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## WP3

# Development

Lead Organisations of WP2: **UBL – Republic of Srpska, BIH**

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

### **Deliverable 3.3**

Title: Evaluation of syllabi

**Participating Organisation:**INSZASUM; BOKU;  
UNSCM; UNIRC;FRI-BAS



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## REPORT ON EVALUATION OF THE SYLLABUSES OF THE NEW AND MODERNIZED SUBJECTS

### 1. Introduction

In line with WP 2 (Development of curricula), individual universities have presented in detail the purpose of each curriculum, the demand for it, and the knowledge students will receive after completion of basic academic and master studies. The universities have also presented the duration of the Study programs and ECTS credits per each course.

The following curricula are presented for evaluation:

#### UNIVERSITY OF BANJA LUKA (FACULTY OF FORESTRY)

**Study program: BSc FORESTRY**

*Subject: FOREST SOILS*

*Subject: LAND DEGRADATION*

*Subject: FOREST ECO-CLIMATOLOGY*

*Subject: FOREST UTILISATION II*

**Study program: MSc FORESTRY**

*Subject: TECHNOLOGIES OF FOREST UTILISATION*

**Study program: MSc FORESTRY, FOREST ECOLOGY AND FOREST ESTABLISHMENT**

*Subject: SUSTAINABLE LAND MANAGEMENT AND GLOBAL TRENDS*

*Subject: SYNDYNAMICS OF FOREST PHYTOCAENOSIS*

#### UNIVERSITY OF NOVI SAD (FACULTY OF AGRICULTURE)

**Study program: BSc WATER MANAGEMENT**

*Subject: ENGINEERING HYDROLOGY*

*Subject: RIVER ENGINEERING*

*Subject: BIOREGULATION*

*Subject: SOIL CONSERVATION STRUCTURES*

**Study program: MSc WATER MANAGEMENT**

*Subject: SOIL AND WATER CONSERVATION*

*Subject: DECISION MAKING IN SOIL EROSION AND TORRENT CONTROL*

*Subject: APPLICATION OF GIS IN PROTECTION AGAINST TORRENTIAL FLOODS*

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**UNIVERSITY OF NIS (FACULTY OF FORESTRY)**

**Study program: BSc ENVIRONMENT**

*Subject: SOIL PROTECTION*

**Study program: MSc EMERGENCY MANAGEMENT**

*Subject: SOIL EROSION AND TORRENTIAL FLOODS PROTECTION*

*Subject: CLIMATE CHANGE ADAPTATION*

**UNIVERSITY OF SARAJEVO**

**Study program: BSc FORESTRY**

*Subject: TORRENT CONTROL*

*Subject: METHODS OF REHABILITATION OF ERODED TERRAINS*

**Study program: BSc FORESTRY; BSc HORTICULTURE**

*Subject: PEDOLOGIJA 2/SOIL SCIENCE2*

**Study program: MSC LANDSCAPE ARCHITECTURE**

*Subject: DEGRADATION AND REMEDIATION OF SOIL*

*Subject: SUSTAINABLE LAND MANAGEMENT IN SPACE PLANNING*

**Study program: MSC SUSTAINABLE FOREST ECOSYSTEM MANAGEMENT**

*Subject: SOIL PROTECTION*

*Subject: MELIORATION OF DEGRADED FORESTS*

*Subject: REFORESTATION OF BARE KARST LAND*

*Subject: CONSERVATION OF KARST TERRAINS*

**UNIVERSITY OF BELGRADE**

**Study program: BSc ECOLOGICAL ENGINEERING FOR SOIL AND WATER RESOURCES PROTECTION**

*Subject: REVITALIZATION OF SMALL WATER FLOWS*

*Subject: CLIMATE CHANGE AND NATURAL HAZARDS MANAGEMENT*

*Subject: BASICS OF FOREST HYDROLOGY*

*Subject: HYDRAULICS OF OPEN CHANNEL FLOW*

*Subject: ECONOMICS OF THE SOIL AND WATER RESOURCES PROTECTION*

*Subject: SOIL CONSERVATION*

*Subject: ORGANIZATION OF EROSION CONTROL WORKS*

*Subject: MANAGEMENT OF SOIL AND WATER RESOURCES IN PROTECTED AREAS*



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**Study program: MSc ECOLOGICAL ENGINEERING FOR SOIL AND WATER RESOURCES PROTECTION**

