

Joint EU/CoE Project
Strategic Development of Higher Education and Qualification Standards



1st Workshop on Qualification and Occupational Standards
18-19 December 2013, Sarajevo

Working group tasks after the first joint workshop	
1. Choose a group chairperson until the next joint workshop is held including a date and place of an internal Working Group meeting	
Group	Engineering
Chairperson	Diana Ćubela
Members	IUSA: Professor Haris Gavranović D.Sc. (absent) SVMO: Mladen Kustura M.Sc. (absent) SVMO: Professor Vlaho Akmadžić D.Sc. (absent) UISA: Professor Mitar Perušić D.Sc. UISA: Professor Goran Tadić D.Sc. UNBI: Assistant Professor Atif Hodžić, D.Sc. (absent) UNBI: Professor Ifet Šišić, D.Sc. UNBL: Grujić Bojana M.Sc UNBL: Professor Jakanović Simo D.Sc. UNMO: Professor Drago Tiro D.Sc. UNMO: Professor Vahida Žujo D.Sc. UNSA Assistant Professor Naida Ademovic D.Sc. UNSA: Professor Majda Čohodar D.Sc. UNTZ: Professor Sandira Ejšan D.Sc. UNTZ: Professor Suad Halilčević D.Sc. UNTZ: Professor Izen Hajdarević (absent) UNZE: Assistant Professor Edin Berberović D.Sc. UNZE: Professor Diana Ćubela D.Sc.
Date	06.02.2014.
Place	Sarajevo, Hotel Evropa
2. Find study programmes at your universities for agreed profile and level of qualification	
Titles of programmes and universities	First cycle- University undergraduate study of civil engineering (academic year 2013/2014) University of Mostar, Faculty of Civil Engineering <hr/> Curriculum of the undergraduate study (academic year 2011/2012) “Džemal Bijedić” University of Mostar, Faculty of Civil Engineering <hr/> Civil Engineering Department, Curriculum – First cycle 4+1 University of Bihać, Faculty of Technical Engineering <hr/> Study program, Civil Engineering, Curriculum of the first cycle of study University of Banja Luka, Faculty of Architecture and Civil Engineering

	Curriculum of the undergraduate and graduate studies at the Faculty of Civil Engineering in Sarajevo University of Sarajevo, Faculty of Civil Engineering
	University of Tuzla, Faculty of Mining, Geology and Civil Engineering Civil engineering STUDY PROGRAM of the First cycle of studies
	Curriculum of the First cycle of studies in civil engineering University of Zenica, Faculty of Polytechnics
3. Analyse written statements of intended learning outcomes in programmes	
(3-A) Intended learning outcomes are well written in the following programmes	First cycle- University undergraduate study of civil engineering (academic year 2013/2014) University of Mostar, Faculty of Civil Engineering
(3-B) Intended learning outcomes are partially written in the following programmes	Study programme, Civil Engineering, Curriculum of the first cycle of study University of Banja Luka, Faculty of Architecture and Civil Engineering University of Tuzla, Faculty of Mining, Geology and Civil Engineering Civil engineering STUDY PROGRAM of the First cycle of studies
(3-C) Intended learning outcomes are not written in the following programmes	Curriculum of the undergraduate study (academic year 2011/2012) "Džemal Bijedić" University of Mostar, Faculty of Civil Engineering
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	Civil Engineering Department, Curriculum – First cycle 4+1 University of Bihać, Faculty of Technical Engineering
	Curriculum of the First cycle of studies in civil engineering University of Zenica, Faculty of Polytechnics
In the case of 3-A, choose one of such programmes and write intended competencies at the level of programme	Competencies of the University of Mostar, Faculty of Civil Engineering: First cycle of the University undergraduate study in civil engineering (academic year 2013/2014) General (generic) competencies <ul style="list-style-type: none"> • Ability of analysing and understanding information, ideas, problems and solutions with both professionals and non-experts, • Ability of adapting to changes in technology and work methods as part of the life-long learning process, • Ability of establishing effective cooperation in expert groups and adapting to the demands of the working environment, • Ability of understanding the effects of civil engineering onto the society and the environment and a distinctly built moral and ethical stance in resolving expert issues, • Ability of applying the acquired knowledge and practices in their further professional and academic education, • Ability of critically assessing arguments, postulates and data in decision-making and resolving professional issues in a creative manner

