Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

REPORT FOR ONLINE WORKSHOP FOR INNOVATIVE TEACHING/TRAINING PRACTICES

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

Project reference number: 598719-EPP-1-2018-1-MK-EPPKA2-CBHE-JP

Project duration: 15 November 2018 – 14 November 2021

EU funding instrument: European Neighbourhood Instrument (Erasmus+: KA2 CBHE)

Erasmus+ (CBHE) grant amount: 531,165.00 €

Partner countries: Armenia, Bosnia and Herzegovina, North Macedonian, Austria, Germany, Finland

Target groups: University management and students, companies, research institutions, intermediaries.

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

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

This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Document information	
Workpackage	WP3 – Creating Collaborative and Open Innovation Platform
Workpackage leader	*RUB, Ruediger Hoeffer*
Due date	August 2020
Revision	Version 1.0
Authors	Angelina Taneva-Veshoska, Ana Tomikj
Contributors	

DELIVERABLE REVIEW HISTORY

Version	Name, Partner	Status*	Date	Summary of changes
1.0	IECE	draft	27.07.2020	

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

Contents

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. The third activity of this workshop was the Online seminar “Innovative teaching/training practices” that took place on 30th June 2020.

As a sequel of this online seminar the following activities were planed 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.
3. Online workshop “Innovative teaching/training practices” where partners presented the more developed versions of the innovative teaching/training practices which were presented only as ideas on the 2nd Workshop in Bochum.

1. Online Workshop –Innovative Teaching/Training Practices

The meeting took place on 30.06.2020, from 11:00 to 12:15, 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. Simona Bogoevska - UKIM
6. Angelina Taneva-Veshoska – IECE
7. Ana Tomikj – IECE
8. Ulf Winlekmann - RUB
9. Ursula Justus - RUB
10. Simon Kosse – RUB
11. Mustafa Hrasnica – UNSA
12. Senad Medic – UNSA
13. Goran Simonović – UNSA
14. Merima Shahinagic-Isovic-UNMO
15. Marko Ćećez - UNMO
16. Amra Šarančić - UNMO
17. Amina Baljic - HP
18. Gevorg Margarov – NPUA
19. Ani Manukyan – NPUA
20. Marine Usepyan
21. Ella Hovhannisyan – NPUA
22. Hasmik Markosyan – NPUA
23. Kristina Hambardzumyan - NPUA
24. Sergey Abrahamyan – IIAP
25. Gohar Avetisyan – NUACA
26. Ruzana Sargasyan – YeTRI
27. Petri Helo – UVA

The Agenda:

- 11:00-11:05 Introductory remarks (Angelina Taneva-Veshoska)

- 11:05-13:05 Presentation of Innovative teaching practices
  - IECE (15min)
  - UKIM (15min)
  - RUB (10min)
  - UVA (10min)
  - WUS (10min)
  - UNSA & WP (15min)
  - UNMO & HP (15min)
  - NPUA & IIAP (15 min)
  - NUACA & YeTRI (15min)

- 13:05-13:15 Concluding remarks

In the introductory remarks Angelina Taneva-Veshoska gave a brief introduction of the agenda, and a short review of the circumstances that led to the online workshop.

Before the Online seminar, a template for presentation of the: Innovative teaching/training practices containing the description, duration and target group, skills to be acquired and improved, methods and techniques and methods of assessment evaluation of the practice was distributed to all partners. Also, one filled examples were distributed. They can be found as part of Annex A of this document.

At this Workshop the partners presented their offer of Innovative teaching/training practices. The proposed Innovative teaching/training practices per institution are listed below:

1. UKIM:
   - Demo (scientific) conference
   - Drone (remote) practice
   - Real –time remote laboratory
   - Role play based model
   - Teaching computational tools by multimedia

2. IECE:
   - Master Mindfulness with game-based learning
   - Solving sustainability challenges with Frame Creation Model
   - Construction Debris Challenge
   - Color me green” Hackathon

- Industrial Master Thesis in Engineering and Management
- Developing sustainability lifestyles

3. RUB:
    - Exchange of Knowledge and Experience
    - Career opportunities outside academia for PhD holders
    - Career planning: Gaining personal orientation for planning a career outside academia
    - Leadership Skills
    - Communication Skills: Advancing communication skills to successfully cooperate with industry partners
4. UNSA & WP:
    - Co-mentors from building industry
    - Job interview
    - Lecturers from engineering praxis
    - Lectures on-site (field trips)
    - Live streaming of data from sensors
5. UNMO & HP:
    - Flipped classroom (Reflective teaching and Learning through Argumentation)
    - Design thinking – case study (Improve field education (crossover learning) and learning from practice)
    - Industrial master theses
6. NPUA & IIAP:
    - Innovative Research Teaching in Flipped Classroom
    - Innovative Teaching Based on Team Work
    - Modular Approach to Research Teaching
    - Situation-Based Approach to Research Teaching
7. NUACA & YeTRI
    - Computational Thinking
    - Learning by Doing Science
    - Adaptive Teaching
    - Context-based Learning
    - Crossover (Inter-disciplinary) Learning
8. UVA:
    - FabLab

The documents with the proposed innovative teaching/training practices 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 innovative teaching/training practices. The presenters per partner institutions were:

1. **UKIM**: Sergey Churilov and Simona Bogoevska
2. **IECE**: Angelina Taneva-Veshoska

3. **RUB**: Ursula Justus
4. **UNSA**: Mustafa Hrasnica
5. **UNMO**: Amra Šarančić
6. **NPUA&IIAP**: Gevorg Margarov, Ani Manukyan, Marine Usepyan, Ella Hovhannisyan – NPUA &Hasmik Markosyan
7. **NUACA& YeTRI**: Gohar Avetisyan (NUACA)
8. **UVA**: Petri Helo

After the presentation, a discussion was raised:

Angelina Taneva-Veshoska noted that each innovative teaching/training practice should be connected with a subject from the All4R&D project, in order to provide implementation of the innovative teaching/training practices and sustainability after the realisation of the project.

"One important thing to reflect inspired from everything we heard, connect the practices with the courses that we are offering as much as we can. This will provide sustainable focus, ready to test and pilot actions and practices during this and next semester and document how the progress was made with all the participants from different target groups."

Angelina Taneva-Veshoska also pointed out that at the end the evaluation methods will be used for all innovative teaching/training practices and that an upgraded version of all innovative teaching/training will be published at the end of the project. The aim is to allow other universities or partnership on national and international level to learn from the experience of the project and implement the innovative practices in their organisations.

Another key point that was addressed by Angelina Taneva-Veshoska is the use of the equipment in the courses and the innovative teaching/training practices, not only the research projects. She took UNSA as a positive example for including the equipment in the innovative teaching/training practices and she concluded that in the next period partners should look at the possibilities to include their equipment in the LLL courses and innovative teaching/training practices.

2. ANNEX A

2.1. Template for the Innovative Teaching/Training Practice

TEMPLATE FOR INNOVATIVE PRACTICE DESCRIPTION

Promoting academia-industry alliances for R&D through

collaborative and open innovation platform

Project reference number: 598719-EPP-1-2018-1-MK-EPPKA2-CBHE-JP

Project duration: 15 November 2018 – 14 November 2021
EU funding instrument: European Neighbourhood Instrument (Erasmus+: KA2 CBHE)
Erasmus+ (CBHE) grant amount: 531,165.00 €
Partner countries: Armenia, Bosnia and Herzegovina, North Macedonian, Austria, Germany, Finland
Target groups: University management and students, companies, research institutions, intermediaries.
Grant holder: Ss. Cyril and Methodius University in Skopje, North Macedonia
Coordinator: Prof. Elena Dumova-Jovanoska, Ss. Cyril and Methodius University in Skopje

This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Document information	
Workpackage	WP3.4 – Developing and implementing training courses and innovation interaction activities offered by professors and experts from industry
Workpackage leader	*IECE*
Due date	October 30, 2020
Revision	Version 1.0
Authors	
Contributors	

DELIVERABLE REVIEW HISTORY

Version	Name, Partner	Status†	Date	Summary of changes
1.0	UKIM	A	18.2.2020	Initial draft

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

Contents

Summary

Innovative practice in the context of this Project is considered to be a practice with the new mindset or new way with value in it. In education context, it is referred to the creative teaching by teacher. The innovative practices are aimed to develop and upgrade technical, soft and business skills. Some examples of innovative teaching practices include:

- Tools that stimulate creativity (playful games, audio-video materials, …)
- "Real-world" learning
- Brainstorming
- Classes outside classroom
- Case studies
- Role playing…

The implementation of innovative teaching practices should contribute to the development and improvement of specific skills that are found to be lacking or not sufficiently developed during the traditional education. The answers from the question "Do you need education in this area" posed in the GAP analysis show that the respondents have identified several skills where the felt high need for further education:

