



- **University of Sarajevo (UNSA)**



- **Institute of Forestry (INSZASUM)**



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Programme country institutions

- **University of Natural Resources and Life Sciences (BOKU)**
- **Ss. Cyril and Methodius University in Skopje (UNSCM)**
- **University Mediterranea of Reggio Calabria (UNIRC)**
- **Forest Research Institute at the Bulgarian Academy of Sciences (FRI-BAS)**



Associated Partners institutions

- **Serbian Chamber of Engineers (SCE)**
- **Forest Management Unit "Donjevrubasko" Banja Luka (FMU)**
- **Cantonal Public Company "Sarajevo-forests" (CPCSF)**





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Work packages

- **WP 1 - PREPARATION**

Title: Analysis of soil erosion state and torrential floods in Western Balkan Countries

Leader: University of Belgrade, Ss. Cyril and Methodius
University in Skopje

Activities:

- Analysis state of soil degradation/soil erosion in WBC
- Analysis of torrential floods in WBC
- Report of prevention measures for soil and torrent control in EU countries
- Analysis and elaboration of bachelor and master curricula in field of soil and torrent control in EU countries
- Workshop on bachelor and master curricula best practices in EU



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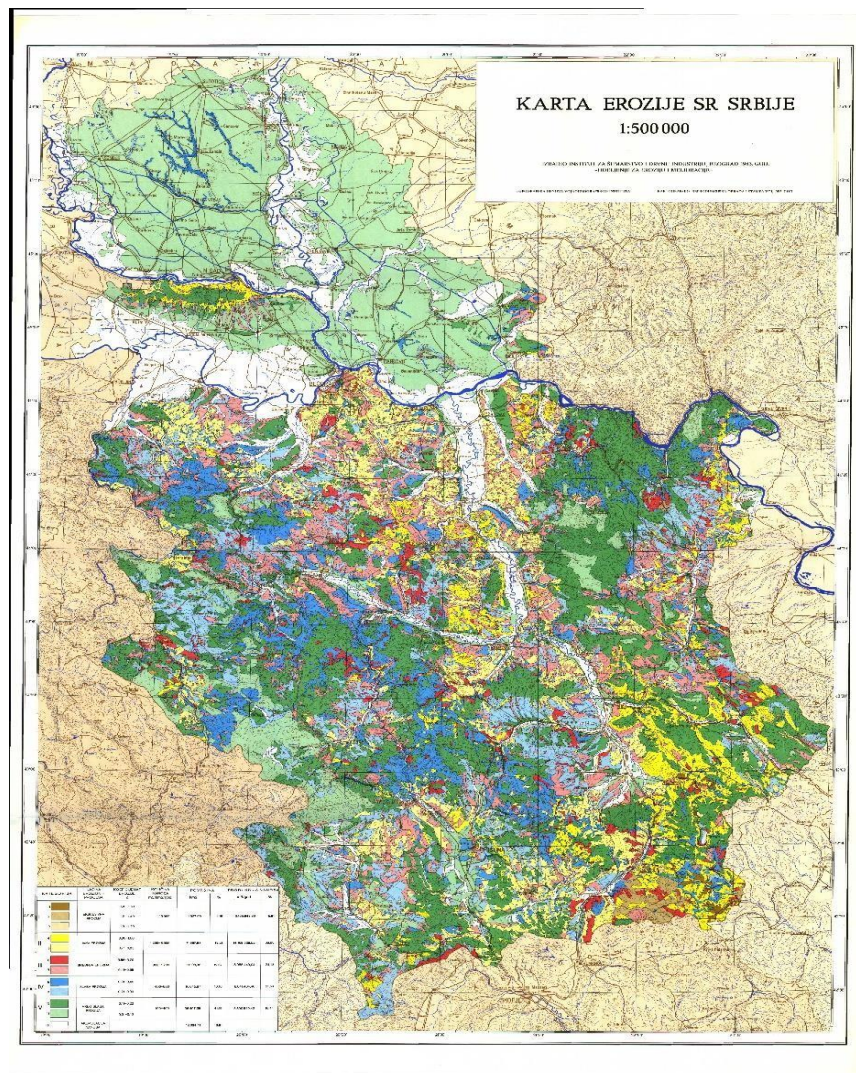


- Land degradation, physical degradation, erosion - significant problem for conserving resources, great negative effect
- Consequences of soil erosion is the occurrence of torrential floods
- Frequent occurrence in Balkan - need to improve the education of experts who will be able to prevent the problems!





