

REPORT FOR ONLINE WORKSHOP FOR LLL COURSES

Promoting academia-industry alliances for R&D through
collaborative and open innovation platform

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Grant holder: Ss. Cyril and Methodius University in Skopje, North Macedonia

Coordinator: Prof. Elena Dumova-Jovanoska, Ss. Cyril and Methodius University in Skopje

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Summary

As a consequence of the COVID-19 pandemic the postponed workshop in Skopje will be organized online. The first activity that took place as part of this workshop was the Online seminar “LLL Courses and innovative teaching/training practices – ideas and challenges” which was organized at 16th April 2020.

As a sequel of this online seminar the following activities were planned in order to complete the workshop:

1. Online workshop “LLL Courses – proposals” where partners presented the more developed versions of the courses which were presented only as ideas on the 2nd Workshop in Bochum.
2. Online workshop “LLL Courses – development” where partners worked on development and finalization of the content of each course.



1. First workshop – LLL courses proposals

The meeting took place on 20.05.2020, from 13:00 to 14:30, online using the online conferences platform Zoom. All listed below were present:

1. Elena Dumova-Jovanoska - UKIM
2. Sergey Churilov – UKIM
3. Vladimir Vitanov – UKIM
4. Stefan Micevski – UKIM
5. Angelina Taneva-Veshoska – IECE
6. Ana Tomikj – IECE
7. Rüdiger Höffer – RUB
8. Ulf Winkelman – RUB
9. Simon Kosse – RUB
10. Merima Shahinagic-Isovic-UNMO
11. Mustafa Hrasnica – UNSA
12. Senad Medic – UNSA
13. Gohar Avetisyan – NUACA
14. Hovhannes Avagyan - NUACA
15. Gevorg Margarov – NPUA
16. Marine Usepyan – NPUA
17. Hasmnik Markosyan - NPUA
18. Ani Manukyan – NPUA
19. Kristina Khudaverdyan - NPUA
20. Ella Hovanisyan - NPUA
21. Kristine Hambardzumyan - NPUA
22. Lilit Amiryan – YeTRI
23. Ruzana Sargasyan – YeTRI
24. Sergey Abrahamyan – IIAP
25. Amina Baljich – HP
26. Almir Kovacevic - WUS
27. Petri Helo – UVA



The Agenda:

- **13:00-13:10 Introductory remarks (Dumova-Jovanoska)**
- **13:10-13:50 Presentation of LLL Courses***
 - UKIM
 - IECE
 - RUB
 - UNSA
 - UNMO
 - NUACA & YeTRI
 - NPUA & IIAP
 - UVA
- **13:50-14:15 Discussion**
- **14:15-14:30 Concluding remarks**

In the introductory remarks Dumova-Jovanoska gave a brief introduction of the agenda, and a short review of the circumstances that led to the online workshop. She also mentioned the activities done so far as part of preparation of the LLL Courses, the activities in the 2nd Workshop in Bochum and the Online Seminar on 16th April. She stressed that the main goal of this workshop is to define several major topics in which all the proposed courses will be distributed according to the field of expertise that they belong to.

At the Online seminar, a template for presentation of the: Learning outcomes, Methods for teaching and learning, content, structure, methods of assessment and method for evaluation of the courses courses was distributed to all partners. Also, two filled examples were distributed. They can be found as part of Annex A of this document.

As an epilogue, the partners prepared their offer of LLL courses which were presented at this workshop. The proposed LLL courses per institution are listed below:

1. UKIM:

- Seismic vulnerability of buildings
- Seismic design for architects
- CAD oriented software
- Structural analysis with Autodesk Robot Structural analysis© software
- An introduction to (sensory-based) structural identification
- Introduction to programming for engineering research and practice