Hard skills – Conceptual/thinking skills

- Critical thinking 68,12%
- Use of information technology 91,18%
- Planning and organizing 85,07%
- Analytic thinking 91,04%
- Decision making 77,61%
- Ability and desire to learn continuously 78,26%
- Research and managing data 86,57%

Soft skills – People related skills

- Collaboration/team work 79,71%
- Communication (oral & written) 74,29%
- Interpersonal skills 70,59%

Soft skills – Personal skills

- Professionalism 81,16%
- Leadership 83,82%
- Flexibility/adaptability 70,15%

- Work ethic 79,41%
- Voluntarism 57,35%
- Social responsibility 71,64%
- Socio-emotional skills 62,69%

Business skills

- Creativity/innovation 82,61%
- Multicultural awareness 62,69%
- Dealing with real world problems 77,61%
- Global business 82,09%
- Strive for quality 81,16%
- Care for sustainable development 80,60%

Innovation is essentially the creation and implementation of new processes, products, services and delivery methods that lead to significant improvements in the efficiency, effectiveness or quality of the results. So, there are three are most important elements in terms of innovation:

- It means creating something new.
- It is a process.
- It should provide some kind of quantitative or qualitative improvement in results.

If we focus on educational innovation, we can define it as the process of changing teaching or learning activities that lead to improvements in learning outcomes. However, to view this process as an educational innovation, it should address some needs: 1) It should be effective and efficient. 2) it should be sustainable over time; and 3) it should deliver transferable results that go beyond the context in which it was created.

Teaching methods are always open to evolution in order to include the enormous possibilities of technological progress. Remote and virtual laboratories, robotic applications, virtual 3D worlds, augmented reality developments, complex data visualizations and mobile applications are just a few examples of new technological supports for teaching methods based on problem-based learning, case-based learning, online learning etc. All of these approaches relate to more active student-centered training.

The list of example innovative practices discussed at the Bochum meeting is given in below:

Innovative practice	Organization
Real-time monitoring lab	UKIM
Demo (student) conference	UKIM
Drone practice	UKIM
Teaching computation tools by multimedia	UKIM
Learning through examination	UKIM
Personal sustainability lifestyle	IECE
Mindfulness – being present in your work and life	IECE
Time management skills	IECE

“Color me green” challenge	IECE
Construction debris challenge	IECE
Solving complex problems	IECE
Exchange of Knowledge and Experiences	RUB
Career Orientation	RUB
Leadership & Management	RUB
Communication skills	RUB
FabLab	UVA
Learning through Argumentation	UNMO
Crossover Learning	UNMO
Creating Flexible Space through classroom redesign	UNMO
Redesigning Faculty space	UNMO
Improve field education (crossover learning) and learning from practice	UNMO
Reflective teaching	UNMO
Business Creation	UNMO
Lectures on-site (field trips)	UNSA
Job interview (WP)	UNSA
Project Based Learning	UNSA
Multi-disciplinary working environment	UNSA
Live streaming of data from sensors on real buildings: deflections, strains and vibrations	UNSA
Computational Thinking	NUACA
Learning By Doing Science	NUACA
Adaptive Teaching	NUACA
Context-Based Learning	NUACA
Learning Through Argumentation	NUACA
Crossover (Interdisciplinary) Learning	NUACA
Stealth Assessment	NUACA
Team Learning	NPUA
Modular Learning	NPUA
Interdisciplinary learning	NPUA
Content-Based learning	NPUA
Problem Based learning	NPUA
Situation-Based Learning	NPUA
Experience-Based Learning	NPUA
Project Based Learning	NPUA
Game Based Learning	NPUA
Flipped Learning	NPUA

Innovative Practices Description Template

Title:	
Skills to be acquired/ improved:	
Methods:	
Description of the practice:	
Author of the practice:	
Method for evaluation of the practice (by students, peer review etc.):	

2.2. Blank Template for Presentation of Innovative Teaching/Training practice

2.3. Field Template for Presentation of Innovative Teaching/Training practice

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about innovative teaching practice

- **Title: Master Mindfulness with game-based learning**

- **Professor:** Angelina Taneva-Veshoska
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** angelina@iege.edu.mk

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by playing the game Master Mindfulness.

- The game is engaging the participants in active learning, utilizing several techniques, such as experiments, discovery, mental models, problem solving, self-assessment quiz, personal diary, think-pair-share, misconception check, one-minute paper, 3-2-1, letter to my younger self, etc.

- In the game-based learning environment, the participants will work on accomplishing specific goal, that they will set at the beginning of the practice, by choosing actions and experimenting along the way.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- As participants will make progress and check specific achievements, they will earn badges and experience points.
- With this learning process the participants will have opportunity to explore their lifestyle, approach to everyday situations and mindful practices, and challenge themselves to adopt effective methods for balanced life (private and business).
- The skills that they will develop/upgrade have transferability potential and can be used in situations at work, in private life. Also, the skills for mindfulness have direct and indirect impact on many other important skills.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students
- Professionals
- Managers

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills
- *Soft skills – Personal skills*: direct impact on Professionalism and Flexibility/adaptability
- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking, indirect impact on Decision making
- *Business skills*: direct impact on Creativity/innovation, indirect impact on Multicultural awareness, Care for sustainable development

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format - Game-based learning**
- **Techniques completed with individual work**: experiments, discovery, mental models, problem solving, self-assessment quiz, personal diary, one-minute paper, 3-2-1, letter to my younger self.
- **Techniques completed in teams**: problem solving, think-pair-share, misconception check, debate, demonstration.
- **Available resources via e-learning** platform: quests, articles, video materials, presentations, forum, self-assessment quizzes.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Pre- and post- self-assessment
- Points achieved in the game

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase

3. ANNEX B

3.1. Proposed Innovative Teaching/Training Practices by UKIM

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Demo (scientific) conference**

>> Case studies model

- **Professor: Elena Dumova- Jovanoska (assistant: Stefan Micevski , MSc.)**
- **Institution: University of Ss. Cyril and Methodius Skopje**
- **Mail: dumova@gf.ukim.edu.mk**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Course participants will be divided in teams.
- Each team will get a case study that needs to be prepared during the complete course schedule.
- The case studies are carefully prepared in collaboration with selected companies, and should provide " real life " tone of the assignments
- At the finalization of the course a scheduled demo conference will take place, where participants present their work.
- The rest of the groups have to introduce questions and discussion on the presented topic.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration

4 weeks

Target group

Students

Researchers

Involvement of industry or third parties

YES

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills (i.e. practice team work)

- *Soft skills – Personal skills*: direct impact on Professionalism (i.e. professional communication, presentation and organization skills)

- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking, (i.e. working on a specific case study)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format > Case study team work**
- **Techniques completed with individual work**: self-assessment quiz
- **Techniques completed in teams**: debate, demonstration, problem solving
- **Available resources via e-learning** platform: articles, presentations, forum, video materials

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

3 levels of grading:

- Points achieved from evaluation received from course teacher on the delivered case study
- Points achieved from evaluation received from course teacher for the conference participation
- Points achieved from evaluation received from company representative on the delivered case study
- Points achieved from evaluation received from company representative for the conference participation
- Points achieved from evaluation received from other groups for the conference participation

- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Drone (remote) practice**

>> "Real-world" remote learning model

- **Professor: Elena Dumova- Jovanoska**

  (Assistant Professor Simona Bogoevska, PhD)

- **Institution: University of Ss. Cyril and Methodius Skopje**
- **Mail: dumova@gf.ukim.edu.mk**

Agreement number – 2018 – 1232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-MK-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Interested companies will provide a short description of working areas, working hours and meeting schedules.
- Each participant in the course will be offered to select from the available list of companies.
- The selected company will provide a "real-world" task for the participants and include the participants via online platforms in group or one-on-one meetings and discussions.
- Specific dates will be marked as finalization of the task (as a deadline).
- Participants will be evaluated by an appointed team from the company for several criteria (i.e. punctuality, motivation, organization, communication etc.) .
- Participants will be evaluated by the course teacher for several criteria (i.e. testing results, case study quality delivered etc.) .