	<p><u>Academic (specific) competencies</u></p> <ul style="list-style-type: none"> • ability to apply the acquired knowledge from all subject groups of the study and the technologies in civil engineering, • ability to prepare and carry out the experiments, analysis and result interpretations, • ability to perceive, identify, describe and solve professional civil engineering issues, • ability to identify the interaction between designing, building and client requests, • ability to use standard computer tools for drawing up documents and presentations and performing calculations and simulations, • ability to design buildings on the basic level, • ability to manage a small-scale civil engineering intervention, • ability to design small civil engineering constructions, • ability to take part as an associate in the planning, designing, constructing, supervising and maintaining large-scale civil engineering projects.
<p>In the case of 3-A choose one subject/course from the selected program and write the intended learning outcomes</p>	<p><u>Subject : Production in civil engineering</u></p> <p>In general, a student gains awareness on ethics in the profession, occupational safety and upgrades his/her abilities in written/spoken communication and presentation of ideas and stances. The student will be able to: analyze and comment on the features of civil engineering production and the use of technology in the construction process, plan effective management of the civil engineering production (construction), analyze and organize the use of certain types of machines and formwork systems in the civil engineering processes, organize and plan the production in the production facilities used in civil engineering, organize effective and profitable use of a group of different machines in the construction processes.</p>
<p>In the case of 3-B, choose one of such programmes and write intended competencies at the level of programme</p>	<p>Competencies of the University of Banja Luka, Faculty of Architecture and Civil Engineering Study program, Civil Engineering, Curriculum of the first cycle of study</p> <p><u>I Personal competencies</u></p> <ul style="list-style-type: none"> • having basic knowledge (research methods and techniques) needed to understand the process of planning, designing, constructing and maintaining buildings, • firmly abiding by the laws, standards, moral and ethical norms of the profession, and • ability to communicate and exchange information and ideas on the problems regarding the civil engineering profession with the experts in and outside the profession; <p><u>II Academic competencies</u></p> <p>At the CIVIL ENGINEERING study program, the students acquire basic knowledge in the field of planning, designing, constructing and maintaining buildings in the area of civil engineering construction, hydraulic construction and building construction and they are capable to perform the following activities:</p> <ul style="list-style-type: none"> • participate in the design of plan, study and technical documentation for building construction, • participate in the construction in all types of civil engineering works and independent managers, • organize the work of construction machinery and equipment and

	<p>independently perform control of conducted activities,</p> <ul style="list-style-type: none"> • expert supervision in the construction of buildings, • draw up designs, perform investigation works and coordination activities relating to the investigations in the field of soil mechanics and building foundations and • use modern computers and programs in construction calculations and drawing up of written and graphic documentation. 																																																						
In the case of 3-B, choose one of such programmes and write intended competencies at the level of programme	<p>Subject: Information Technology 2 Using MATLAB for solving engineering problems, design and programme writing.</p>																																																						
<p>4. Analyse assessment criteria and review procedures of acquired competencies (knowledge, skills...etc) as written in the programmes</p>																																																							
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<p>5. Analysing the selected programmes and subjects, discuss the harmonisation between intended learning outcomes and the assessment criteria and procedures</p>																													
<p>The complexity level of the given learning outcomes are: remembering, understanding, applying and analysing.</p> <p>University of Mostar – Faculty of Civil Engineering There is harmonisation at a certain number of subjects between the intended learning outcomes and the assessment criteria and procedures. However, a large number of subjects only have partial harmonization.</p> <p>Example: Subject – Applied mathematics</p> <p>The assessment procedures are partially in accordance with the level of learning outcomes. Namely, the assessment procedures correspond to the complexity level</p>																													

of *understanding* – exam 1 and 2 (or a make-up exam – oral and written). One of the listed learning outcomes in this subject reads: “apply ready-made and make simple computer programs for certain numerical methods and analyse the results of the numerical methods.” This relates to the complexity level of *applying* and *analysing*. However, for the subject of Applied mathematics the assessment procedures in the form of: program design, program work, seminar paper ...etc are not provided for.