- Durability of concrete structures
 - Design of Concrete Structures to EC2
 - Structural design with FRP materials
2. IECE:
- Introduction to BIM
 - Introduction to use of BIM for improved energy efficiency of buildings
 - Risk management of built cultural heritage
 - Managing intellectual capital
 - Engineering ethics
 - Corporate social responsibility
 - Emotional intelligence at work
 - Marketing management for engineering managers
3. RUB:
- Introduction to Fluid Dynamics and Computational Fluid Dynamics (CFD)
 - Environmental wind engineering
 - Part 1: Air Quality
 - Part 2: Wind Energy
4. UNSA:
- Landslides in highway construction
 - Geotechnical Engineering in urban environment
 - Testing of structures
 - Hydraulic modeling of natural water flows
 - BIM in Civil Engineering
 - Seismic Resistant Design
 - Finite element analysis of reinforced concrete and masonry structures
5. UNMO:
- Methods and tools for improvement of urban planning and planning in general (zoning and GIS basic)
 - Practical Design to Eurocode 0, 1 and 2
 - Sustainable new building materials
 - Sustainability of the building (life cycle of the building, maintenance, conservation approaches from reuse and sustainability point)
 - Water (resource, usage, risk, risk management)
 - Renewable energy sources
6. NPUA & IIAP:
- Cloud Tools to Ensure the Quality of Research and Education
 - Data Driven Decision Making
 - Mobile Programming and Cloud Applications
 - Object-oriented and Interactive Programming in Python
 - Software Design and Testing
 - Video Content as a Tool for Blended Learning
 - Cyber-Security for Non-Professional
7. NUACA & YeTRI
- Concrete Compressive Strength (Non-destructive methods)
 - Concrete Compressive Strength (Destructive methods)



- Determination of Dynamic Parameters of Buildings
- Entrepreneurship for Engineers
- Innovation Systems/IoT
- The Embedded Systems in the Field of Energy Efficiency

8. UVA:

- Virtual Reality VR simulation and digital manufacturing
- Enterprise Resource Planning

The documents with the proposed courses from each institution are given in annex B in this document.

Each of the partners shortly presented their offer giving short description of each proposed course. The presenters per partner institutions were:

1. **UKIM:** Elena Dumova-Jovanoska
2. **IECE:** Angelina Taneva-Veshoska
3. **RUB:** R Rüdiger Höffer and Ulf Winkelmann
4. **UNSA:** Mustafa Hrasnica
5. **UNMO:** Merima Shahiagic-Isovic
6. **NPUA&IIAP:** Gevorg Margarov
7. **NUACA& YeTRI:** Gohar Avetisyan (NUACA), Hovhannes Avagyan (NUACA), Ruzana Sargasyan (YeTRI)
8. **UVA:** Petri Helo

After the presentations the following grouping in four major topics of the proposed courses was given by the project coordinator:

1. CIVIL ENGINEERING

- Infrastructure:
 - Landslides in highway construction (UNSA)
 - Geotechnical Engineering in urban environment (UNSA)
 - Hydraulic modeling of natural water flows (UNSA)
 - Methods and tools for improvement of urban planning and planning in general (zoning and GIS basic) (UNMO)
 - Water (resource, usage, risk, risk management) (UNMO)
 - Renewable energy sources (UNMO)
- Structural engineering
 - An introduction to (sensory-based) structural identification (UKIM)
 - Introduction to Fluid Dynamics and Computational Fluid Dynamics (RUB)
 - Environmental wind engineering (RUB)
 - Testing of structures (UNSA)
 - Determination of Dynamic Parameters of Buildings (NUACA)
 - Sustainability of the building (UNMO)
- Structural Materials
 - Design of Concrete Structures to EC2 (UKIM)
 - Practical Design to Eurocode 0, 1 and 2 (UNMO)



- Durability of concrete structures (UKIM)
- Structural design with FRP materials (UKIM)
- Sustainable new building materials (UNMO)
- Concrete Compressive Strength (Non-destructive methods) (NUACA)
- Concrete Compressive Strength (Destructive methods) (NUACA)
- Finite element analysis of reinforced concrete and masonry structures (UNSA)
- Seismic engineering
 - Seismic design for architects (UKIM)
 - Seismic Resistant Design (UNSA)
 - Seismic vulnerability of buildings (UKIM)

2. IT & SOFTWARE

- Innovation Systems/IoT (NUACA)
- The Embedded Systems in the Field of Energy Efficiency (YeTRI)
- Cloud Tools to Ensure the Quality of Research and Education (NPUA)
- Data Driven Decision Making (NPUA)
- Mobile Programming and Cloud Applications (NPUA)
- Object-oriented and Interactive Programming in Python (NPUA)
- Software Design and Testing (NPUA)
- Video Content as a Tool for Blended Learning (NPUA)
- Cyber-Security for Non-Professional (IIAP)