Agreement number – 2018 – 1232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-MK-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration

4 weeks

Target group

Students

Involvement of industry or third parties

YES

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills (i.e. meet and discuss with management and diverse employees in companies)
- *Soft skills – Personal skills*: direct impact on Professionalism and Flexibility/adaptability as well as time optimization
- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking, indirect impact on Decision making (i.e. gaining experience in industry and working on actual problem with a team of employees)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format > "Real world" remote learning**
- **Techniques completed with individual work**: problem solving
- **Techniques completed in teams**: debate, demonstration
- **Available resources via e-learning** platform: articles, presentations, forum, video materials

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Points achieved from evaluation received from an appointed team from the selected company
- Points achieved from evaluation received from course teacher

- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Real –time remote laboratory**

>> Remote experimental work

- **Professor: Simona Bogoevska**
- **Institution: University of Ss. Cyril and Methodius Skopje**
- **Mail: simona.bogoevska@gf.ukim.edu.mk**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

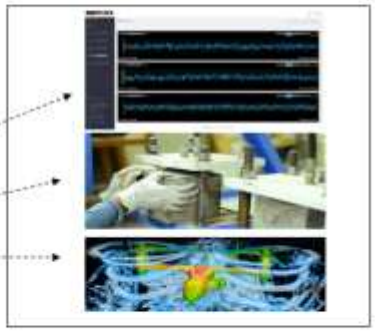
2. Description of the innovative teaching practice

- Each participant in the course will select an available lab experiment from a provided list of web platforms.
- The list of offered remote laboratories is predefined with involved companies .
- A specific case study will be appointed , and it will include conducting laboratory experiment.
- Depending on the covered curriculum, the laboratory web platform can be organised either as:

i) real-time autonomous laboratory
ii) real-time remote (one-on-one) communication with lab staff
iii) real-time simulation-based "experiments" for software developers

- Results and data will be directly applied and included in the appointed case study.
- Companies will be directly involved via the laboratory web platforms

select your laboratory



Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration

4 weeks

Target group

Students

Professionals

Involvement of industry or third parties

YES

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills (e.g. via discussions and planning lab work with appointed company staff)

- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking (e.g. enhance learning by evaluating experimental data, gained with involvement in all stages of planning and obtaining) indirect impact on Presentation skills (e.g. presenting full case study at the finalization of the course)

- *Business skills: direct impact on Creativity/innovation* (e.g. creating appropriate lab program) *indirect impact on developing sense for managing and team work* (e.g. apply management for lab staff coordination and team work)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format > Case study and remote involvement**
- **Techniques completed with individual work**: problem solving and planning strategies
- **Techniques completed in teams**: debate and demonstration with company support system,
- **Available resources via e-learning** platform: articles, presentations, forum

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

Final presentation of the case study with:

1. evaluation received from an appointed company representative
2. evaluation received from the course teacher

- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: I am your teacher- who is my teacher?**

>> Role play based model

- **Professor: Elena Dumova-Jovanoska (Assistant: Kristina Milkova, MSc.)**
- **Institution: University of Ss. Cyril and Methodius Skopje**
- **Mail: dumova@gf.ukim.edu.mk**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

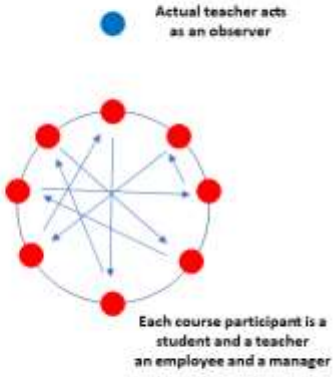
2. Description of the innovative teaching practice

Part 1>

- Each participant in the course will get a randomly selected "anonymous teacher " from the rest of the course participants.
- Specific dates (depending on the material) will be appointed as testing days and each participant will have an assignment to create a test , define the grading points and afterwards grade the test of his appointed student.
- Specific dates will be marked as open discussion forums in which all the participants and the actual course teacher, as well as company representative, debate the results and questions.
- Participants will get points for creating the tests and at the same time for giving answers to a certain test they receive.
- All participants will fill a questionnaire for the rest of the group on how each performed during discussion platforms

Part 2>

- Each participant in the course will get a randomly selected "anonymous manager " from the rest of the course participants, who will have to appoint a case study previously prepared with a selected company.
- Specific dates will be marked as open discussion forums in which all the participants, the actual course teacher, as well as company representative debate the case studies.
- All participants will fill a questionnaire for the rest of the group on how each performed during discussion platforms



Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration

4 weeks

Target group

Students

Professionals

Involvement of industry or third parties

YES

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills (i.e. via open discussion forums where tests and results are debated)
- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking, indirect impact on Decision making (i.e. enhance learning by evaluating colleagues work and understanding quality criteria; estimating points on quiz responses)
- *Business skills: direct impact on Creativity/innovation* (i.e. creating course quizzes and grading system) *indirect impact on developing sense for managing* (i.e. apply professional objectivity, recognition of quality levels in knowledge, practice responsibility)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format > Role play-based learning**
- **Techniques completed with individual work**: problem solving, creation of quizzes and individual grading systems
- **Techniques completed in teams**: debate, demonstration
- **Available resources via e-learning** platform: articles, presentations, forum, trial quizzes

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Points achieved in 3 parts:

1. evaluation received from the appointed student for the created quiz and grading system
2. evaluation of the quiz he/she took from another "teacher"
3. evaluation of participation in discussion forums received from the rest of the group

- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** **Teaching computational tools by multimedia**

- **Professor:** **Assoc. Prof. Sergey Churilov**
- **Institution:** **Ss. Cyril and Methodius University in Skopje (UKIM)**
  Faculty of Civil Engineering-Skopje
- **E-mail:** **curilov@gf.ukim.edu.mk**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Contemporary trend in educational technology
- Google search for:
  - teaching + multimedia returns about 248,000,000 results
  - "teaching +computational tools + multimedia" returns about 12,600,000 results
- Computation tool: computer program or utility that helps users: represent data, perform analysis, visualize data, process databases and etc.
- Multimedia: content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content.
- Innovative practice oriented to structural engineering computational tools
- Communicating with *Generation Z (born between 1995-2015)* - Utilizing modern information technologies for teaching and learning.

Agreement number – 2018 – 3234 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-MK-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Why teach with multimedia?[1]

- When students have access to video content to watch outside of class, class time can be used for **comprehension checks**, **discussion**, and **reinforcement of content**.
- Multimedia content helps to **vary and enhance the learning process**, and leads to better **knowledge retention**.
- Educational video can provide more opportunities for students to **engage with the content.**
- Students **around the world** can learn from course content made available through video.
- Video can sometimes **demonstrate complex ideas** and **access other times and places** better than speaking can.
- Video can help instructors **overcome limitations** like large class sizes and limited time.

[1] https://digital.bu.edu/edtech/resources/teaching-with-multimedia/

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration:

- **4 weeks**

Target group:

- **Students, Professionals**

Involvement of industry or third parties:

- **Possible, if software vendors provide content**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

Hard skills:

- Computer literacy,
- Structural Engineering analysis programs,
- Multimedia programs,
- Exercises such as assignments to reinforce skills
- Structural Analysis and Finite Element method

Soft skills:

- Critical thinking
- Communication skills
- Exchange of ideas and opinions among students–students and teacher–students; discussions
- Individual learning through practice and feedback (also hard skill)
- Problem solving through trial and error

Agreement number – 2018– 3234 /001 –001
Project reference number –598719-EPP-1-2018-1-MK-EPPKA2-CBHE-IP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

Methods:

- Clarifying and illustrating complex subjects
- Adapting to individual learning styles
- Improving retention and aiding recall
- Reaching nonverbal learners

Techniques:

- Individual work: problem-solving, experiments, trial and error
- Group work: discussions, brainstorming, presentations, demonstrations

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

Methods for assessment:

- Problem solving assignments
- 3-2-1 reflective activity (3 ideas or issues that were learnt, 2 example or uses for how the ideas could be implemented, 1 unresolved area question)

Methods for evaluation:

- Attendance and Completion (Participation)
- Student feedback forms (Data Collection)
- Testimonials (Subjective-Qualitative)

Agreement number – 2018 – 3234 /001 – 001
Project reference number – 598719-EPP-1-2018-1-MK-EPPKA2-CBHE-IP

3.2. Proposed Innovative Teaching/Training Practices by IECE

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title:** Master Mindfulness with game-based learning

- **Professor:** Prof. Angelina Taneva-Veshoska
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** angelina@iege.edu.mk

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by playing the game Master Mindfulness.
- The game is engaging the participants in active learning, utilizing several techniques, such as experiments, discovery, mental models, problem solving, self-assessment quiz, personal diary, think-pair-share, misconception check, one-minute paper, 3-2-1, letter to my younger self, etc.
- In the game-based learning environment, the participants will work on accomplishing specific goal, that they will set at the beginning of the practice, by choosing actions and experimenting along the way.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- As participants will make progress and check specific achievements, they will earn badges and experience points.
- With this learning process the participants will have opportunity to explore their lifestyle, approach to everyday situations and mindful practices, and challenge themselves to adopt effective methods for balanced life (private and business).
- The skills that they will develop/upgrade have transferability potential and can be used in situations at work, in private life. Also, the skills for mindfulness have direct and indirect impact on many other important skills.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students
- Professionals
- Managers