*Subject: SURFACE WATER RESOURCES*

*Subject: STABILIZACIJA TERENA / STABILIZATION OF TERRAIN*

*Subject: QUALITY MANAGEMENT IN SOIL AND WATER RESOURCES PROTECTION*

*Subject: NATURAL CAPITAL VALUATION*

In evaluating the curricula, we have made some recommendations, some of which apply to almost all subjects, and in section 4 we have presented our general remarks and recommendations, believing that if taken into account, this will contribute to improving the quality of education.

In the appendix we present completed questionnaires for the individual subjects. Some of the questions are impossible to answer, as they are related to the specifics of education in individual universities.

## **2. Evaluation of modernized/new syllabi on existing study programmes for each partner**

The presented curricula were reviewed in detail and discussed by the FRI-BAS team. In all new programs, the objectives of the training, subject contents and outcomes are clearly presented. During our work, our main goal was not to highlight the positive aspects of the curriculum (undoubtedly there are in each of them), but rather to show noticeable gaps and in the form of notes and recommendations to present them so that we can improve the final version of the curricula.

We present our notes and recommendations, following the sequence: University, Basic Academic Studies and Master's degree studies.

### **UNIVERSITY OF BANJA LUKA FACULTY OF FORESTRY**

#### **Study program: BSc FORESTRY**

*Subject: FOREST SOILS*

Why classification of soils of Yugoslavia?

It is not clear to how many semesters the number of active teaching hours per week refers to. This applies to all programs/subjects.

It is necessary to clarify the fieldwork training - duration and content covered. There is no assessment of student's knowledges during the fieldwork.

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The literature can be expanded. The name of the teacher is not in the literature.

*Subject: LAND DEGRADATION*

In the new syllabus is included conditionality with petrography and geology. One of the new learning objectives is the possibilities of prevention through different techniques and approaches. Floods are included as learning objectives in the new syllabus.

The content of the program is very enriched and the same applies to literature. Participation in the class and one more test are included as a way of assessment. The evaluation of a modernized program can be considered very high and covers all requirements by all criteria.

*Subject: FOREST ECO-CLIMATOLOGY*

One of the main objectives of this new syllabus is to be presented global trends and climate change and their impact on forest ecosystems and land degradation, which is considered as very good add. In this syllabus, it is taken into account the climate extremes, especially those that cause the occurrence of floods and droughts.

The content of the program is enriched. In forms of assessment activities on classes is added.

*Subject: FOREST UTILISATION II*

In the new syllabus, there are no changes in conditionality with other subjects, learning objectives and learning outcomes. The new part of the contents is environmentally acceptable ways of global utilization, which is considered as global trend requirements. The literature provided is rather outdated, with only one source added from 1996. It is not changing in forms of assessment.

The syllabus is modernized. It will improve students' competence and learning outcomes.

**Study program: MSc FORESTRY**

*Subject: TECHNOLOGIES OF FOREST UTILISATION*

The objectives and outcomes of the course are comprehensive and describe well the study programme. The content of the course is broad and detailed. The literature covers also recent topics, however the sources for technologies of forest utilisation by approaching the international experience are not evident.

**Study program: MSc FORESTRY, FOREST ECOLOGY AND FOREST ESTABLISHMENT**

*Subject: SUSTAINABLE LAND MANAGEMENT AND GLOBAL TRENDS*

Is there a difference between study program: Forestry and study program: Forestry - Forest ecology and forest establishment?



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In Teaching Methods there is field work, but Subject content does not specify what this involves.

No points for Activity on classes and Practical work.

The literature could be expanded.

