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## WP3

# Development

Lead Organizations of WP2: **UBL, Republic of Srpska, BiH**

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

Deliverable 3.1

Title : **Evaluation of syllabi**

**Participating Organization:** UB; UNS; UNI; UBL; UNSA; BOKU;  
UNSCM; UNIRC



## PROJECT INFO

Project title	Soil Erosion and Torrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries
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 CONTROLSHEET

Ref. No and Title of Activity	<b>3.3. Evaluation of syllabi</b>
Title of Deliverable:	Report on evaluation of the syllabuses of the new and modernized subjects
Institutions:	UNSCM
Author/s of the deliverable	Ivan Blinkov
Status of the document:	draft

Project number: 598403-EPP-1-2018-1-RS-EPPKA2-CBHE-JP (2018 – 2579 / 001 – 001)

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## Introduction

Topics related to erosion and torrent control are differently represented in various faculties, on different cycles, and extent.

Evaluation was made in 3 steps

- Analyze of existed study programmes and curricula
- Analyze of extent of erosion and torrent related issues
- Analyze of improved curricula and evaluation

For the first and second aim were analyzed data from official faculty web sites because Serbian and Bosnian languages are understandable for us.

## Faculty of Forestry, University of Banja Luka

- Analyze of existed study programmes and curricula

Faculty offer:

1 study programme on the I cycle - forestry, and

2 study programmes on the II cycle – a) forestry, b) –Management of forest resources.

- Analyze of extent of erosion and torrent related issues

No one compulsory course on the I cycle about Erosion and Torrent control.

Land Degradation (focus generally on land degradation as problem including erosion, factors of erosion and basic conservation measures), and Systems for Erosion Control Afforestation (focus is on afforestation of degraded land) are elective courses.

There is no anything related to torrents, torrent hydrology and hydraulic, torrent control measures, risk/hazard management....

No available data about courses on the II cycle.



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- Analyze of improved curricula and evaluation

Four (4) course are proposed for improve on the I cycle as follow:

1. Forest eco-climatology – compulsory - improve
2. Forest soils – compulsory, improve
3. Land degradation – elective - improve
4. Forest utilization 2 - elective – improve

### General evaluation

Topics related to soil and land are well covered, especially those related to the concept of Land degradation Neutrality that is new in the frame of UN CCD.

It is missing: basics of forest hydrology especially elements of water cycle and water balance into the forest. Perhaps within the course Forest eco-climatology could be involved taking in consideration that there I s no other similar course. It could be very well base for part of environmental acceptable ways of forest utilisation that is into the course Forest utilization 2. Beside this, what about technical-ameliorative measures for erosion control eventually small bioengineering structures ? Torrents are not represented in any course as well as landslides and Basics of risk/hazard management.

Two (2) courses are proposed on Master degree - Forest ecology and forest establishment

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- Sustainable land management and global trends – new  
General politics related to te land degradation are very important and it is covered with this course, especially new trends for SLM.
- Syndinamics of forest phytocaenosis –

Very positive related to erosion and torrent and other degraded land in the part of vegetation succession as well as other degraded land. Taking in consideration climate changes scenarios, more frequent forest fires and other processes, is important and for some erosion control measure to be adapted to the natural succession processes.

### FINAL OPINION

One area that is target of the project (Erosion and Torrents) , is not covered within the syllabus It is needed improvement in the part of torrents, torrent hydrology and torrent management including basics of risk/hazard management (The new Sendei declaration for EcoDRR is favorable for forest engineers). One course is enough for the I cycle but also another on the second cycle that will enable advanced knowledge for students.



Beside it, within the course Land Degradation, in the “Subject Content” except general land management policy, soil conservation measures are not mentioned although in the chapter “Learning objective” is written “The objective is also to learn and master modern methods of land conservation, and possibilities of prevention through different techniques and approaches” .