Involvement of industry or third parties: Professionals from industry are involved as guest speakers to share their work and life experience regarding the topic

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills
- *Soft skills – Personal skills*: direct impact on Professionalism and Flexibility/adaptability
- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking, indirect impact on Decision making
- *Business skills*: direct impact on Creativity/innovation, indirect impact on Multicultural awareness, Care for sustainable development

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format - Game-based learning**
- **Techniques completed with individual work**: experiments, discovery, mental models, problem solving, self-assessment quiz, personal diary, one-minute paper, 3-2-1, letter to my younger self.
- **Techniques completed in teams**: problem solving, think-pair-share, misconception check, debate, demonstration.
- **Available resources via e-learning** platform: quests, articles, video materials, presentations, forum, self-assessment quizzes.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Pre- and post- self-assessment
- Points achieved in the game

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title: Solving sustainability challenges with Frame Creation Model**

- **Professor:** Ass. Prof. Slavica Trajkovska, M-r Suzana Kasovska Georgieva
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** slavica.trajkovska@iege.edu.mk

2. Description of the innovative teaching practice

- This innovative teaching practice **collaborative learning,** *students work in teams on sustainability problems.*

- The participants will have opportunity to explore new approach in solving open and complex everyday problems, using the unique frame creation model.
- The process will start with identification several relevant sustainability challenges with sessions where guest form industry and public institutions will be present.
- Though blended learning format the participants will understand the Frame creation model.
- Teams of 3-4 students will be made, working on realistic case study, developed from the identified sustainability challenges.
- The proposed solutions from each team will be presented at the end of this innovative teaching practice in a wider auditorium.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

This innovative teaching practice is beneficial for students, because it offers methodology and transferrable skills that can be used in many different work and life situations.

The objective of the innovative practice:

- Solving real every day complex problems using Frame creation methodology
- Discovering new ways to view problems
- Archaeology — Deeply investigate the problem and earlier attempts to solve it
- Map the intellectual, cultural, and social 'space' that surrounds the problem
- Improve soft and hard skills

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 3 months

Target group:

- Students from different faculties
- Max number of students per group is 20; divided in teams of 3-4 students

Involvement of industry or third parties: Professionals from industry and representatives from public institutions are involved as guest speakers to introduce the participants with the different sustainability challenges in their environment, to share their experience

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills*: direct impact on Critical thinking, indirect impact on Decision making and Research and managing data
- *Soft skills – People related skills*: direct impact on Communication and Interpersonal skills
- *Soft skills – Personal skills*: direct impact on Flexibility/adaptability
- *Business skills*: direct impact on Creativity/innovation and Dealing with real world problems, indirect impact on Multicultural awareness and Global business

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format - collaborative learning,** students will work in teams on solving open ad complex sustainability problems
- **Techniques completed with individual work**: discovery, self-assessment quiz, personal diary, one-minute paper, 3-2-1, individual assignment.
- **Techniques completed in teams**: problem solving activities, concept-sharing rotations, think-pair-share, case study, discussion forum, student presentations.
- **Available resources via e-learning** platform: articles, video materials, presentations, forum, self-assessment quizzes.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Pre- and post- self-assessment
- Individual assignment
- Team presentations

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase
- Feedback from involved professionals from industry and public institutions

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title: Construction Debris Challenge**

- **Professor:** Dijana Likar, Elena Nikolovska, Angelina Taneva-Veshoska
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** dijana.likar@iege.edu.mk, elena.nikolovska@gim.mk, angelina@iege.edu.mk

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- The Construction Debris Challenge is a competition between teams of students, who will work on creating solutions for the given projects. Pair of two teams will work on solving the same problem, given by one construction company. It is expected to have 3-5 pairs of teams and 3-5 companies.
- Each team will have mentorship from academic staff and professionals from industry.
- The solutions will be presented on the final event where the most successful teams and solutions will be selected, basing on pre-determined criteria.
- During this challenge the participants will have opportunity to observe the dynamics of debris generation over different phases in construction. They will explore different strategies that companies are using, propose best scenario in specific case, having in mind type and quantities of waste materials and costs and savings.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

The objective of the innovative practice:

- Visit a job-site to observe the dynamics of debris generation over many phases of construction
- Explore the availability of different strategies to tackle construction debris (recycling methods, sustainable production)
- Learn about green building materials and products

Topic that will be covered in this practice:

- The role of engineers in construction waste management
- Investigate construction debris production - Types and quantities of waste materials produced
- Cost savings accrued by recycling rather than disposing of waste in landfills
- Positive influence on the environmental impact of construction

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 3 months

Target group:

- Students

- **Involvement of industry or third parties:** Industry partners will be invited to participate in the Construction Debris Challenge. Professionals from industry will present real every day problems in construction, cases with implemented solutions, and evaluate the proposals from the students.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills*: direct impact on Critical and Analytical thinking, indirect impact on Planning and organising
- *Soft skills – People related skills*: direct impact on Collaboration and Communication
- *Soft skills – Personal skills*: direct impact on Social responsibility
- *Business skills*: direct impact on Strive for quality and Care for sustainable development

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Student competition utilising project-based learning**
- **Techniques completed with individual work**: discovery, distortion, problem solving, self-assessment quiz, one-minute paper, 3-2-1.
- **Techniques completed in teams**: brainstorming, problem solving, field trip, misconception check, discussion forum, challenging assumptions, mud slinging, reversal.
- **Available resources via e-learning platform**: articles, video materials, presentations, forum, case studies.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Team presentations
- Quality of proposed project

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase
- Feedback from involved professionals from industry

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title: "Color me green" Hackathon**

- **Professors/workshop leaders:** Elena Nikolovska, Aleksandra Trajkovska, Martina Blinkova
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** elena.nikolovska@gim.mk, martina.blinkova@gim.com.mk

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- "Color me green" Hackathon will be a design sprint-like event, including students form several fields: engineers, architects, graphic designers, environmental engineers, collaborating intensively on projects given by industry partners.
- The hacking will begin with project introductions by the professors and professionals from industry. They will explain what the students will work on at the very start of the event. Short training sessions will be organized on each day in duration up to 1,5 hours.
- At the end of the event, a wrap-up session will be organised so each team will present their project solutions. A panel of judges (professors and professionals) will select the winning teams.

- The participants will have opportunity to explore the benefits of green buildings considering materials, costs and wellbeing of habitants. They will analyse case studies of green buildings and sustainable landscapes, focusing on the design, costs, challenges in implementation and maintenance phase.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

The objectives of the innovative teaching practice:

- Design buildings with more greenery
- Be part of new trend of built environments
- Design sustainable buildings (cost-benefit analysis)
- Explore methods for sustainable landscaping
- Learn about green building materials and products
- Work in teams, creating new designs, collaborating with students from different disciplines

This innovative teaching practice is beneficial for students and professionals because they will learn how to design smart and active green walls, facades and rooftops in a sustainable manner.

More on how to organise Hackathon: https://hackathon.guide/

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 3 days hackathon, preparation time for the hackathon 2 month

Target group:

- Students from engineering and environment fields
- Maximum number of students will be 30. They will be divided in teams of 4-5 students.

Involvement of industry or third parties: Professionals from industry will be involved as stakeholders - proposing projects to be solved, being available for mentoring the students, having short lectures on specific topics related to the hackathon theme, participating in the committee for selecting the best project proposal created by the students.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills*: direct impact on Critical and Analytical thinking, indirect impact on Planning and organising
- *Soft skills – People related skills*: direct impact on Collaboration and Communication
- *Soft skills – Personal skills*: direct impact on Social responsibility, indirect impact on Work Ethic and Leadership
- *Business skills*: direct impact on Strive for quality and Care for sustainable development

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format - Hackathon**

- **Techniques completed with individual work**: discovery, obstacle map, concept of the day, self-assessment quiz.

- **Techniques completed in teams**: team—based learning, brainstorming, creative design, creative problem solving, white board, discussion, demonstration, project-based learning.

- **Available resources via e-learning platform**: articles, video materials, presentations, case studies.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Team presentations
- Quality of created design and proposed project

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase
- Feedback from involved professionals from industry

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title:** **Industrial Master Thesis in Engineering and Management**

- **Professor:** Ass. Prof. Slavica Trajkovska and Prof. Angelina Taneva-Veshoska
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** slavica.trajkovska@iege.edu.mk, angelina@iege.edu.mk

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- The participants will have opportunity to do research on an interdisciplinary topic, proposed by an industry partner. Each students will have mentor from university, and co-mentor from industry.
- At least 3 events will be organized where students will present the progress in their research, communicate the research topic with wider public, promote the research results.
- This innovative teaching practice is beneficial for students in all engineering fields. These skills are transferable to the work environment and it expected to support them in their career progress.