*Subject: SYNDINAMICS OF FOREST PHYTOCAENOSIS*

The course is taught for 1 semester and gives theoretical knowledge regarding the syndinamics of forest stands and students are also have training on the application of acquired knowledge in practice. It is not clear what the rationale of the test is, as there is also final exam students' evaluation.

**UNIVERSITY OF NOVI SAD  
FACULTY OF AGRICULTURE**

**Study program: BSc WATER MANAGEMENT**

*Subject: ENGINEERING HYDROLOGY*

The old program was not provided for comparison. Content is very well structured. Subject-specific methodologies are included. The downside is the lack of a written exam.

*Subject: RIVER ENGINEERING*

The old program was not provided for comparison. Good rate of learning obligations. This syllabus is supposed to be very attractive for the students. It will improve students' competencies and competencies of the engineers.

*Subject: BIOREGULATION*

The old program was not provided for comparison. The subject is elective, but the content is a prerequisite for the subject to be attractive to students. Includes knowledge of basic risk processes. The training provided will enhance the competencies of students and engineers.

*Subject: SOIL CONSERVATION STRUCTURES*

The old program was not provided for comparison. Main objective of this subject is to introduce students to the basic principles of erosion processes. Very well structured content with a lot of themes connected with transversal structures.

The literature presented is unsatisfactory. Lectures and exercises are included in the program, but for such a subject it would be necessary to include fieldwork so that students can become familiar with the facilities.

This syllabus is supposed to improve the competence of students and engineers.

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**Study program: MSc WATER MANAGEMENT**

*Subject: SOIL AND WATER CONSERVATION*

The subject is elective and is for master students. The main objective is to expand knowledge of soil erosion processes. In content are included modern strategies and methods of land and water conservation and relevant legislation. These themes will be attractive for master students and will prepare engineers and students for decision making. The written exam is missed.

*Subject: DECISION MAKING IN SOIL EROSION AND TORRENT CONTROL*

The presented subject is new, it is elective and is for master students. The subject aimed to present the Multi-Criteria Decision Analysis. The expected competencies and learning outcomes are a lot. The content is well structured with a lot of themes. The literature is from recent years.

This subject met requirements and global trend related soil erosion.

*Subject: APPLICATION OF GIS IN PROTECTION AGAINST TORRENTIAL FLOODS*

This subject is new and it is an elective. The objective is to master the basics of GIS. This subject must be obligatory with the view of new better decision making. The content is well structured and includes a lot of practical classes.

The disadvantage is the lack of sufficient literature and the lack of a written or practical examination.

**UNIVERSITY OF NIS  
FACULTY OF FORESTRY**

**Study program: BSc ENVIRONMENT**

*Subject: SOIL PROTECTION*

This is obligatory course in bachelor programme. and is upgraded bachelor degree course. The study programme is prepared for accreditation – projected submission in April 2020. The literature of the course is recent and the objectives of the course are focused on the fundamental theoretical and practical knowledge on soil properties, pollution and protection. The syllabus includes both theoretical and practical classes with duly students' engagement. The old study programme is not presented for comparison.

**Study program: MSc EMERGENCY MANAGEMENT**

*Subject: SOIL EROSION AND TORRENTIAL FLOODS PROTECTION*

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This is a new master degree course and the curricula is recently developed and is pending accreditation (expected submission in April 2020). The course is suggested to be elective and to take place in the 1<sup>st</sup> year of master studies. The objectives of the course reflect the present needs to implement theoretical and practical approaches to study soil erosion and torrential floods protection. The teaching hours for lectures and practical exercises are equally committed. The literature covers recent topics and the evaluation process includes students' engagement during the course and results from oral exam.

*Subject: CLIMATE CHANGE ADAPTATION*

The course is developed over an existing master degree course and the suggested study programme is submitted for accreditation (expected in April 2020). The course is elective and planned to take place in the 1<sup>st</sup> year of master studies. The course aims to give knowledge to students about climate change related problems and measure for adaptation. It includes theoretical and practical classes, distributed equally in the study programme. The readings are recent and publications mainly review the national/local context of the topic. The evaluation of the overall preparation includes pre-exam activities and oral exam on the studied theory. The old study programme is not presented for comparison.