Personnel opinion is that probably is technical mistake in the chapter “Subject content” and last part is missed.

it is missing part for forest hydrology, torrent hydrology and hydraulic, torrent control, but also principles of risk/hazard management and

### UNIBL

Question	Poor	OK	Good	Very good	Excellent
How do you rate the quality of modernized study programe?			*		
How do you rate competenceof teaching staff regarding improved study programme?					
Are the new/modernized curricula attractive for students/engineers?				*	
Rate quality of teaching material.				*	
How do you assess access to literature and database?					*
Rate learning obligations.				*	
The overall rating of modernized study programe.				*	
Do new/modernized subjects increase chance for employment of engineers?				*	
Do new/modernized syllabuses met requirements and global trends related to soil erosion and land degradation?				*	
Do new/modernized syllabuses improve students’ competencies and learning outcomes?				*	
Do new/modernized subjects improve				*	

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competencies of engineers?					
Final comment and recommendations:					

## Faculty of forestry – University of Sarajevo

- Analyze of existed study programmes and curricula

Two (2) study programmes exist on the I cycle – Forestry and Landscape Architecture. Courses related to erosion and torrent control are included in the study programme – Forestry.

- Analyze of extent of erosion and torrent related issues

Compulsory course - Torrent Control exist in the curricula of the I cycle and cover everything about torrents, and elective course Methods for rehabilitation of eroded land.

These courses cover the basics about Erosion and Torrent Control

- Analyze of improved curricula and evaluation

List of innovated subjects included in the study program of basic academic studies BSc Forestry and BSc Horticulture:

1. Torrent control;
2. Methods of rehabilitation of eroded terrains;
3. Pedology 2.

List of innovated subjects included in the study program of basic academic studies MSc Forestry and MSc Horticulture:

1. Degradation and remediation of soil
2. Soil protection
3. Sustainable land management in space planning
4. Melioration of degraded forests
5. Reforestation of bare karst land

1 new subject - Conservation of karst terrains



## Final opinion

All of these courses are well improved and cover all necessary topics related to erosion and torrent control and land degradation and conservation at all.

**As lack** would be noticed the following topics :

- Forest hydrology issues - there is something within the course Meteorology with climatology, but it is not enough
- Principles of risk hazard management and EcoDRR frame.

To be Suggested additional literature for MSc courses, especially related to: contemporary bioengineering techniques and materials , open check dams ...

## UNSA

Question	Poor	OK	Good	Very good	Excellent
How do you rate the quality of modernized study programe?					*
How do you rate competence of teaching staff regarding improved study programme?					
Are the new/modernized curricula attractive for students/engineers?					*
Rate quality of teaching material.					*
How do you assess access to literature and database?					
Rate learning obligations.					*
The overall rating of modernized study programe.					*
Do new/modernized subjects increase chance for employment of engineers?					*
Do new/modernized syllabuses met requirements and global trends related to soil erosion and land degradation?					*

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Do new/modernized syllabuses improve students' competencies and learning outcomes?					*
Do new/modernized subjects improve competencies of engineers?					*
Final comment and recommendations:	Excellent wit slight suggestions and recommendation explained above.				

## UNI - Faculty of Agriculture, University of Novi Sad

### - Analyze of existed study programmes and curricula

This faculty offer 13 study programmes on BSc level. 14 on MSc Level, 1 integrated BSc+MSc study programme and 3 study programmes on PhD level.

Only 1 study programme Water Management is selected for improve.

This faculty is not related to forestry and the study program Water management can not be compared with UNIBL and UNIS, possible with similar study programme in Belgrade.

### - Analyze of extent of erosion and torrent related issues

Study programme Water Management contain main courses related to Erosion and torrent Control as: Erosion Control and River engineering as well as supportive courses.

On the MSc degree are course related generally to water management as well as osil and water conservation.

### - Analyze of improved curricula and evaluation

Updated courses at the Bachelor study program Water Management at the University of Novi Sad, Faculty of Agriculture:

1. Engineering Hydrology - OK
2. River engineering - OK
3. Bioregulation
4. Soil Conservation Structures

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## Courses - **Soil Conservation Structures and Bioregulation**

Recommendation - To redistribute the methodological units in these two subjects.