The objectives of the innovative teaching practice:

- Do research on relevant engineering topic
- Have possibility to collaborate with professionals from industry, and receive direct feedback on the research results
- Explore options for commercialization of the results
- Have higher satisfaction because the knowledge created and research done is meaningful with applicative possibility

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 12 months

Target group:

- Students
- Professionals

Involvement of industry or third parties: Professionals from industry will be involved as co-mentors of the industrial master thesis.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Basic/fundamental skills:* Knowledge in the specialized area, Technical skills
- *Hard skills – Conceptual/thinking skills*: direct impact on Research and managing data and Critical and Analytical thinking
- *Soft skills – People related skills*: direct impact on Collaboration and Communication
- *Soft skills – Personal skills*: direct impact on Professionalism, Flexibility/adaptability, and indirect impact on Work Ethic
- *Business skills*: direct impact on Creativity/innovation, Strive for quality and Dealing with real world problems

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format - Industrial master thesis**

- **Individual work**: experiments, discovery, problem solving, level-chain, distortion, graphic organisers, literature review, consultant letters.

- **Techniques completed in teams**: problem solving, thesaurus, crystal ball, someone else's view, misconception check, debate, demonstration, concept sharing rotation.

- **Available resources via e-learning platform**: articles, case studies, books, video materials, presentations, forum.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Master thesis
- Presentations

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials from students during implementation phase
- Feedback from professionals from industry

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title:** **Developing sustainability lifestyles with inquiry-based learning**

- **Professor:** Prof. Angelina Taneva-Veshoska and Ana Tomikj
- **Institution:** Institute for Research in Environment, Civil Engineering and Energy - IECE
- **Mail:** angelina@iege.edu.mk, ana.tomik@iege.edu.mk

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Based on student investigation, role-models and hands-on projects, inquiry-based learning will be employed as a innovative teaching method that will support the students to acquire and develop new skills oriented toward sustainable lifestyles.
- The participants will have opportunity to observe their behavior and challenge themselves for a period of 5 months to experiment with new habits oriented toward more sustainable lifestyle.
- They will explore individually and in teams many different approaches humans have toward life, environment, resources, work and explore more sustainable ones.
- This innovative teaching practice is beneficial for students, and the experience can be inspiration for their work style as well.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

The **objectives** of the innovative practice:

- Challenge unsustainable behavior and make shift toward more sustainable lifestyle
- Explore the different strategies and approaches in order to use resources in more sustainable manner
- Employ reflexive thinking and action learning techniques
- Supports the participants to uncover their own agency and potential through which they can contribute to a sustainable world
- Development of change agency competences for walking the talk of sustainability, namely personal leadership and self-sustainability competences

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Topics that will be covered in this practice:

- Responsible vs. irresponsible use of resources
- Exploring our personal footprint
- Brainstorming ideas to practice sustainable living
- Sustainability lifestyle challenge – personal goal, obstacles and inspiration
- Case studies and real life examples from Sustainability leaders
- Being sustainable at work

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 5 months

Target group:

- Students

Involvement of industry or third parties: Professionals from different organisations will be involved as role models, challenging the behaviour and habits of the students. Once a month guest lectures will organised when professionals will present their experience, challenges and sustainable lifestyles.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills*: direct impact on Analytical thinking and Decision making, indirect impact on Planning and organizing
- *Soft skills – Personal skills*: direct impact on Social responsibility and Flexibility/adaptability
- *Business skills*: direct impact on Care for sustainable development and Creativity/innovation

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format - Inquiry-based learning**

- **Techniques completed with individual work**: experiments, compass, "do nothing", discovery, mental models, someone else's view, self-assessment quiz, personal diary, 3-2-1, letter to my younger self.

- **Techniques completed in teams**: brainstorming, aerial survey, knowledge café, think-pair-share, role plays, misconception check, debate, demonstration.

- **Available resources via e-learning** platform: quests, articles, case studies, video materials, presentations, forum, self-assessment quizzes.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Pre- and post- self-assessment
- Individual assignments
- Team presentations

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase
- Feedback from involved professionals

3.3. Proposed Innovative Teaching/Training Practices by RUB

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** **Exchange of Knowledge and Experience**
  - Career opportunities outside academia for Ph.D holders –
- **Professor:** RUB Research School & Experts from business, industry, politics
- **Institution:** RUB Research School
- **Mail:** research-school@rub.de

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Exchange with representatives from industry, economy, politics, NGOs and society provides early career researchers with first-hand information on career possibilities in these sectors.
- This event promotes the dialogue with a wide range of representatives widening the participant's horizon beyond an academic university career. The focus lies on the individual experiences of invited experts, exemplifying career paths and perspectives beyond academia.
- Themes addressed include the transition from university to industry, typical career steps in the business world, and career perspectives in selected fields or companies. Moreover, the dialogue serves to identify that early career researchers gain real employability skills during their doctorate. The exchange should stimulate a discussion about the mutual expectations of potential employees and employers.
- All participants are expected to be highly interested in an open exchange and in hearing individual opinions of all sides.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 2-3 hours

Target group: Ph.D. students, Postdocs

Involvement of industry or third parties: yes

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Outcomes:

- early understanding of employability skills of Ph.D
- presentation of career possibilities in industry and the public sector
- providing first-hand information on career opportunities & requirements
- discussion of mutual expectations for making a career outside academia
- leading experts share their insider perspectives on activities, strategies and the decision-making processes of job opportunities in industry & public sector
- visiting companies

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- short keynotes / statements of experts
- moderated panel discussion
- personal interaction

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

The best evaluation method is to use a combination of summative and formative evaluation. On the one hand, such an approach makes it possible to check whether the expectations and goals set were achieved within the intended time frame with the resources available. On the other hand, this allows recommendations to be made after several events to optimize the exchange and to develop it further accordingly.

The combination of qualitative and quantitative data collection methods and the perspectives of various stakeholders should be done. EvaSys is a good choice for collecting data, it`s a special evaluation program with an integrated analysis tool. The questionnaire can be filled in an online or paper pencil format

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** **Career planning: Gaining personal orientation for planning a career outside academia**
  (Online format possible)

- **Professor:** Prof. Dr. Eleonore Soei-Winkels holds a professorship in business psychology (FOM Hochschule für Ökonomie & Management). She holds a PhD in Neuroscience and is psychologist by training. She is a "Systemische Management Coach".

- **Institution:** freelance trainer

- **Mail:**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

General landscape: career outside academia - first or second choice
- career compass: pros and cons for a career outside academia
- career paths: opportunities, hurdles and challenges for a career outside academia
- climbing the mountain: competencies are expected from employers
- career horizon: experience, skills and competencies developed by a PhD

Personal career planning:
- analysing personal reasons or constraints for a career change
- reflecting personal aims & expectations for a career outside academia
- assessing potentials, capabilities & expertise for a non-scientific job
- profiling personal & professional competencies against expected skill sets for a career outside academia
- networking – a career factor?

Take some action:
- creating a non-academic CV
- articulating skills to a non-academic audience

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 2 days (online 3 modules à 5 h)

Target group: Ph.D. students, Postdocs

Involvement of industry or third parties: no, but Dr. Eleonore Soei-Winkels works outside academia as a professional IT consultant

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- raise awareness for career decisions
- assessing career opportunities outside academia
- gain knowledge & strategies to plan a career outside academia & entrepreneurship in relation to a career in research
- working on personal identity features & skill sets for developing individual career perspectives
- first steps for job application training (industry)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- The workshop aims to start reflecting and profiling career opportunities outside academia.
- Considering the highly diverse situations of the labour markets of the participating countries the workshop will mainly focus on strategies, competencies and skills described on a metascale by several EU projects.
- The workshop will put a special focus on assessing career opportunities in general, evaluation personal aims & challenges and working our first competence profiles for a career outside academia.
- The workshop will combine expert input with interactive group work and hands-on training to ensure professional knowledge and a first practice transfer

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

The workshop will be evaluated by the participants by an evaluation form rating the relevance of the workshop's topic and contents as well as the professional performance of the trainer and the benefit for the participants.