## UNIVERSITY OF SARAJEVO

### **Study program: BSc FORESTRY**

*Subject: TORRENT CONTROL*

There is a large set of teaching material about erosion factors, different erosion types, floods, technical and biological anti-erosion measures, i. e. In the literature provided is missing information concerning knowledge about current trends in erosion assessments, use of GIS, etc.

Is it possible to increase the number of active teaching hours for practical classes? This will provide an opportunity for better understanding of the erosion processes, torrential rains and flood control activities.

It is not clear why no points are assigned for Pre-exam obligations for Practical teaching. The name of the teacher is not in the literature materials.

*Subject: METHODS OF REHABILITATION OF ERODED TERRAINS*

Subject aim - the study material overlaps with the program of "Torrent control".  
Subject outcomes - It is not clear what "solves simpler problems related to the formation and occurrence of erosion processes and torrential phenomena" means. Is this training going to be different from Subject "Torrent control"?

In Practical teaching, there are no Points.

The same literature is included as in the subject "Erosion control". The name of the teacher is not in the literature materials.



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## **Study program: BSc FORESTRY; BSc HORTICULTURE**

### *Subject: PEDOLOGIJA 2/SOIL SCIENCE2*

It is not clear why the subject is entitled Soil Science2. Is there Soil Science 1? It is necessary to consider the physical and chemical properties of the soil and the soil organic matter in the context of their importance for limiting erosion processes and the impact of anti-erosion activities.

Subject outcomes - It is necessary to consider whether "distinguishing the typological affiliation of forest soils and connecting them in evolutionary sequences and explaining their production and ecological characteristics, in the framework of Bosnia and Herzegovina connecting pedosystematic units with regions" is sufficient. It is necessary to include a study of an established European soil classification.

The name of the teacher is not in the literature. The literature is incomplete - no pages, publisher ... For example, the reference *Weil, R.R. and Brady, N.C. 2017 The Nature and properties of soil* is missing information.

## **Study program: MSC LANDSCAPE ARCHITECTURE**

### *Subject: DEGRADATION AND REMEDIATION OF SOIL*

Subject content - it is not clear what is meant by "Principles of prevention measures and techniques for repairing damaged soils are the last part of the course". Is this likely to duplicate some of the study material of other subjects?

Literature - Literature is not enough. The name of the teacher is not in the literature.

Is it understood that he does not work in the field of Degradation and remediation of soil?

In Teaching Methods there is "... field work", but it is not clear what this includes. In Pre-exam obligations in the part Practical teaching there are no Points assigned. Active teaching hours for practical classes are missing.

### *Subject: SUSTAINABLE LAND MANAGEMENT IN SPACE PLANNING*

The notes are the same as for soil Degradation and remediation. The literature is missing papers and references of the proposed lecturer. It should be clear that he works in the field of Sustainable land management in space planning.

It is the same as in the subject "Degradation and remediation of soil": In Teaching Methods there is ". field work, but it is not clear what this involves. In Pre-exam obligations in the part Practical teaching there are no Points. No active teaching hours for practical classes.

## **Study program: MSC SUSTAINABLE FOREST ECOSYSTEM MANAGEMENT**

### *Subject: SOIL PROTECTION*

Subject content - The main part of the course deals with the forms and consequences of soil degradation: erosion, landslides, and due to industry, mining and urbanization is written. To



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what extent the educational content overlaps with Subject "Degradation and remediation of soil" and subject "Methods of rehabilitation of eroded terrains"?

In Teaching Methods there is "... field work ", but it is not clear what this includes. No points are set for Pre-exam obligations for Practical teaching.

It is not necessary to present the classification of soil damages.

Exam I and Exam II - the need for split exams is not specified.

Literature - Literature is not enough. The name of the teacher is not in the literature.

It is not clear what field work involves. Practical classes (1 hour) are provided, but there are no points in Practical teaching.