Erosion Processes in Serbia



CATEGORY	EROSION PROCESSES INTENSITY	COEFFICIENT OF EROSION Z	SPECIFIC SEDIMENT YIELD m ³ km ² god ⁻¹	SURFACE AREA		SEDIMENT YIELD	
				km ²	%	m ³ god ⁻¹	%
I	EXCESSIVE EROSION	1,41-1,50	≥ 3.000	1.027,00	1,16	2.165.643,30	5,81
		1,21-1,40					
		1,01-1,20					
II	INTENSIVE EROSION	0,86-1,00	1.200-3.000	11.657,83	13,21	14.169.528,52	38,03
		0,71-0,85					
III	MEDIUM EROSION	0,56-0,70	800-1200	11.198,98	12,67	8.988.449,04	24,13
		0,41-0,55					
IV	WEAK EROSION	0,31-0,40	400-800	16.045,87	18,16	8.041.404,46	21,59
		0,21-0,30					
V	VERY WEAK EROSION	0,11-0,20	100-400	36.407,35	41,19	3.890.949,42	10,44
		0,01-0,10					
12	ACCUMULATION OF SEDIMENT			12.024,41	13,61		





	Erosion Processes Intensity	Area	
		km ²	%
I	Excessive Erosion	2,888.0	3.27
II	Intensive Erosion	9,138.0	10.34
III	Medium Erosion	19,386.0	21.94
IV	Weak Erosion	43,914.0	49.78
V	Very weak Erosion	13,035.0	14.75
	Total	88,361.0	100





In BiH total average annual erosion 16,5 mil m³, while specific annual erosion is 323 m³ km²
The new Erosion Map of RS was designed in two phases (restructuring of erosion map and innovation of erosion map) during 2011.

More than 80% of the BiH territory exists on slopes exceeding 13% water-induced erosion is an increasingly present problem (unplanned exploitation of forests and total deforestation of the terrain).

This phenomenon is most prevalent in central and southern parts of the country where the annual quantity of precipitation amounts to no less than 2,000 mm.





In the northern part of BiH hydromorphic soils are dominant on flat and slightly hilly terrains.

In those areas erosion risk is at a much lower level from the point of view of potential erosion, but agricultural production is the basis of the intensive development of erosion processes, and on these soils surface erosion happens. In addition, besides water erosion, one should not forget the risks of aeolian erosion in the southern part of the country where shallow soils dominate on limestone/dolomite substrata with extensive vegetation or without and the risk of aeolian erosion is high.





- **Torrential floods are the most frequent catastrophic events that occur in the RS and BIH with serious risks for people and their activities.**
- **Torrential floods have caused the death of more than 400 people in the last 65 years and material damage estimated at more than 27 billion EURs.**

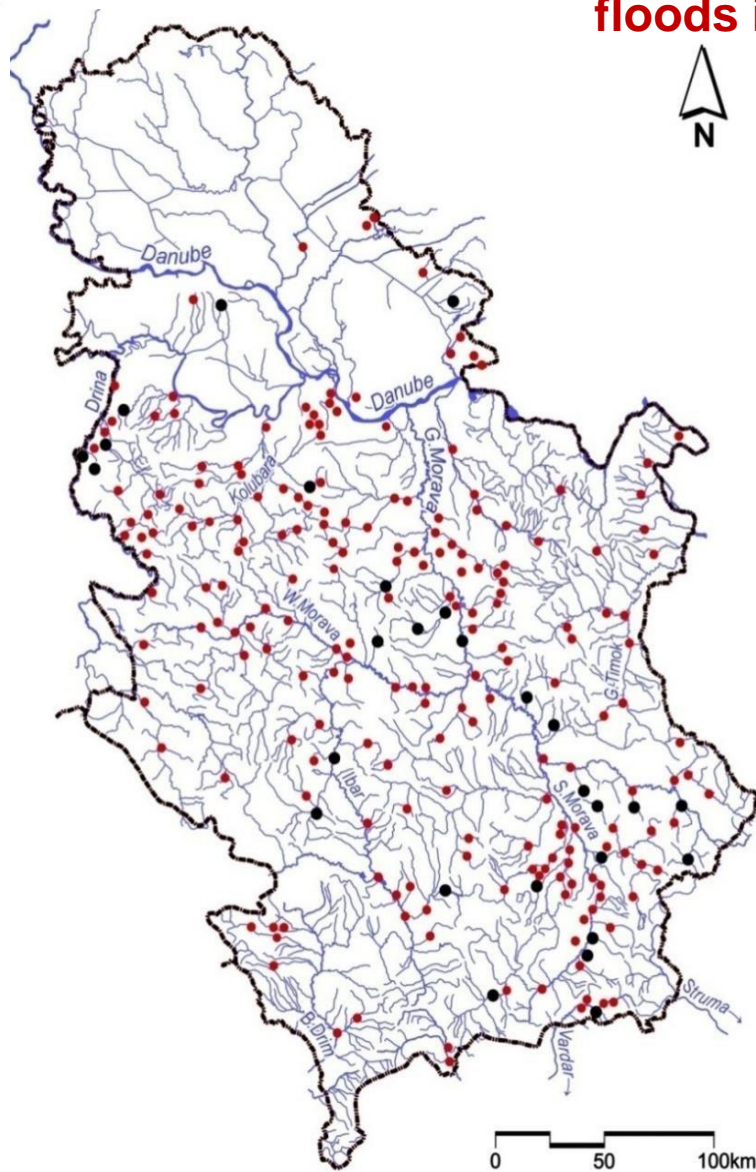




- **The main factors increasing the flooding risk, besides topographic and land characteristics, are heavy precipitations, removal of forest cover, uncontrolled urbanization, the reduced discharge capacity of regulated river sections (deposition of sediment and garbage; overgrowing by shrubs and trees).**
- **During catastrophic torrential floods in BIH and Serbia, in May 2014, 76 lives were lost, 2.6 million people were endangered, and about 12.000 km² were flooded with material damage higher than 3 billion EUR.**