The trainer will be interviewed to bring in the professional perspective of the expert.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** **Leadership Skills** (Time Management is offered by IECCE)
  (Online-Format possible)

- **Professor:** Sabine Lerch has 17 years of experience in High-Tech Companies in different management positions; as Human Resources Manager she was responsible for the professional development of technical experts and leaders; since April 2003 she works professionally as trainer, coach and business mediator.
- **Institution:** freelance trainer
- **Mail:**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Leadership models - about styles, tasks and responsibilities
- group development
- decisions and participation
- situational leadership
- agile leadership and selforganisation

Delegation by Pleasure - how to open space
- management by objectives
- stewardship delegation

Coaching - about orientation and potential
- providing feedback
- supporting your team members

Diversity – how to handle different personalities
- the principles of personal behaviour
- Maslow's pyramid and motivation

Communication for Leaders - typical situations and tools
- face-to-face conversation
- group/team meetings

Conflict Resolution - a leader's responsibility
- vicious circles
- mediation basics

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 2 days (online 4 module à 4 h)

Target group: Ph.D. students, Postdocs

Involvement of industry or third parties: no

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- leading teams
- agile working strategies & techniques
- introduction to leadership skills
- creativity and innovation

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- The workshop aims to provide competencies beyond research qualification.
- It offers a basic understanding and first knowledge in leadership skills.
- During the workshop the participants will gain insight into different leadership styles and can reflect their own understanding and attitude towards leadership.
- The participants will get to know some instruments of leadership and apply them in realistic case studies and short role plays.

➢ The workshop will prepare the participants to start approaching this challenging responsibility.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

The workshop will be evaluated by the participants by an evaluation form rating the relevance of the workshop's topic and contents as well as the professional performance of the trainer and the benefit for the participants.

The trainer will be interviewed to bring in the professional perspective of the expert.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** **Communication Skills: Advancing communication skills to successfully cooperate with industry partners**
  (Online Format possible)

- **Professor:** The workshop will be offered by an expert in the field of professional communication in business and industry
- **Institution:**
- **Mail:**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice (I)

Roles & responsibilities of researchers:

- reflecting roles and expert status of researchers cooperating with industry
- discussing responsibilities of researchers in industry cooperation (including research integrity and ethics)
- clarifying concerns, aims and interests to cooperate with industry partners
- managing expectations between research and industry
- describing a value added chain for industry cooperations

Professional communication strategies:

- designing a communicating strategy to acquire cooperative projects with industry partners
- profiling the innovation and technology novelty of research projects (key message) for successful industry cooperations
- clarifying language and terminologies to convincingly communicate research projects between research and industry
- optimizing communication strategies by considering the expectations of external partners

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice (II)

Professional communication skills:

- profiling communication skills to negotiate aims, interests and outcomes of research projects supported by industry or joint research/industry projects
- upgrading professional negotiation skills for contracts and mutual understandings of conditions, resources and expectations
- professional communication skills for meetings and decision-making processes with industry partners
- developing a communication strategy to ensure a mutual understanding about the project's progress and results
- discussing successfully the use and dissemination of outcomes and products

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 2 days (online 4 à 4 h)

Target group: Ph.D. students, Postdocs

Involvement of industry or third parties: no

4. Skills to be acquired/ improved:

- skills to communicate research projects outside academia
- professional communication skills of researchers cooperating with industry partners
- personal communication skills of researchers for diverse settings
- professional negotiation skills

5. Methods and techniques

- The workshop aims to facilitate communication strategies and skills of researchers to successfully cooperate with industry partners.
- It will cover topics from profiling and communicating individual research projects for industry cooperation to negotiating interests, aims and conditions to successfully work together with partners from outside academia.
- The workshop will put a special focus on developing professional communication skills for the acquisition of industry projects, for joint meetings, decision-making processes or for negotiating about the use and dissemination of results between researchers and industry partners.
- The workshop will combine expert input with interactive group work and real case scenarios to ensure professional knowledge and a first practice transfer.

6. Methods for assessment and evaluation of the practice

The workshop will be evaluated by the participants by an evaluation form rating the relevance of the workshop's topic and contents as well as the professional performance of the trainer and the benefit for the participants.

The trainer will be interviewed to bring in the professional perspective of the expert.

3.4. Proposed Innovative Teaching/Training Practices by UVA

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about innovative teaching practice

- **Title: FabLab**

- **Professor:** Rayko Toshev, Petri Helo
- **Institution:** University of Vaasa
- **Mail:** rayko.toshev@uva.fi petri.helo@uva.fi

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- A fab lab (fabrication laboratory) is a small-scale workshop offering (personal) digital fabrication
- A fab lab is typically equipped with an array of flexible computer-controlled tools that cover several different length scales and various materials, with the aim to make "almost anything"
- The fab lab movement is closely aligned with the DIY movement, open-source hardware, maker culture, and the free and open-source movement, and shares philosophy as well as technology with them.

FAB LAB

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

FabLab in Vaasa

TECHNOBOTHNIA

- Community access
- Planned release 2020
- Company cooperation with Wärtsilä Smart Tech Hub

https://www.youtube.com/watch?v=CXEST17QfxY

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: Open visitor days to access the equipment

Target group:

- Students
- Professionals
- Managers

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: networking skills, collaboration/team work
- *Hard skills – Conceptual/thinking skills*: Hands on with 3D printing technology, Use of information technology
- *Business skills - Creativity/innovation*

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – hands-on learning**
- **Techniques completed with individual work**: experiments, problem solving, self learning technology and tools
- **Techniques completed**: problem solving, demonstration, peer support.
- **Available resources via e-learning** platform: FabLab networks https://www.fablabs.io/

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- No formal evaluation or credits
- **Methods for evaluation**
- Feedback and photos from sessions

3.5. Proposed Innovative Teaching/Training Practices by UNSA&WP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Lectures on-site (field trips)**

- **Professor: Fadil Biberkić**
- **Institution: Faculty of Civil engineering, University of Sarajevo**
- **Mail: fadil_biberkic@gf.unsa.ba**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Visit to building sites

Introduction about construction works and produres in real civil engineering praxis

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: one semester

Target group: Students

Involvement of industry or third parties: crucial / important

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- Developing of capability to implement theoretical knowledge, acquired during university studies in solving real building tasks
- Team work

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- Regular presence on the construction site, e.g. once per week
- Completing construction log
- Direct discussions with engineers and foremen on building-site

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- Reports
- Presentations at the end of praxis
- Feedback from participants

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Co-mentors from building industry**

- **Professor: Mustafa Hrasnica, Senad Medić, Goran Simonović**
- **Institution: Faculty of Civil engineering, University of Sarajevo**
- **Mail: hrasnica@bih.net.ba, senad_medic@yahoo.com, goransimonovic@yahoo.com**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Involvement of colleagues from engineering praxis as co-mentor for Master thesis in different fields of civil engineering

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: one semester

Target group: Master students

Involvement of industry or third parties: important

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- Team work - Additional value to the thesis
- Solving of practical problems

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- Multi disciplinary working enviroment

- Possibilityof part-time engagement in the company during the work on thesis (using of company infrastructure)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- Presentation of master thesis

- Feedback from students and engineers

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Job interview**

- **Professor: Mustafa Hrasnica, Safet Neković (industry partner)**
- **Institution: Faculty of Civil engineering, University of Sarajevo/Winner project**
- **Mail: hrasnica@bih.net.ba, marketing@winnerproject.ba**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Direct communication with potential employers (company manager)

Support from university professor

Developing of personal porto-folio

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration 30 days

Target group Master students (evt. doctoral students)

Involvement of industry or third parties: important, crucial

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- Capability to present himself/herself

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- Discussions with professionals and professors
- Preparing of presentations

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment and evaluation**
- Questionnaires
- Feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Lecturers from engineering praxis**

- **Professor: Senad Medić**
- **Institution: Faculty of Civil engineering, University of Sarajevo**
- **Mail: senad_medic@yahoo.com**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Regular lectures fom practicing engineers and other professional on different subject:

- Problems in practical structural design of buildings
- Modern project management
- Legal and economical issues
- Standard updates

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: one semester

Target group: Bachelor and Master students, Engineers from praxis

Involvement of industry or third parties: important

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- Knowledge about different practical issues, not covered in regular university lectures

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- Lectures
- Case studies

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- Questionnaires

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title: Live streaming of data from sensors**

- **Professor: Goran Simonović**
- **Institution: Faculty of Civil engineering, University of Sarajevo**
- **Mail: goransimonovic@yahoo.com**

Agreement number – 2018 – 3232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-BA-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

Inclusion of students in work with new equipment acquired through Erasmus+ program

Monitoring of structural performance in real time

(not implemented yet in our country)

Agreement number – 2018 – 3232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-BA-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration : up to 30 days

Target group: Students and young engineers from industry

Involvement of industry or third parties

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- Capability to work with modern measuring equipment
- Critical assessment of the measured data

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- Hands-on experience with modern measuring devices at the Research and Development Centre at the Faculty of Civil Engineering in Sarajevo
- Implementation of measuring devices on real structure