*Subject: MELIORATION OF DEGRADED FORESTS*

Is it possible to merge Subject "Melioration of degraded forests" with "Reforestation ..."? If there is a comprehensive training for the activities for mastering mountain terrains, which are covered with degraded forests and the open eroded soils around them, maybe there will be better result after the lectures, exercises and field works.

Literature is not enough - teaching cannot be modern without the use of modern European literary sources (this applies to most of the developed training programs).

For 1 hour for Theoretical classes and 1 hour for practical classes set in the program, the final grade is 85 points (40 + 45). There should be balance in the assessment. For example, if the subject "Torrent control" is 85 points (40 + 45) at 2 + 2 hours, then what should be the point for "Melioration of degraded forests"? They should not be equal.

*Subject: REFORESTATION OF BARE KARST LAND*

Subject outcomes and Subject content are well-presented.

It is also necessary to study the climate change impact, given the close link with the choice of adaptive species for afforestation.

It is necessary to expand the literature cited.

*Subject: CONSERVATION OF KARST TERRAINS*

At the heart of desertification is climate change. It is necessary to teach the influence of climate in karst terrains, as part of this subject.

It is necessary to expand the literature used. There is no literature from potential teachers.

In Teaching Methods is included field work, but it is not clear what field work involves. There are no active teaching hours for Practical classes. No points included for practical teaching. Is it possible to study this subject without practical classes? The division of the exam into Written exam I and Written exam II is not explained.



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## UNIVERSITY OF BELGRADE

### **Study program: BScECOLOGICAL ENGINEERING FOR SOIL AND WATER RESOURCES PROTECTION**

#### *Subject: REVITALIZATION OF SMALL WATER FLOWS*

This topic may be a bit far from basic erosion training, mainly because it is not clear whether it is torrential currents or small water flows.

The necessity for this topic has to be better articulated. It is also necessary that there is no repetition of teaching material in other subjects, for example for the part Revitalization of small water flows - facilities and works.

There are no teachers in the literature.

#### *Subject: CLIMATE CHANGE AND NATURAL HAZARDS MANAGEMENT*

The literature can be supplemented, incl. with published works of the lecturers.

#### *Subject: BASICS OF FOREST HYDROLOGY*

The literature can be supplemented. Literature references to teacher's works are missing. The points for the final exam can be increased.

#### *Subject: HYDRAULICS OF OPEN CHANNEL FLOW*

The teacher is an author of Practicum for Hydraulics.

#### *Subject: ECONOMICS OF THE SOIL AND WATER RESOURCES PROTECTION*

The teachers are the authors of a part of the list of literature.

#### *Subject: SOIL CONSERVATION*

Very general topic of the subject, and Subject content includes many directions to study - Soil as natural resources and as ecosystem, erosion, models for estimating soil losses, soil conservation, etc.

In this wide range of areas, the literature used is very limited. There is probably an overlap with other subjects (at least for erosion assessments it is certain that they will be studied in the subject Soil erosion).

#### *Subject: ORGANIZATION OF EROSION CONTROL WORKS*

There is no teacher assigned.

The term "... application of modern organizational methods" needs to be clarified.

The Subject outcomes section has many general explanations. We need more specificity.

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The Subject content section lists activities that should be part of a Normative document of the respective department / ministry and it is difficult to determine whether this should be a separate subject. Education for civil engineers prevails in this subject.

*Subject: MANAGEMENT OF SOIL AND WATER RESOURCES IN PROTECTED AREAS*

There is no teacher assigned.

My opinion is that this content needs to be part of another subject.

The literature needs to be expanded.

**Study program: MSc ECOLOGICAL ENGINEERING FOR SOIL AND WATER RESOURCES PROTECTION**

*Subject: SURFACE WATER RESOURCES*

There is an error in Subject name. The program has not been translated to the end.

Works of the teacher are missing in the Literature. The literature can be expanded.