3. ENGINEERING SOFTWARE TOOLS

- CAD oriented software (UKIM)
- Structural analysis with Autodesk Robot Structural analysis© software (UKIM)
- Introduction to programming for engineering research and practice (UKIM)
- Introduction to BIM (IECE)
- Introduction to use of BIM for improved energy efficiency of buildings (IECE)
- BIM in Civil Engineering (UNSA)
- Virtual Reality VR simulation and digital manufacturing (UVA)

4. MANAGEMENT

- Risk management of built cultural heritage (IECE)
- Managing intellectual capital (IECE)
- Corporate social responsibility (IECE)
- Enterprise Resource Planning (UVA)
- Entrepreneurship for Engineers (NUACA)
- Engineering ethics (IECE)
- Emotional intelligence at work (IECE)
- Marketing management for engineering managers (IECE)

After this, the following discussion raised:

Dumova-Jovanoska noted that the biggest difference is notable in the workload foreseen for the content of each courses. This will be addressed on the second workshop “LLL courses – development”.



Hoeffler suggested that Environmental Wind Engineering should go to the cluster Infrastructures

Hrasnica & Hoeffler commented that Design of Eurocode should move to Structural Engineering

Hoeffler also commented that the Eurocode offer should include the EN1998 and it was agreed that this will be taken in consideration in the second workshop (LLL Courses – development)

Senad Medic proposed that Finite element modeling of reinforced concrete and masonry structures can be put in the Structural Engineering cluster.

Several participants discussed the division of the civil engineering cluster in 4 groups. It was mentioned that the clusters structural engineering and structural materials should maybe compile in one cluster. It was decided to stay in the way that it was proposed.

After further discussion it was decided that the cluster structural materials should be named: structural materials and engineering, and the cluster seismic engineering should be named earthquake engineering.

After all modifications the following list was adopted by all the participants:

1. CIVIL ENGINEERING

- Infrastructure:
 - Landslides in highway construction (UNSA)
 - Geotechnical Engineering in urban environment (UNSA)
 - Hydraulic modeling of natural water flows (UNSA)
 - Methods and tools for improvement of urban planning and planning in general (zoning and GIS basic) (UNMO)
 - Water (resource, usage, risk, risk management) (UNMO)
 - Renewable energy sources (UNMO)
 - Environmental wind engineering (RUB)

- Structural engineering
 - An introduction to (sensory-based) structural identification (UKIM)
 - Introduction to Fluid Dynamics and Computational Fluid Dynamics (RUB)
 - Testing of structures (UNSA)
 - Determination of Dynamic Parameters of Buildings (NUACA)
 - Sustainability of the building (UNMO)
 - Design of Concrete Structures to EC2 (UKIM)
 - Practical Design to Eurocode 0, 1 and 2 (UNMO)
 - Finite element analysis of reinforced concrete and masonry structures (UNSA)

- Structural Materials
 - Durability of concrete structures (UKIM)
 - Structural design with FRP materials (UKIM)
 - Sustainable new building materials (UNMO)
 - Concrete Compressive Strength (Non-destructive methods) (NUACA)



- Concrete Compressive Strength (Destructive methods) (NUACA)

- **Earthquake** engineering
 - Seismic design for architects (UKIM)
 - Seismic Resistant Design (UNSA)
 - Seismic vulnerability of buildings (UKIM)

2. IT & SOFTWARE

- Innovation Systems/IoT (NUACA)
- The Embedded Systems in the Field of Energy Efficiency (YeTRI)
- Cloud Tools to Ensure the Quality of Research and Education (NPUA)
- Data Driven Decision Making (NPUA)
- Mobile Programming and Cloud Applications (NPUA)
- Object-oriented and Interactive Programming in Python (NPUA)
- Software Design and Testing (NPUA)
- Video Content as a Tool for Blended Learning (NPUA)
- Cyber-Security for Non-Professional (IIAP)