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- Reports
- Questionnaire

3.6. Proposed Innovative Teaching/Training Practices by UNMO&HP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about innovative teaching practice

- **Title: Flipped classroom (Reflective teaching and Learning through Argumentation)**
- **Professor:** Merima Šahinagić-Isović
- **Institution:** UNMO – Civil Engineering Faculty
- **Mail:** merima.sahinagic@unmo.ba

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of one semester students will have opportunity to develop new hard and soft skills by participation in the flipped classroom.
- The strategy is engaging the participants in active learning, utilizing several techniques and skills,
- In the flipped classroom learning environment, the students will:
  - Get introduction materials prior work,
  - Be introduced to real problem in the civil engineering sector (demolished building, for example)
  - Explore problem by themselves,
  - Discuses the problems, findings and solutions in the groups,
  - Planned their own work dynamic in order to achieve time plan agreed at the beginning,
  - Work in the classroom and prepare materials by themselves at home using previously given presentations and discussion conclusions.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- The participants will work on accomplishing specific goal, that will be set by the professor at the beginning of the practice.
- With this learning process profesor will determine what they need to teach and what materials students should handle on their own. Class time will be maximized in order to adopt learner-centered an activity oriented class.
- In addition , strategy will include site visit and work on real problem within the community – cooperation with the partner institution

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: one semester (15 working weeks)

Target group:

- Students

Involvement of the professionals from the industry

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills:* planning and organizing, ability and desire to learn continuously
- *Soft skills – People related skills*: collaboration/team work and communication
- *Soft skills – Personal skills*: work ethic
- *Business skills*: dealing with real world problems

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Flipped classroom**
- **Techniques completed with individual work**: discovery, problem solving, self-learning.
- **Techniques completed in teams**: problem solving – problem based learning, debate, presentation.
- **Available resources via e-learning** platform: articles, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Pre- and post- self-assessment

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about innovative teaching practice

- **Title: Design thinking – case study (Improve field education (crossover learning) and learning from practice)**
- **Professor**: Merima Šahinagić-Isović
- **Institution:** UNMO – Civil Engineering Faculty
- **Mail:** merima.sahinagic@unmo.ba

2. Description of the innovative teaching practice

- During a period of one semester students will have opportunity to develop new hard and soft skills through design thinking (case study) methodology.
- The methodology is engaging the participants in active learning, utilizing several techniques and skills,
- Using design thinking, the students will:
  - Develop non-linear mind process in order to understand requests from other professions, final users as well as constrains regarding possible solutions,
  - Redefine problems and create innovative solutions,
  - Be introduced and work on real problem in the civil engineering sector (demolished building, for example)
  - Work on site in groups
  - Planned their own work dynamic in order to achieve time plan agreed at the beginning,
  - Work in the classroom and prepare materials by themselves at home using previously given presentations and information given on site (practice)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- The participants will work on accomplishing specific goal, that will be set by the professor at the beginning of the practice.
- They will learn how to work in real multidisciplinary and interdisciplinary environment
- They will learn how to combine their so far gained knowledge by trying to find appropriate solutions
- In addition , strategy will include site visit and work on real problem within the community.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: one semester (15 working weeks)

Target group:

- Students

Involvement of the professionals from the industry

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills:* planning and organizing, research and managing data
- *Soft skills – People related skills*: collaboration/team work and interpersonal skills
- *Soft skills – Personal skills*: flexibility / adaptability
- *Business skills*: dealing with real world problems and creativity / innovation

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – project based learning**
- **Techniques completed with individual work**: discovery, problem solving, learning, rationality to meet needs of others (users, protected buildings, etc)
- **Techniques completed in teams**: problem solving – problem based learning, debate, presentation, work on site, creativity,
- **Available resources via e-learning** platform: articles, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Pre- and post- self-assessment
- **Methods for evaluation**
- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about innovative teaching practice

- **Title: Industrial master theses**
- **Professor:** Merima Šahinagić-Isović
- **Institution:** UNMO – Civil Engineering Faculty
- **Mail:** merima.sahinagic@unmo.ba

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Defining real problems from the environment on which students could investigate and do the research
- Problems will be defined in collaboration with industry or community /civil / city organizations (schools, sport associations, etc)
- Common issues when defining problems for research are how to provide more user-friendly, environmentally friendly and mentally stimulating space for final users
- Students will get intro information by final user of the chosen space/building

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Students will be mentored by professor from the Faculty, but will have guidelines and consultations by representatives of other professions (mainly architects, urban planners, communal engineers, etc) as well as discussions with final users
- Student will have to solve not just construction or material problem faced in their research, but also to offer possible solution for identified social / environmental problem
- Final presentation will done in front of the final users as well in order to get their feed back
- Students will have possibility for development of the "after" work – to wrap up conclusions of their master theses and write a research project to be applied for financing by relevant institutions, all in order to get involved in the community engagement projects

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: one semester (15 working weeks)

Target group:

- Students of the final year (maximum number 4 students per year)

Involvement of the wider community, industry partners, civil sector

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Hard skills – Conceptual/thinking skills:* critical thinking, decision making
- *Soft skills – People related skills*: collaboration/team work and communication
- *Soft skills – Personal skills*: flexibility / adaptability, voluntarism, social responsibility
- *Business skills*: creativity / innovation, dealing with real world problem

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – master theses**
- **Techniques completed with individual work**: discovery, determining social needs, self-learning.
- **Techniques completed in teams**: problem solving – problem based learning, debate, presentation.
- **Available resources via e-learning** platform:, articles, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**

- Pre- and post- self-assessment

- **Methods for evaluation**

- Evaluation lists and feedback from students
- Testimonials and photos from students during implementation phase

3.7. Proposed Innovative Teaching/Training Practices by NPUA&IIAP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

Title: Innovative Research Teaching in Flipped Classroom

Lecturer: Ella Hovhannisyanyan

Institution: National Polytechnic University of Armenia

Mail: hovhannisyanella@gmail.com

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- Innovative practice is focusing on the practical application of knowledge.
- This method will increase the student's engagement, understanding.

- As a result of this practice the students will acquire self-directed, independent learning abilities and for them to apply their knowledge through problem-solving.
- The students will acquire teamwork skills.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration:

40 days

Target group

For general public with special emphasis of young researchers and teachers.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

The aim to improve student's and resercher's:

- Engagement and understanding skills,
- Digital literacy skills,

- Potentially building skills in communication and collaboration,
- Independent learning and self-evaluation skills.

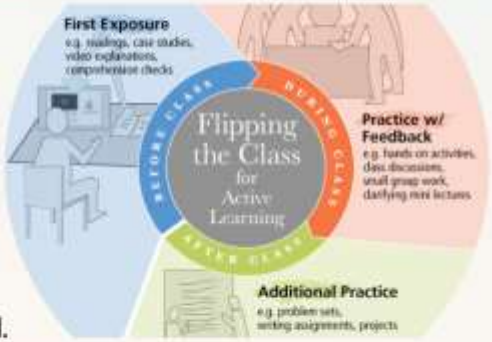
Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

Methods of work with Flipped Classroom includes:

- Group work on issues based on the flipped material.
- Teacher-directed interaction (teacher prepared questions).
- Individual tasks solving and discussing in groups.
- Plenary discussion after group work.
- Teacher's short presentation clarifying difficult concepts or theories based on what students find difficult to understand.
- Student-produced issues based on the flipped material.



Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- Peer review by experts
- Anonymous polling of students
- Feedback from students, peer review

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the innovative teaching practice

- **Title:** ***Innovative Teaching Based on Team Work***

Lecturer: ***Marine Usepyan***

Institution: ***National Polytechnic University of Armenia***

Mail: ***musepyan@gmail.com***

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- This is a form of educational and cognitive activity, which involves various small teams working on the tasks of the lecturer.
- During the team work, team members interchanging opinions and their skills, which forms students' ability to interact with other team members and listen the opinions of others.

- The lecturer monitors the teams work, can take part in discussions, but does not dictate his own opinion, supporting the students to actively search for a solution to the problem.
- During forming teams, it is necessary consider the level of academic performance of students and their interpersonal relationship.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: _____

Target group:

Students

Specialists in various fields

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

The main skills for students are:

- ✓coordinated student interaction,
- ✓mutual responsibility,
- ✓cooperation to each other.