Because Soil Conservation Structures is compulsory to be renamed simply in Erosion and Torrent Control or Soil and Water Conservation 1 and to cover all aspects of this matter

- Erosion and Torrents
  - `- Erosion types, damages, process mechanism, factors, classification, estimation soil loss and sediments,..)
  - `- Basics of torrents, (torrent hydrology and hydraulic, types of torrents, types of flow ..)
- Erosion and torrent control measures
  - Land use planning
  - Technical -ameliorative measures (contour ditches, contour walls, ditches and ponds for retention ....),
  - Agricultural measures(crop rotation, mulching, tillage, .....
  - Silvicultural measures (afforestation, sustainable forest activities, ..)
  - Longitudinal hydraulic structures - ....
  - Transverse hydraulic structures - ... types of check dams , design - static and hydraulic calculations..... )
  - other measures (administrative, public awareness...)
- Cost-benefit analyses

### Literature

1.S. Belić (1996) Vodoprivredni objekti (skripta), Novi Sad

Suggestions:

Kostadinov Stanimir (2006.): Bujični tokovi i erozija, Šumarski fakultet, Beograd.

Subject **BIOREGULATION** to be focused on river bioengineering - streambank bioengineering ... and Principles of Eco-DRR - nature-based solutions for flood risk reduction

- Processes in water ecosystems
- Biotechnical characteristics of plants
- Principles of Eco-DRR and Contemporary river engineering
- River restoration
- Bioregulation (alignment, longitudinal profile, cross profile..... River regulation with
- Regulation of running and stagnant waters by applying bioregulations. Transverse bioengineering structures, streambank bioengineering structures - landscaping of shores. Establishment and care of coastal vegetation. Bioengineering materials. Cadastre of commonly used plants in bioengineering

### Literature

1. Jovanović B.M.: Regulacijareka, rečna hidraulika i morfologija, Građevinskifakultet, Beograd, 2008.
2. Babić-Mladenović M.: Uređenje vodotoka. Institut za vodoprivredu Jaroslav Černi, Beograd, 2018.
3. Kolaković S.: Odbrana od poplava, FTN. Novi Sad. 2012.
4. Tehničar - Građevinski priručnik - Odabrana poglavlja iz hidrotehnike. Građevinska knjiga, Beograd, 2007.
5. LetićLj.: Bioregulacije, Šumarskifakultet, Beograd, 2001.

Suggestions: any material related to EcoDRR principles for water

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**Updated courses at the Master study program Water Management at the University of Novi Sad, Faculty of Agriculture:**

1. Soil and Water Conservation -similar to subject on the I cycle.  
To be included Desertification related material , Land Degradation processes according to CCD and Land Degradation Neutrality approaches,.

New courses at the Master study program Water Management at the University of Novi Sad, Faculty of Agriculture:

1. Decision making in soil erosion and torrent control- ok
2. Application of GIS in protection against torrential floods - ok

Question	Poor	OK	Good	Very good	Excellent
How do you rate the quality of modernized study programe?					*
How do you rate competence of teaching staff regarding improved study programme?					
Are the new/modernized curricula attractive for students/engineers?					*
Rate quality of teaching material.				*	
How do you assess access to literature and database?					*
Rate learning obligations.					*
The overall rating of modernized study programe.					
Do new/modernized subjects increase chance for employment of engineers?					
Do new/modernized syllabuses met requirements and global trends related to soil erosion and land degradation?					
Do new/modernized syllabuses improve students' competencies and learning outcomes?					

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Do new/modernized subjects improve competencies of engineers?					
Final comment and recommendations:	Suggestion for subjects : Soil Conservation structures and Bioregulation				

## UB - Forestry Faculty within University of Belgrade

Only on this faculty there is a special study programme directly related to erosion and torrent control and proposed changes are only for courses on this study programme.

List of new subjects included in the study program of basic academic studies Ecological engineering for soil and water resources protection:

1. Revitalization of Small Water Flows
2. Climate change and natural hazards management
3. Basics of forest hydrology
4. Hydraulics of open channel flow
5. Economics of the soil and water resources protection

List of new subjects included in the study program of basic academic studies Ecological engineering for soil and water resources protection:

1. Soil conservation
2. Organization of anti-erosion works
3. Management of soil and water resources in protected areas

List of new subjects included in the Master's Degree Program in Ecological engineering for soil and water resources protection:

1. Surface water resources
2. Stabilization of the terrain

All curricula on I and II cycle is excellent developed, subject covre wide area, literatures is complete.