*Subject: STABILIZACIJA TERENA / STABILIZATION OF TERRAIN*

The stabilization of the terrain is a part of subject: Erosion control. If it is studied in a separate subject, it is likely that an overlap of study material will be allowed. The knowledge of stabilization procedures, measures, and techniques, as well as measures of use and maintenance of stabilized terrain knowledge, which is obtained by studying erosion control works. A more appropriate wording of the subject would be "Modern approaches to terrain stabilization".

The number of teaching hours is not indicated.

*Subject: QUALITY MANAGEMENT IN SOIL AND WATER RESOURCES PROTECTION*

The number of teaching hours is not indicated.

There is no literature of the teachers. It is necessary to include more titles in the literature.

*Subject: NATURAL CAPITAL VALUATION*

The topic is presented very generally and it is difficult to understand the content and topics covered. Subject outcomes and Subject content need to be presented in more detail.

The purpose of a subject "Complementing the spectrum of knowledge in ...." can be expanded.

The number of teaching hours is not mentioned and therefore it is not clear whether there will be practical classes.



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### **3. Evaluation of modernized/new syllabi on existing study programmes on the level of project**

The presented new syllabi cover present topics in relation to environmental management and climate change. The aim of the study programmes is to prepare students with both fundamental knowledge and practical skills. The field classes are essential for the sound and comprehensive preparation and realization of the suggested outcomes.

We assume that the evaluation of modernized / new syllabi on existing study programs on the level of project will be done after combining all evaluations of the participating partners in this work package.

### **4. Recommendations**

- The old programs were not provided for comparison in most of the courses. If old programs are presented, the assessment of the updated/upgraded syllabi would be easier.
- The terminology used needs to be uniform according to the European literature.
- Although the development of WP2 (Development of curricula) indicates the duration of training (in years), most curricula do not specify the duration in number of semesters.
- Part of the programs may include hours of field trips, which will enrich students' knowledge. For courses where terrain work is included in the training program it is necessary to mention and explain what "subject content" is about and according to this field hours can be increased.
- Part of the programs does not include a written exam, which we consider to be a drawback. It is necessary to include scoring (points for Pre-exam Practical teaching) for teaching hours for Practical classes. It is necessary to find the balance when defining the evaluation points for the study subjects. We have given comments for each study program and we would like to discuss that again by taking the example of UNSA – Bosnia and Herzegovina. In the subject „Melioration of degraded forests“ there is 1 hour for theoretical classes and 1 hour for practical classes and the total evaluation is 85 points (40+45). Compared with subject „Torrent control“, where the final score is also 85 points (40+45), the teaching classes are 2+2 hours, i. e. twice more. Our consideration is that the evaluation points must not be equal. Points for Pre-exam obligations for Practical teaching are not considered for some of the subjects, despite that there are 1 or 2 Practical classes included.
- In the literature materials, European sources are barely reviewed as well as sources from the last 10 years and for the majority of the study programs such literature is lacking. It will be useful to be included more up-to-date literature. In many study programs it is not full – it is missing titles. It is possible to have foreign students in the classes, therefore it is necessary to have English translation of the study literature.

The basic literature (Uni Banja Luka) covers fundamental titles about the forest vegetation in B&H, however, the quality of the course might be improved if recent publications are



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considered. It will be useful to review the forest vegetation succession processes on global scale – the recent publications about international research experience.

-To consider the possibility of unification in all universities of the names of Study programs related to the training of students in the specialty "Erosion and torrents control"

## 5. Conclusions

The presented programs are modernized and well structured. The competence of the teachers and the high rate of learning obligations are prerequisites for improvement of student learning outcomes.

The subjects are different, but each of them contributes to increasing the skills and knowledge of students. The large set of elective subjects is impressive. Through this approach, students who are genuinely interested in erosion-related disciplines can gain a narrow specialization. The introduced new disciplines are modern and interesting. GIS and remote methods are the future of this discipline and training students in such programs will increase the capacity of scientists and the quality of scientific research.

The weaknesses in the presented programs are few, mainly the lack of updated literature, the hours for fieldwork, and the unclear number of semesters of some of the programs. If these shortcomings are supplemented, the programs will become even more attractive to students. Considerations about the unification of the names of the programs, will increase the students interest.