University in Banja Luka – Faculty of Architecture and Civil Engineering

The learning outcomes on the level of each subject were not provided within the curriculum. A special document entitled “Workflow 1” includes a list of subjects in the curriculum with given competencies on the level of each individual subject!

Example: Subject – Information Technology 2

The assessment criteria corresponds to the complexity level of *understanding*, *applying* and *analysing* as it includes testing through homework, practical tests...etc. On the other hand, the learning outcomes were provided in a relatively modest form in one sentence: “Using MATLAB to solve engineering problems, designing and programming.”

University of Tuzla, Faculty of Mining, Geology and Civil Engineering

On the competencies on the study level were not provided. The learning outcomes on the level of individual subjects were given as “Expected developed abilities/competencies of students” in an improper form where they are repeated in the general form for most of the subjects:

„At the end of a SEMESTER/course, the successful students, who have continuously performed all their obligations throughout the study period, will be able to:

- *Use the accessible and available literature to resolve various problems of this course*
- *Solve problems of varying complexity both individually and in team and present them in written or oral form*
- *Understand the importance of this course in solving different problems in practice*
- *Pass the final exam in the first exam dates at the end of a semester”*

The assessment procedures are planned within the curriculum on the level of each subject in the item “Methods of testing” and “Methods of assessing.” For some of the subjects, there is a detailed description of activities within the scope of the lectures, tutorials, practical laboratory work and student obligations which they need to fulfil in order to pass the exam. There is inconsistency in the template form and there is repetition of content for a number of different subjects relating to the “expected developed abilities...” as well as on testing and assessment methods.

The curricula of the civil engineering faculties of University “Dzermal Bijedic” in Mostar, University of Bihac, University of Zenica and University of Sarajevo do not have well-defined learning outcomes nor developed assessment criteria and procedures.

- **Curricula of the University of Mostar** The learning outcomes within the curriculum on the level of each of the subjects were written partially. Although the syllabus of the undergraduate study plans the defining of the learning outcomes in a large number of subjects they were either not given or were written in unsatisfactory

form. The assessment criteria (testing criteria) and the assessment procedures were planned to be included in the curriculum of on the level of each subject but in a large number of cases they were given in an unsatisfactory form. A great number of subjects provides for written and/or oral exam without using techniques of testing such as: presentations, case studies, seminar papers...etc. No distribution of ETCS credits was done by assessment procedures (assessment obligations).

- **Curricula of the University of Zenica** The learning outcomes on the level individual subjects at an undergraduate level were given as “Competencies”. The assessment procedures (testing procedures) were provided within the curricula on the level of each subjects in the item “Methods of testing” and they were mostly presented in an unsatisfactory form and there is no mention whether this was testing during the course of the semester (midterm exam) or is it a final exam (during exam dates). For example, the subject “Sociology and economics of civil engineering” uses “Oral presentation of a seminar paper” as a method of testing. The assessment criteria were not defined precisely. There was no distribution of ECTS by assessment procedures, the number of points allocated for each of the relevant activities...etc.
- **Curricula of the University of Sarajevo** The intended learning outcomes were not given neither at the level of a study program nor at the level of individual subjects. There was just brief information in the section on *methods of taking the exams* where the exams were mostly defined as *written or written and oral*.
- **Curricula of the University of Bihać** The syllabi of the individual subjects at an undergraduate cycle provides for the development of general and acquiring of specific competencies (knowledge and skills). This item notably defines:
 - **learning outcomes** (e.g.: subject: English language1 → „Learning the terminology of the basic fields of the profession and acquiring the characteristic language structures of technical English and characteristics of the professional/academic text. Developing awareness on the importance of correct interpretation of technical information”, **learning aims** (e.g.: subject: Introduction into engineering information technology → „The aim of the subject is to acquire knowledge on the application of information technology in textile.”, **other** (e.g.: subject: Introduction into civil engineering → „ Introduction into civil engineering “). We can conclude that the learning outcomes have not been written in a satisfactory form for a large number of subjects. The assessment criteria and the procedures were partially written and were provided for within the curricula on the level of each subject in the items „*Methods of continuous assessment*” and “*Methods of final examination for students who did not complete continuous assessment.*” However, in most number of cases they were given in an unsatisfactory form, e.g.: subject „Engineering hydrology“ only writes „By writing a seminar paper and doing a written exam,” or “ Final examination will take place in the form of a written and oral exam which will be taken after the passing of the written exam.” The assessment criteria were not precisely defined. There was no distribution of ECTS by assessment procedures, the number of points allocated for each of the relevant activities...etc.