Spatial disposition of the most destructive torrential floods in Serbia from 1950 to 2018



- material damage and loss of human lives;
- **material damage**



Table 2.15 Summary of major flood events in Bosnia and Herzegovina, 2010-2015 (Source: Flood Prevention and Management, Gap analysis and needs assessment in the context of implementing the EU Floods Directive, September 2015)

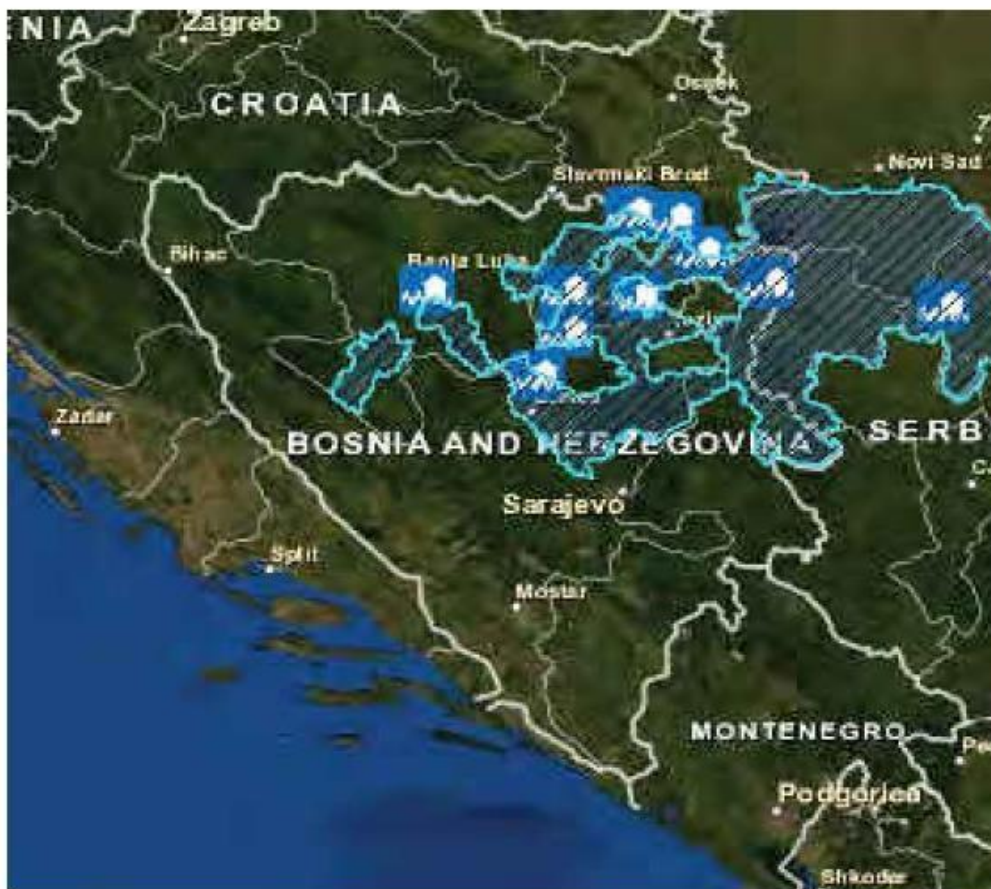
Date	Affected areas, municipalities	Extent of damage
Dec. 2010	River Drina catchment, Municipalities of Bosanska Krupa, Domaljevac - Šamac, Orašje, Tuzla, Maglaj, Goražde, Foča - Ustikolina, Pale - Prača, Ravno, Čitluk, Čapljina, Stolac, Mostar, Trnovo, Ilidža, Novi Grad, Tomislavgrad, Drvar, Trebinje, Bileća, Nevesinje, Foča, Novo Goražde, Bratunac, Zvornik, Bijeljina	<ul style="list-style-type: none"> • 20,000 people affected, 5,000 houses flooded, • 6,000 people evacuated.
May 2014	Sava tributaries: Una, Sana, Vrbas, Vrbanja, Bosna and Drina and River Sava at Rača	<ul style="list-style-type: none"> • Nearly 15% of GDP lost. • 13,200 km² flooded. • Over 1 million people in 46 municipalities affected. • 25 lives lost.
Aug. 2014	Northern and Western BiH. All areas along the Sava, Sava tributaries: Una, Vrbas, Banja Luka, Gračanica, Tuzla, Foča, Višegrad, Zvornik, Žepče, Lukavac, Zenica	<ul style="list-style-type: none"> • Some 200 homes evacuated.