Suggestions – to be included Desertification related material , Land Degradation processes according to CCD and Land Degradation Neutrality approaches,.

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## UB

Question	Poor	OK	Good	Very good	Excellent
How do you rate the quality of modernized study programme?					*
How do you rate competence of teaching staff regarding improved study programme?					
Are the new/modernized curricula attractive for students/engineers?					*
Rate quality of teaching material.					*
How do you assess access to literature and database?					
Rate learning obligations.					*
The overall rating of modernized study programme.					*
Do new/modernized subjects increase chance for employment of engineers?					*
Do new/modernized syllabuses met requirements and global trends related to soil erosion and land degradation?					*
Do new/modernized syllabuses improve students' competencies and learning outcomes?					*
Do new/modernized subjects improve competencies of engineers?					*
Final comment and recommendations:	Excellent with slight suggestions and recommendation explained above.				



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## UNI – University of Nis – Faculty of occupational safety

The faculty offer 2 study programmes on Bachelor degree and 5 study programmes on Master degree.

Subject of evaluation are 3 courses

- 1 course on bachelor degree, 1 on master degree, both on study program Environment management
- 1 course on Master degree - Emergency management
- Environment management - Bsc and MSc degree

Bachelor degree - Upgraded course - Soil protection

This course cover various problematics of Soil science i.e. pedology, soil chemistry, physic... as well as soil degradation with focus on Soil pollution and remediation of polluted soil.

No remarks.

Master degree –Upgraded course - Climate change adaptation

Well presented. Floods are not exposed in the content but should be involved.

Master programme –Emergency management

The study program differ from other programs offered from other universities. . The primary aim of the study programme is to enable students to apply scientific and professional achievements in solving problems of safety of human and material wealth, and in developing emergency management system.

Erosion and torrents are natural hazards and topics about management of hazard during the occurrence and post-hazard management are very important too.

Several courses in the current program are relevant for erosion and torrent control.

New course: Soil erosion and torrential floods protection

No remarks, everything is well presented.



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## **CROSS CUTTING - I and II cycle**

For this analyze were selected the most relevant subjects for Erosion and Torrent Control.

There are a significant number of subjects that are related to this matter as: Climatology, Geology, Pedology, Mechanics, Civil Constructions, Geodesy and GIS, subjects typical for forestry faculty (Forest management planning, Silviculture, harvesting, transport, ...) or Agricultural faculty (related to sustainable agricultural activities) etc. but they are not taken in consideration for the following analyze.

Each faculty is specific depend on the country /province.

Faculty in Banja Luka pay significant attention to Land Degradation and Desertification issues. Besides, only in their programmes contemporary principles regraded erosion and torrents are involved within the subject Forest utilization 2. On the other hand, part related to torrent is almost missing although in 2014, torrents and landslides made huge damages.

Faculty in Sarajevo focus on torrent control while issues related to erosion control is well addressed. Good example is paying attention on karst areas. Perhaps should be involved some methodological about sustainable practices within their courses related to harvesting and transport.

Faculty of Novi Sad taking in consideration the natural conditions in AP Vojvodina and faculty and study programme, generally issues related to erosion and torrent control are well addressed. Parts of torrent and torrent control are included within the subjects related to river (river regulation). Hydrology and hydraulic are well elaborated. It is missing part of forest Hydrology and maybe specifics of torrent Hydrology and hydraulic. Suggestion is Any material to be replaced between 2 subjects. It is not clear if there are any course about general forestry activities.

Faculty in Nis and study programmes are different the others. Missing part about erosion and torrents, for my opinion are enough involved for this type of programmes.

Faculty of Belgrade is the only where Erosion and Torrents are in a separate study programme and there is no additional comments.



University	UNIB	UNIS	UNS	UNB	UNI
<b>Topic</b>					
Land degradation and Desertification	***	*	**	**	*
Erosion	**	**	**	***	*
Erosion Control	**	***	***	***	*
Basic or hydrology/forest hydrology	*	**	**	***	*
Torrent Hydrology and hydraulic		***	**	***	*
Torrent Control	*	***	**	***	*
Risk/hazard management				***	***

- *Study programmes on UNI are different then others and presented material is enough for the aims of the study programmes.*