The main skills for lecturer are:

- ✓the work coordination as with the whole group of students, and with each small team.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

Steps of teamwork organization:

- Explanation of the purpose by the lecturer
- Split students into the small teams.
- Tasks distribution between teams
- Roles distribution between the team members
- Teamwork monitoring
- Presentation of conclusions by the lecturer after the reports of the teams

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- Peer Review by experts
- Anonymous polling of students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

Title

Modular Approach to Research Teaching

Lecturer Ani Manukyan

Institution National Polytechnic University of Armenia (NPUA)

E-mail manukyan.ani55@gmail.com

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

During the course, the participant will have the opportunity to master the knowledge with separate modules, independent parts of the course, integrated with other parts. Also use interconnected courses with blocks that can be explored independently of another block.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration

- 40 days

Target group

- For the general public with special emphasis on young researchers and teachers

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

The final goal is to empower:

- Orientation to the activity
- The constant response of the lecturer and the students
- The active role of the student
- The new role of the teacher

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

Methods of work with modular learning materials includes:

- Part of the orientation (goals, resources)
- Part of the content
- Part of control (how to check the obtained results)
- Part of reflective (self-assessment of the results of work with educational materials)

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

Peer Review by experts

Anonymous polling of students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** Situation-Based Approach to Research Teaching

- **Professor:** Hasmik Markosyan
- **Institution:** National Polytechnic University of Armenia
- **Mail: hasmikmark@gmail.com**

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

The idea of situation-based teaching is as follows: the real work situation must be transported into the classroom. It promotes cognitive apprenticeship based on specific situations. The aim is to help the students analyze and find out relevant solutions in various problematic situations.

Case studies are in-depth investigations of a person or a specific situation. It is an effective method for cognitive activities and it promotes the development of analytical skills, reasoning, thinking perceiving, decision making, listening, observing.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration - 40 days

Target group-For the general public such as professionals from various sphere as well as young researchers and teachers

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

The students will be able to:

- Analyze real problems and find relevant solutions
- Develop critical thinking
- Look for different solutions and choose the best one
- Make questions about the situation
- Gather more information about the problem and agree or disagree with offered solutions
- Analyze the given datum and solutions

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

The situational method involves open discussion

- creating a new case according to the requirements
- Presenting the case to students and researchers
- the lecturer leads the discussion of the problem presented in the case.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

➢Peer Review by experts and attendees

➢Anonymous polling of students

3.8. Proposed Innovative Teaching/Training Practices by NUACA&YeTRI

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

1. General information about the Innovative teaching practice

- **Title:** Computational Thinking

- **Professor:** Gohar Avetisyan
- **Institution:** ***National University of Architecture and Construction of Armenia (NUACA)***
- **Mail:** gavetisyan@nuaca.am

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by thinking and problem solving.
- With this learning process the participants will have opportunity to break large problems down into smaller ones (decomposition), recognize how these relate to problems that have been solved in the past (pattern recognition).

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students
- Professionals

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on Problem Solving Skills (through trial and error)
- *Soft skills – Personal skills*: direct impact on Professionalism (Professional Communication, Organizational skills)
- *Hard skills – Conceptual/thinking skills*: direct impact on Analytic thinking

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Computational thinking**
- **Techniques completed with individual work**: mental models, problem solving, task-solving.
- **Techniques completed in teams**: problem solving, debate, demonstration.
- **Available resources via e-learning** platform: task-solved samples, articles, video materials, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Pre- and post- self-assessment
- Points achieved after problem solving
- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. General information about the Innovative teaching practice

- **Title: Learning by Doing Science**

- **Professor:** Hovhannes Avagyan
- **Institution:** ***National University of Architecture and Construction of Armenia (NUACA)***
- **Mail:** avaghovo9221@gmail.com

Agreement number – 2018 – 3232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-AM-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by developing conceptual understanding.
- With this learning process the participants will have opportunity to be engaged with authentic scientific tools and practices such as controlling remote laboratory experiments, can build science inquiry skills, improve conceptual understanding, and increase motivation.

Agreement number – 2018 – 3232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-AM-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students
- Professionals

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on science inquiry skills
- *Soft skills – Personal skills*: direct impact on Professionalism by controlling remote laboratory experiments
- *Hard skills – Conceptual/thinking skills*: direct impact on conceptual understanding

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Learning By Doing Science**
- **Techniques completed with individual work**: mental models, problem solving, improving conceptual understanding.
- **Techniques completed in teams**: problem solving, doing experiments.
- **Available resources via e-learning** platform: articles, remote-experiment video materials, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Pre- and post- self-assessment
- Experiments results achieved after doing them
- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. General information about the Innovative teaching practice

- **Title: Adaptive Teaching**

- **Professor:** Mher Markosyan and Ruzanna Sargsyan
- **Institution:** ***Yerevan Telecommunication Research Institute (YeTRI)***
- **Mail:** mark@yetri.am, ruzanna.sargsyan2@gmail.com

Agreement number – 2018 – 3232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-AM-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by developing individual task solving.
- All learners are different. However, most educational presentations and materials are the same for all. This creates a learning problem, by putting a burden on the learner to figure out how to engage with the content. It means that some learners will be bored, others will be lost, and very few are likely to discover paths through the content that result in optimal learning.
- Adaptive teaching offers a solution to this problem. It uses data about a learner's previous and current learning to create a personalized path through educational content.

Agreement number – 2018 – 3232 / 001 – 001
Project reference number – 598719-EPP-1-2018-1-AM-EPPKA2-CBHE-JP

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students, teachers
- Professionals

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on individual task-solving skills
- *Soft skills – Personal skills*: direct impact on Professionalism by doing tasks individually
- *Hard skills – Conceptual/thinking skills*: direct impact on individual thinking

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Adaptive Teaching**
- **Techniques completed with individual work**: mental models, problem solving, improving individual conceptual understanding.
- **Techniques completed in teams**: individual problem solving to achieve team's goal,
- **Available resources via e-learning** platform: articles, video materials, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Pre- and post- self-assessment
- Task-solved results achieved after doing them individually
- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. General information about the Innovative teaching practice

- **Title: Context-based Learning**
- **Professor:** Gohar Avetisyan
- **Institution:** ***National University of Architecture and Construction of Armenia (NUACA)***
- **Mail:** gavetisyan@nuaca.am

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by learning from experience and interacting with the surrounding.
- Context-based learning enables us to learn from experience. We have opportunities to create context, by interacting with our surroundings, holding conversations, making notes, and modifying nearby objects.
- We can also come to understand context by exploring the world around us, supported by guides and measuring instruments. It follows that to design effective sites for learning, at universities, construction fields and websites, requires a deep understanding of how context shapes and is shaped by the process of learning.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students
- Professionals
- Managers

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on individual skills by learning from experience
- *Soft skills – Personal skills*: direct impact on Professionalism by interacting with the surroundings and changing nearby objects
- *Hard skills – Conceptual/thinking skills*: direct impact on experience-based learning skills

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Context-based Learning**
- **Techniques completed with individual work**: problem solving, improving experience-based learning skills.
- **Techniques completed in teams:** interacting with the surroundings and changing nearby objects within a team
- **Available resources via e-learning** platform: articles, video materials, presentations.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Pre- and post- self-assessment
- Task-solved results achieved after doing them
- **Methods for evaluation**
- Evaluation lists and feedback from students

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. General information about the Innovative teaching practice

- **Title: Crossover (Inter-disciplinary) Learning**
- **Professor: Hovhannes Avagyan and Lilit Amiryan**
- **Institution: *National University of Architecture and Construction of Armenia (NUACA)***
- **Mail:** avaghovo9221@gmail.com, amiryan.93@mail.ru

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

2. Description of the innovative teaching practice

- During a period of 40 days the participants will have opportunity to develop new skills and challenge their behavior by learning from experience and interacting with the surrounding.
- An effective method is for a teacher to propose and discuss a question in the classroom, then for learners to explore that question on a construction, visit or field trip, collecting photos or notes as evidence, using some softs then share their findings back in the class to produce individual or group answers.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

3. Duration and Target group

Duration: 40 days

Target group:

- Students
- Professionals

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

4. Skills to be acquired/ improved:

- *Soft skills – People related skills*: direct impact on individual skills by learning things through inter-disciplinary learning practice
- *Soft skills – Personal skills*: direct impact on Professionalism by exploring questions/issues on a construction, visit or field trip, using various softs
- *Hard skills – Conceptual/thinking skills*: direct impact on experience-based learning skills

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

5. Methods and techniques

- **Format – Crossover (Inter-disciplinary) Learning**
- **Techniques completed with individual work**: problem solving, improving experience-based learning skills.
- **Techniques completed in teams:** interacting within a team implementing various skills and knowledge acquired in various disciplines
- **Available resources via e-learning** platform: articles, video materials, presentations, visit or trip experience.

Promoting academia-industry alliances for R&D through collaborative and open innovation platform - All4R&D

Co-funded by the Erasmus+ Programme of the European Union

6. Methods for assessment and evaluation of the practice

- **Methods for assessment**
- Pre- and post- self-assessment
- Tests, quizzes
- **Methods for evaluation**
- Evaluation lists and feedback from students