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More than 1000 landslides annually in the BiH (depending on climate characteristics). In 2010 30 appeared in Banja Luka, 41 Lopare, 50 Zvornik, and 763 in Sarajevo canton.



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Work packages

• WP2 – DEVELOPMENT

Title: Development of curricula

Leader: University of Novi Sad

Activities:

- Defined study requirements with Bologna standards
- Defined goals, competences and learning outcomes of bachelor and master curricula
- Established new and improved existing subjects of bachelor programme
- Established new master programme
- Study visits to EU partners university and analysis best practices
- Harmonization of the proposed changes
- Introduce and training teaching staff

• WP3 – DEVELOPMENT

Title: Implementation of developed curricula
and training

Leader: University of Banja Luka

Activities:

- New bachelor subjects implemented
- New master programme implemented
- Evaluation of syllabi
- Report of master and bachelor curricula quality





- Improving and modernizing existing BSc and MSc study programs at universities in Serbia and Bosnia and Herzegovina
- Developing a new joint master program
- In accordance with the Bologna Declaration and good practices of EU countries (Austria, Italy, Bulgaria) and countries in the region (North Macedonia)





- Educate experts who will be able to solve problems in the field of soil erosion and torrential flood prevention, having the knowledge and skills to be competitive at regional and international level
- Train students with integrated scientific and professional knowledge and skills
- Education through training by employed engineers for practical solutions of flood prevention and education of local governments for the development of prevention programs





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New MSc program

Soil erosion and torrential flood prevention,

students gain the knowledge that will enable them to carry out the tasks of protecting the soil from degradation, primarily soil erosion and taking preventive measures to protect against torrential floods

The expected learning outcomes are:

- selection and implementation of solutions, based on knowledge of natural, bio-ecological and technical sciences, in the field of soil protection against erosion and prevention of torrential floods



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- design of sustainable systems for the protection of soil from erosion and prevention of torrential floods, based on the principles of ecological engineering, or individual components of the system for basin management, planning and execution of works in the field of torrential flood protection
- analyzing, planning and solving problems following environmental principles that link society to the natural environment for mutual benefit





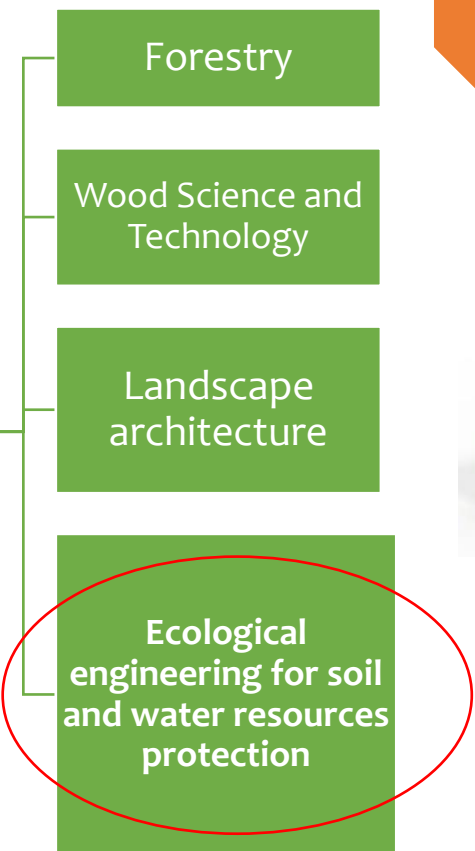
- application of information technologies in solving problems in the field of protection of soil from erosion and torrential floods
- effective application of knowledge individually, in a team and multidisciplinary teams, with the ability to learn throughout life

Upon completion of the MSc program ***Soil erosion and torrential flood prevention***, as well as upgraded existing master programs, graduates are entitled to continue their education in doctoral studies in forestry or other scientific fields of biotechnical sciences





University of
Belgrade
Faculty of Forestry



1.

- Bachelor degree
- 4 years
- 240 ECTS



2.