3. ENGINEERING SOFTWARE TOOLS

- CAD oriented software (UKIM)
- Structural analysis with Autodesk Robot Structural analysis© software (UKIM)
- Introduction to programming for engineering research and practice (UKIM)
- Introduction to BIM (IECE)
- Introduction to use of BIM for improved energy efficiency of buildings (IECE)
- BIM in Civil Engineering (UNSA)
- Virtual Reality VR simulation and digital manufacturing (UVA)

4. MANAGEMENT

- Risk management of built cultural heritage (IECE)
- Managing intellectual capital (IECE)
- Corporate social responsibility (IECE)
- Enterprise Resource Planning (UVA)
- Entrepreneurship for Engineers (NUACA)
- Engineering ethics (IECE)
- Emotional intelligence at work (IECE)
- Marketing management for engineering managers (IECE)

Taneva-Veshoska added that the syllabus of the proposed courses should include the target groups of the course and the needed preknowledge to follow the course.

At the end of the workshop it was agreed that the following workshop dedicated to development of the courses will be held in the first week of June (3rd or 4th June 2020).

Dumova-Jovanoska suggested the following working groups from the proposed clusters:

- **Group 1:** Infrastructure and Structural Engineering
- **Group 2:** Structural materials and Earthquake engineering
- **Group 3:** IT & Software and Engineering software tools
- **Group 4:** Management



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2. ANNEX A

2.1. Template for the LLL Courses

Type of learning: Blended learning

Workload for the learner: 10 hours teaching+50 hours self-learning = 60 hours (2 ECTS)

Title:	
Learning Outcomes:	
Method/s for teaching and learning:	
Content/short description:	
Structure of the course:	
Preparer of the course:	
Method/s of assessment*:	
Method for evaluation of course (by students, peer review etc.):	

* Optional, in case if the learner requires certificate for the 2 ECTS issued.



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DELIVERABLE REVIEW HISTORY

Version	Name, Partner	Status*	Date	Summary of changes
1.0	IECE	A	13.2.2020	Initial draft
2.0	UKIM	C	18.2.2020	Revision of the proposed form

* A = Author; C = Contributor; REV = Reviewer; EXT = External Reviewer



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Summary

A significant part of the activities in WP3.4 is the “Preparing the innovative training courses with blended learning approach”. Blended learning is a learning method that combines personal and online learning experiences. It is a combination of different learning methods and materials that are coordinated to help learners achieve their own educational goals and objectives more effectively than learning in traditional environments. Blended learning combines the best aspects of online and teacher-led learning and is offered in individual or small group training. The content has been carefully designed and adapted so that learners can access their own time and work at their own pace.

Blended learning is more effective than traditional methods because learners can focus on content while using their online material at their own pace. In live sessions, the tutor can work with learners to support their individual needs and goals. Lessons are not wasted on material that learners already know or can practice themselves. Learning is maximized through more effective and authentic learning time in all environments.

In a traditional classroom, learners are one of many. Your individual needs are not taken into account and integrated into a "one size fits all" curriculum. This can be costly and time consuming. In our blended learning program, learners only work on what is relevant and important for them.

The tracking and assessment management embedded in blended learning enables learners to get instant feedback and track their own progress so they can stay more motivated to achieve their goals, which are enjoyable themselves. Qualified tutors provide a learning environment that is enriched with suitable and relevant material, so that the learning experience becomes even more engaging, effective and exciting.

Advanced technology gives learners more choice and control over how their learning is delivered. Blended learning enables instant access to information anywhere in the world, provided the learner has a computer or smartphone and an internet connection. Live classes, whether face-to-face or virtual, are based on the availability of learners and allow greater flexibility compared to traditional learning environments, in which learners have to attend classes on a specific date and time..