6. Write all the challenges that you faced during your work and how you overcame them

- A huge difference in the descriptions and structure of the curricula at universities which significantly hinders the possibility of their comparison.
- There is evident discrepancy on the level of subjects within the same study programs which complicates to a certain extent the categorisation of the programs by the defined criteria 3 and 4.

- There is use of different terminology within one curriculum: midterm, practical exam, test or program assignment, term assignment, project...etc.
- In order to overcome these problems, we first harmonised our stances regarding what makes a well-written learning outcome and how to link the assessment criteria and procedures with the learning outcome. As a basis for our work, we consulted the following documents:
 1. S. Lončar-Vicković, Z. Dolaček-Alduk, ISHODI UČENJA – priručnik za sveučilišne nastavnike, Sveučilište Josipa Jurja Strossmayera, Osijek, 2009. (LEARNING OUTCOMES – A Guidebook for University Teachers – University Josip Juraj Strossmayer, Osijek 2009)
 2. Dželalija, Mile (ur.), HRVATSKI KVALIFIKACIJSKI OKVIR. Uvod u kvalifikacije / R. Beljo-Lučić, A. Buntić-Rogić, M. Dubravac-Šigir, M. Dželalija, S. Hitrec, S. Kovačević, M. Kreš, M. Lekić, K. Mrnjauš, M. Rašan-Križanac, M. Štajduhar, M. Tatalović, Zagreb, 2009. (CROATIAN QUALIFICATION FRAMEWORK – Introduction to qualifications)
 3. V. Kovač, S. Kolić-Vehovec, IZRADA NASTAVNIH PROGRAMA PREMA PRISTUPU TEMELJENOM NA ISHODIMA UČENJA. Priručnik za sveučilišne nastavnike, Sveučilište u Rijeci, Rijeka, 2008. (DEVELOPING CURRICULA BASED ON THE LEARNING OUTCOME APPROACH. A Guidebook for University Teachers, University of Rijeka, Rijeka, 2008).

Our dilemmas:

1. What is the purpose if the ECTS distribution by individual activities within one subject (University of Mostar)? Is it necessary? What is its role? Can it cause any problems?
2. Would it be better if the form for the writing of syllabi for the subject was uniform as well as the terms that define the testing procedures: test, midterm, seminar paper, program assignment, project assignment, written exam, oral exam...etc.?
3. What does it mean that the outcomes or the assessment criteria were partially written? Does that mean that it was partially well-written or that within one curriculum we have the well and poorly written outcomes or assessment criteria and does that mean that we have subjects with written learning outcomes and others without them?
4. Can the student pass the subject by fulfilling his obligation in the course of the semester and treat the exam dates as a make-up exam (University of Mostar) or should the obligations during the semester be only viewed as a precondition for the passing of the final exam on the set exam dates (University of Banja Luka)?
5. Should the teachers be completely free to define the assessment criteria and procedures or is it better to have them uniform at least on the level of one study program? (Examples of inconsistencies from practice):
 - a) Although it is an oral exam, the students do it in written form and if their results are not good, the teacher will then additionally examine them orally.
 - b) In order to get a passing mark with one teacher, the student needs to answer for example two out of three questions while the other teacher deems that the student needs to answer at least 50% of all three questions in order to get a passing mark...etc.