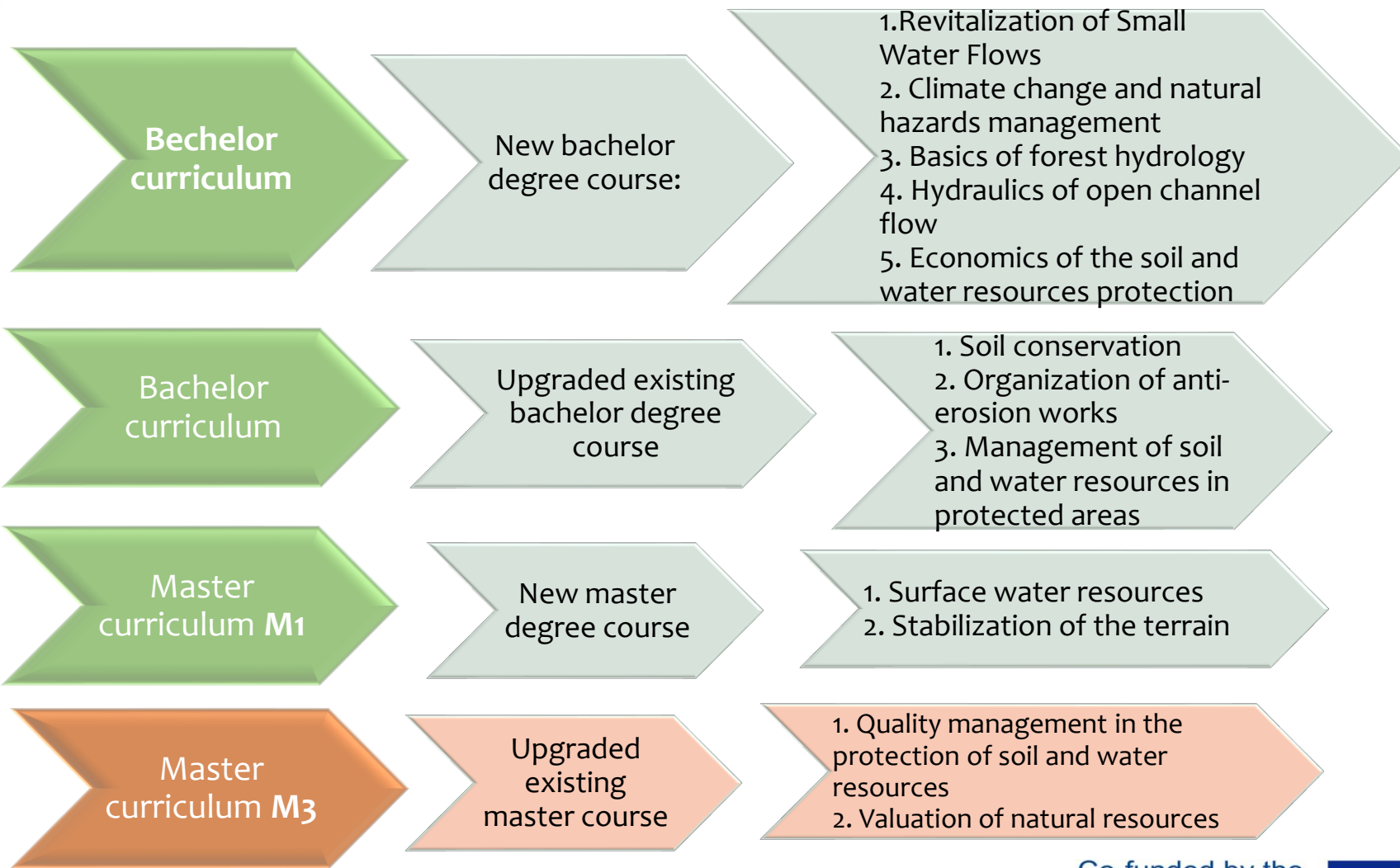
- Master degree
- 1 year
- 60 ECTS



3.