List of LLL courses proposed at the Bochum meeting:

Eurocodes (6/8)

- EC0 – UNSA, UNMO
- EC1 – RUB (wind load)
- EC2 – UKIM, UNSA
- EC8 – UKIM



BIM (4)

- Basic – IECE, UNMO
- AEC - UNSA
- Energy efficiency – IECE

Earthquake engineering (4/6)

- Seismic resistant Design – UKIM, UNSA
- Seismic vulnerability - UKIM
- Seismic strengthening of structures – NUACA

Wind engineering (2)

- Wind induced fatigue of steel structures - RUB
- Wind and environment - RUB

Digitalization (2)

- Development and Presentation of effective digital content - NPUA
- Cloud tools to Ensure the Quality of Research and Education - NPUA

Computer science (4)

- Cybersecurity at the user Level – NPUA
- Object-Oriented and interactive programming in Python - NPUA
- Data-Driven Decision Making - NPUA
- Machine Learning Algorithms in the Real World - NPUA

Geo-informatics (2)

- Infrastructure for spatial information - UNMO
- Improvements of work through management of spatial information - UNMO

Geotechnics (2)

- Landslides - UNSA
- Landfills - UNSA

Testing and Monitoring of Structures (3/5)

- Testing of structures - UNSA (Choose from the proposed)
- Determination of Dynamic Parameters of Buildings – NUACA
- Monitoring and Structural Identification - UKIM

Materials (7)

- Durability of concrete structures - UKIM
- Special types of concrete - UKIM



- Structural design with FRP materials - UKIM
- Sustainable new building materials - UNMO (one company)
- Concrete Compressive Strength (Non Destructive Methods) - NUACA
- Concrete Compressive Strength (Destructive methods) – NUACA
- 3D printing - UVA

Computer tools in Engineering (4/6)

- MATLAB for engineering research and practice - UKIM
- CAD oriented software - UKIM
- Autodesk Robot Structural Analysis - UKIM
- Numerical modeling - UNSA (Choose from the proposed) - UNSA

Computer tools in Business (2)

- Virtual reality – UVA
- Enterprise resource planning – UVA

Interdisciplinary (social sciences) (9)

- Learning how to Learn: Powerful mental tools to help you master tough subjects - NPUA
- Managing intellectual capital - IECE
- Engineering ethics - IECE
- Corporate Social Responsibility - IECE
- Emotional intelligence at work - IECE
- Marketing management for engineering managers - IECE
- Risk management of built cultural heritage - IECE
- Entrepreneurship for Engineers – NUACA
- Innovation Systems

The answers from the question “Do you need education in this area” posed in the GAP analysis show that the respondents felt a high need for further education in their field:

Hard skills – Basic/fundamental skills

- Knowledge in the specialized area 88,06%
- Technical skills 91,04%

It is obvious that providing LLL courses is highly needed and would be very beneficial for the professionals.



3. LLL course description form

Type of learning: Blended learning

Workload for the learner: 10 hours teaching+50 hours self-learning = 60 hours (2 ECTS)

Title:	Corporate Social Responsibility and Sustainability
Learning Outcomes:	<p>The student will demonstrate a multi-stakeholder perspective in viewing the scope and complexity of CSR.</p> <p>The student will increase your awareness and develop an ability to demonstrate a solid understanding of the challenges posed by CSR and sustainability, and their impact on global society.</p> <p>The student will be equipped with the appropriate skills that will allow you to analyze the connections between corporate strategy and CSR and the impact on foundational organizational principles such as mission and vision.</p> <p>The student will be able to apply the concept of sustainability and corporate social responsibility to current socio-economic issues and discuss the relationships between sustainability and competitive advantage of organizations.</p>
Method/s for teaching and learning:	<ul style="list-style-type: none"> • Self-assessment activities • Videos • Reading material • Learning Terminology • Games • Individual research
Content/short description:	<p>The course introduces you to the concept of Corporate Social Responsibility (CSR) and sustainability. Why should organizations expand their focus from serving stockholders to also considering the impact of the firm's activities on diverse stakeholders?</p> <p>Going through the sections, you will develop an understanding of the issues driving CSR, as well as the opportunities and challenges CSR has on business performance. The lesson, furthermore, will address the issues and current trends in responsible, sustainable, globalization. The quadruple bottom line of social, environmental, cultural, and economic responsibility will be explored.</p>



Structure of the course:	<ul style="list-style-type: none">• The concept of Corporate Social Responsibility• Opportunities and challenges• Global sustainability
Preparer of the course:	Angelina Taneska Veshoska
Method/s of assessment*:	
Method for evaluation of course (by students, peer review etc.):	Anonymous polling

* Optional, in case if the learner requires certificate for the 2 ECTS issued.