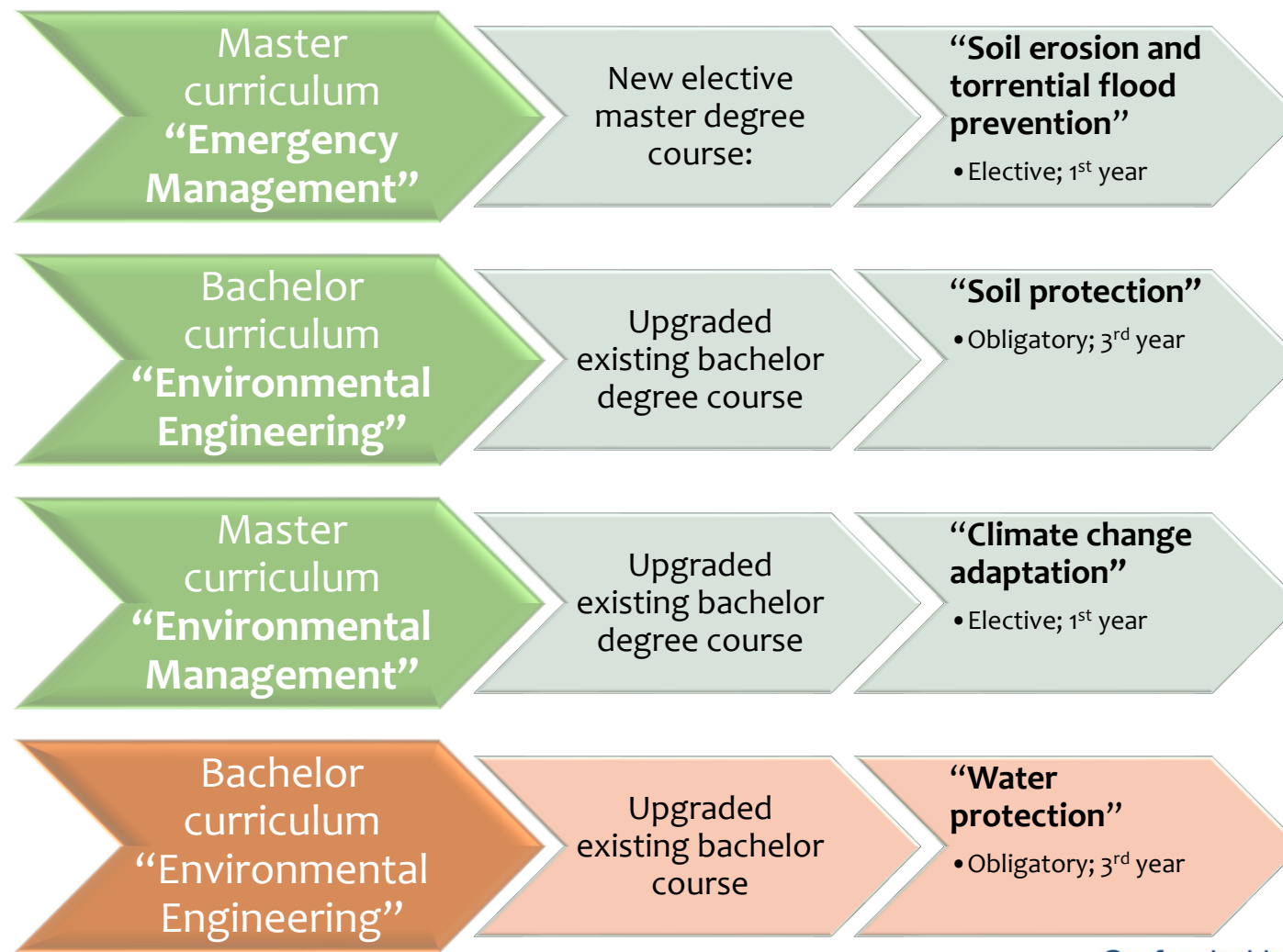
- PHD
- 3 years
- 180 ECTS

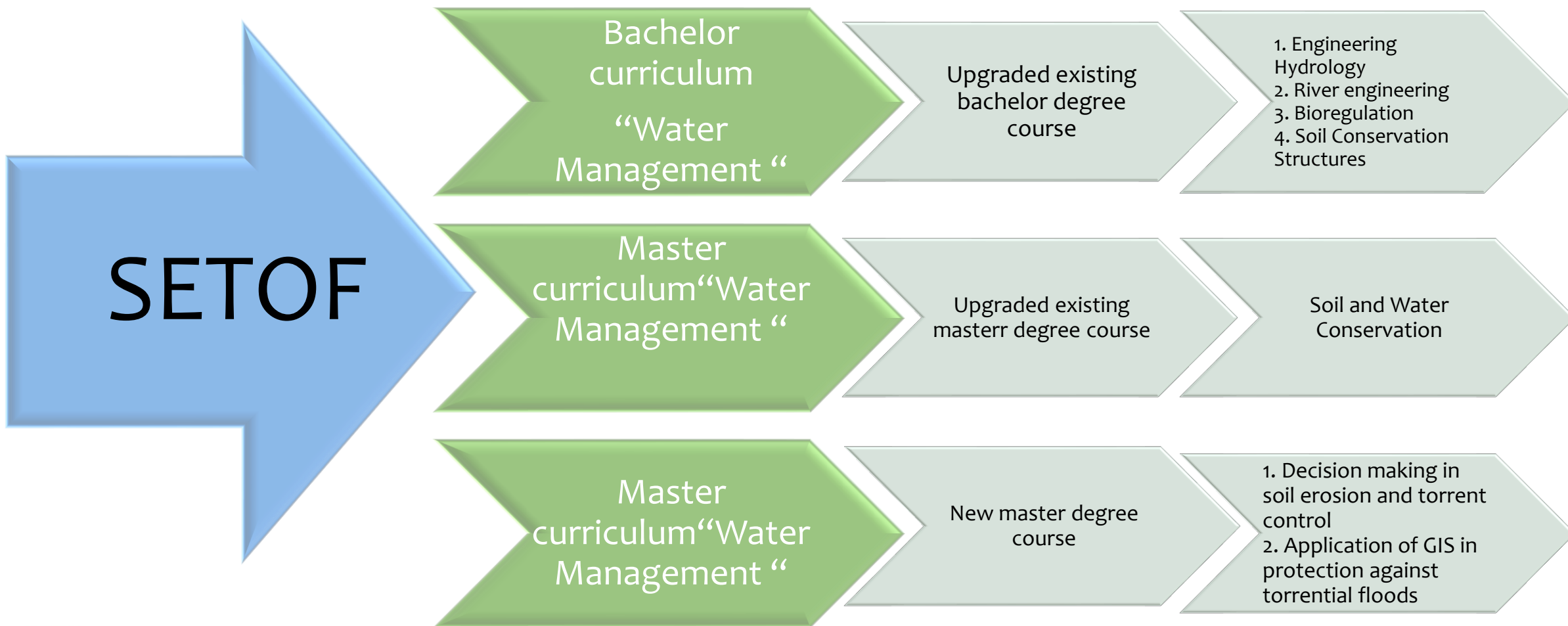






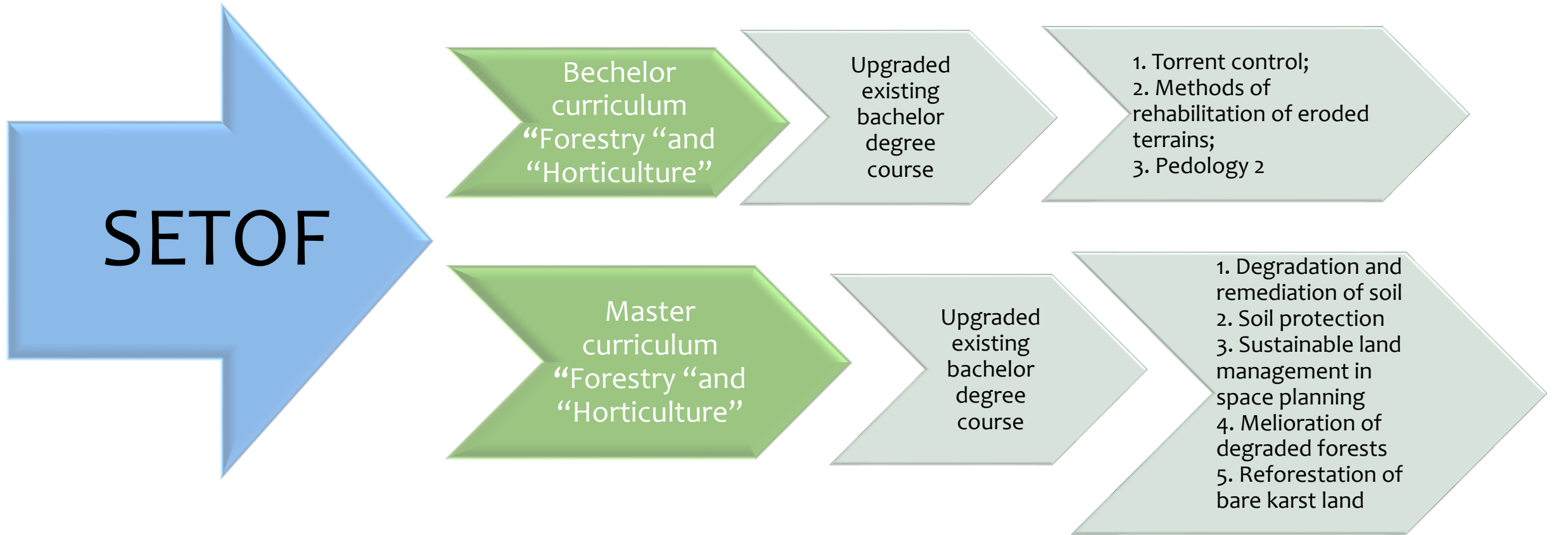
University of Niš, Faculty of Occupational Safety

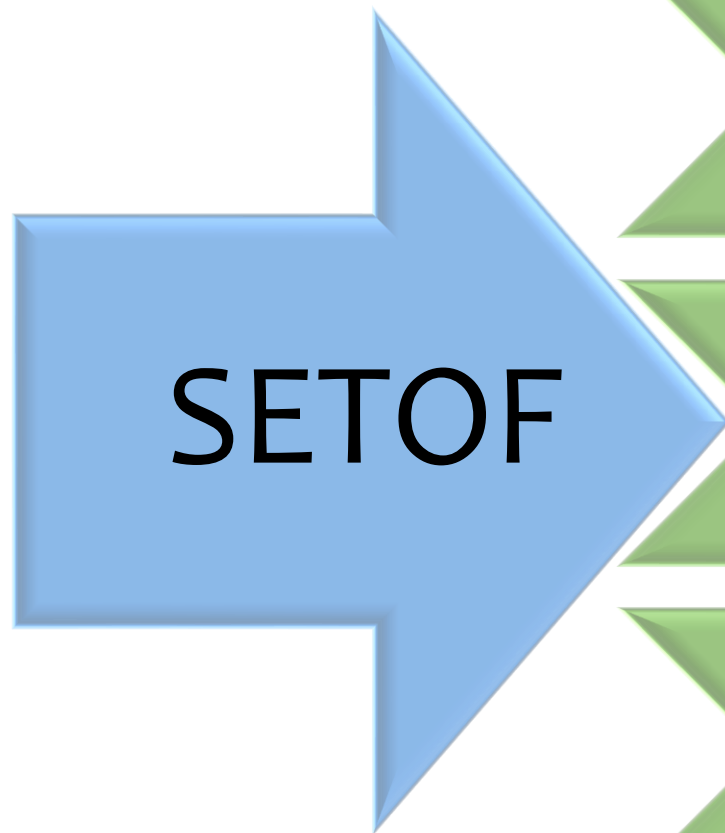






University of Sarajevo, Faculty of Forestry





Bachelor curriculum
“Forestry”

Upgraded existing bachelor degree course:

- 1. Forest eco-climatology
- 2. Forest soils
- 3. Land degradation
- 4. Forest utilization 2

Master curriculum
“Forestry Type”

New master degree course

Sustainable land management and global trends

Master curriculum
Forestry Type”

Upgraded existing master degree course

Syndinamics of forest phytocaenosis





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Joint study program of master's academic studies
Soil Erosion and Torrential Flood Prevention

was developed within the Erasmus + K2 project

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The joint study program of the master academic studies is organized by five Universities:

- three from the Republic of Serbia:

University in Belgrade,

University in Novi Sad

University in Niš

- two from the Republic of Bosnia and Herzegovina:

University in Banja Luka

University in Sarajevo





- The joint master study program is **one year long** and it is sectioned into two semesters
- It contains four mandatory and two elective subjects and in its total volume carries 60 ECTS points
- The teaching process contains: lectures, exercises, seminar papers, exams, study-research work, professional practice, and master's thesis.
- The courses are designed as a joint course, with professors from **several universities**, program holders and partners participate in teaching.





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No	Code	Subjects	S	Number of classes	ECTS
1.	20.ER2101	Soil and water degradation	I	3+2	5
2.	20.ER2102	Soil erosion protection	I	3+2	6
3.	20.ER2103	Torrential flood protection	I	2+3	6
4.	20.ER2104	Integrative torrential watershed management	I	3+2	5
5.	20.ER2110	Elective subject I - Land melioration - Conservation of karst terrain - Climate change adaptation - Project management for natural resources protection - Sustainable land management - Biomelioration of barelands - Geoinformation tehnology	I	2+2	4
6.	20.ER2120	Elective subject II - Natural disasters risks management - Land degradation and ecosystem services - Torrent monitoring and early warning system - Decision making in soil erosion and torrent control - Modelling of soil and water degradation - Melioration of degraded forests	I	2+2	4
7.	20.ER2201	Study -research work	II	10	7
8.	20.ER2202	Professional practice	II	6	3
9.	20.ER2203	Development of master thesis	II	12	12
10.	20.ER2204	Master thesis	II	2	8
Total classes of active teaching				58	
Total ECTS					60



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The certificate of accreditation of the joint study program of master's academic studies

Soil erosion and flood prevention

was obtained by the decision of the Commission for Accreditation of the National Body for Accreditation and Quality Assurance in Higher Education of the Republic of Serbia (NEAQA)

from 13.05.2021. year (no.612-00-00212/5/2020-03)



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The 23 students who applied for the competition:

- 6 with completed undergraduate studies at the faculty of
University of BiH:

4 students from the University of Banja Luka

2 students from the University of Sarajevo

- 17 students with completed undergraduate studies at the
faculties of the University of Serbia:

7 students from the University of Belgrade

5 students from the University of Nis

5 students from the University of Novi Sad



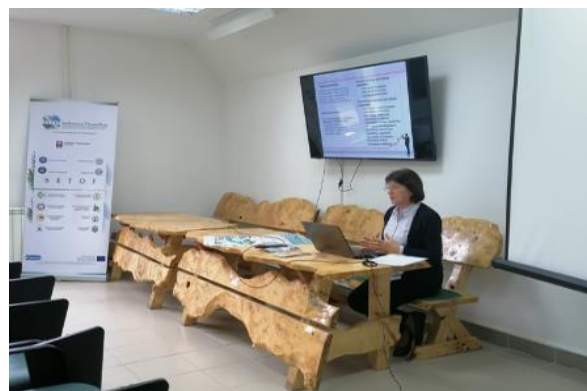
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SETOF Soil Erosion and **T**Orrential Flood
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The SETOF project planned and held **block classes** in the teaching base of the University of Belgrade - Faculty of Forestry in Goč from 1 to 5 November, 2021 and January 31 to February 4, 2022.



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Work packages

- **WP 4 -QUALITY PLAN**

Title: Quality plan and monitoring

Leader: University Mediterranea of Reggio Calabria

Activities:

- Quality plan established
- Quality control according to the adopted plan and measures for improving
- External financial control
- Quality assurance Committee meetings

- **WP5 – DISSEMINATION & EXPLOITATION**

Title: Dissemination of project results

Leader: University of Niš

- **Activities:**

- Project website created and maintenance
- Establish dissemination plan
- Promotion material created
- Trainings plan defined and adopted
- Promotion trainings with engineers in enterprises
- Trainings in local communities





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Work packages

• WP6 – DISSEMINATION & EXPLOITATION

Title: **Exploitation of project results**

Leader: **University of Sarajevo**

- **Activities:**
- Sustainability plan created
- Accreditation of master curricula
- Promotion for students enrolment

• WP7 – MANAGEMENT

Title: **Project management**

Leader: **University of Belgrade**

- **Activities:**
- Project management meetings
- Steering committee meetings
- Guidelines on the reporting and correspondence
- Day-to-day coordination of project activities
- Interim and finale report meeting



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The need for experts in protection against erosion and torrential floods is evident.

Future students, we are waiting for you!



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