EACEA 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP



University of Belgrade



**Implementation of Dual Education in Higher Education of Serbia**

Kraljice Marije 16, 11120 Belgrade 35, Republic of Serbia

email: nzrnic@mas.bg.ac.rs



Faculty of Mechanical Engineering

























Republic of Serbia
Ministry of Education, Science and Technological Development



Republic of Serbia
National council for higher education



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



# Д6.5 Извештај са Завршне конференције

# D6.5 Final Conference Report

contacts: Prof. Dr.-Ing. Nenad Zrnić, tel: +381-63-287-193
Dr.-Ing. Žarko Mišković, +381-64-18-32-989

| | |
|---|---|
| Project acronym: | DUALEDU |
| Project full title: | Implementation of Dual Education in Higher Education of Serbia |
| Project No: | 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP (2017-2962/001-001) |
| Funding scheme: | ERASMUS+ |
| Project start date: | October 15, 2017 |
| Project duration: | 36 months |


| | |
|---|---|
| Abstract | This document represents the proceedings of the DualEdu Final conference |


| | |
|---|---|
| Title of document: | Final Conference Proceedings |
| Work package: | WP 6: Dissemination and exploitation |
| Activity: | 6.5. Final Conference Proceedings |
| Last version date: | 01/09/2021 |
| File name: | Plan for Pilot implementation and testing of specific DHEMs |
| Number of pages: | 64 |
| Dissemination level: | National |

VERSIONING AND CONTRIBUTION HISTORY

| Version | Date | Revision description | Partner responsible |
|---|---|---|---|
| 1.0 | 01/09/2021 | First draft | UB (Nenad Zrnić, Žarko Mišković and Sanja Šešlija) |

DISCLAIMER

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Final conference of DualEdu project took place at the Faculty of Mechanical engineering at the University of Belgrade on Thursday July 8th 2021 (Kraljice Marije 16, 11120 Belgrade 35, Serbia).

The agenda which was followed during the conference is represented in Fig. 1. After the Final conference, Local committee was held (for project partners from Serbia), and day after, on July 9th 2021, a Steering committee was held (with representatives from all project partners – Serbian and foreign).



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University of Belgrade

DualEdu +Erasmus

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# AGENDA

## FINAL CONFERENCE / LOCAL AND STEERING COMMITTEE MEETING

**University of Belgrade – Faculty of Mechanical engineering, Kraljice Marije 16, 11120 Belgrade 35, Serbia**

**IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA**

contacts: Prof. Dr.-Ing. Nenad Zrnić, tel: +381-63-287-193
Dr.-Ing. Žarko Mišković, +381-64-18-32-989

## DAY I

| **08.07.2021. University of Belgrade – Faculty of Mechanical engineering, Kraljice Marije 16, 11120 Belgrade 35, Serbia** | | |
|---|---|---|
| **Part I<br>Final conference - representatives of the ALL partners** | | |
| $08^{30}$ – $09^{00}$h | Registration of the participants | All partners and present participants |

| | | |
|---|---|---|
| $09^{00}$ – $09^{15}$h | Welcome speech | Prof. dr. Nenad Zrnić |
| $09^{15}$ – $09^{45}$h | Project presentation at the overall level – analysis of planned/achieved results | Asst. Prof. dr. Žarko Mišković |
| $09^{45}$ – $10^{00}$h | Coffee break | All present participants |
| $10^{00}$ – $10^{30}$h | Presentation of the developed dual study model at the University of Belgrade | Prof. dr. Nenad Zrnić<br>Asst. Prof. dr. Žarko Mišković<br>Ph.D. Sanja Šešlija |
| $10^{30}$ – $11^{00}$h | Presentation of the developed dual study model at the Metropolitan University | Prof. dr. Dragan Domazet |
| $11^{00}$ – $11^{30}$h | Presentation of the developed dual study model at the University of Kragujevac | Prof. dr. Vesna Mandić |
| $11^{30}$ – $12^{00}$h | Presentation of the developed dual study model at the University of Novi Sad | Prof. dr. Mirko Savić |
| $12^{00}$ – $12^{30}$h | Presentation of the developed dual study model at the University of Novi Pazar | Prof. dr. Miladin Kostić |
| $12^{30}$ – $13^{00}$h | Presentation of the developed dual study model at the VISER | Prof. dr. Vera Petrović<br>Prof. dr Goran Dikić |
| $13^{00}$ – $14^{30}$h | Lunch break | All present participants |

| **Part II<br>Local Committee Meeting -<br>Administrative management of the DUAL EDU Project – representatives of Serbian partners** | | |
|---|---|---|
| $14^{30}$ – $15^{00}$h | Registration of the participants | Representatives of Serbian partners |
| $15^{00}$ – $16^{30}$h | Presentation of the administrative management of the project at the local level – changes in the documentation, templates for the reporting to the coordinator etc. | Prof. dr. Nenad Zrnić<br>Asst. Prof. dr. Žarko Mišković<br>Ph.D. Sanja Šešlija |
| $16^{30}$ – $17^{00}$h | Coffee break | All present participants |
| $17^{00}$ – $19^{30}$h | Free time | |
| $19^{30}$h | *Dinner* | |

DualEdu +Erasmus

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## DAY II

| 09.07.2021. University of Belgrade – Faculty of Mechanical engineering, Kraljice Marije 16, 11120 Belgrade 35, Serbia | | |
|---|---|---|
| **Part I<br>Steering Committee Meeting – representatives of ALL partners** | | |
| $10^{30}$ – $11^{00}$h | Registration of the participants | Representatives of all partners |
| $11^{00}$ – $11^{30}$h | Project Management at the overall project level – analysis of planned/achieved results | Prof. dr. Nenad Zrnić<br>Asst. Prof. dr. Žarko Mišković |
| $11^{30}$ – $12^{15}$h | Definition of the Work plan for the final period of the project realisation – remaining activities | Prof. dr. Nenad Zrnić |
| $12^{15}$ – $12^{45}$h | Coffee break | All present participants |
| $12^{45}$ – $13^{30}$h | Analysis of the financial aspects of the project – budget effectiveness | Ph.D. Sanja Šešlija |
| $13^{30}$ – $14^{45}$h | Analysis of the results of the project external evaluation | Prof. dr. Nenad Zrnić<br>Asst. Prof. dr. Žarko Mišković<br>Ph.D. Sanja Šešlija |
| $14^{45}$ – $15^{30}$h | Lunch break | |

Fig. 1: DualEdu Final conference Agenda

Taking into account that the Final conference target groups were academic, scientific and industrial sector in general, invitation (Fig. 2) was sent to Ministry of Education, Science and Technological Development of Republic of Serbia, different national Universities and Faculties, National Council for Higher Education of the Republic of Serbia, foreign Universities which participated in DualEdu project realisation, as well as to Chamber of Commerce and different companies. Due to COVID-19 pandemic the conference was held in hybrid form – the presentations were held for limited number of participants on-site and other interested parties were able to follow the conference by provided ZOOM link. In total, more than 200 contacts were provided with the opportunity to participate in the Final conference.




Fig. 2: DualEdu Final conference invitation

The conference was also promoted by social networks (such as Facebook – Fig. 3):

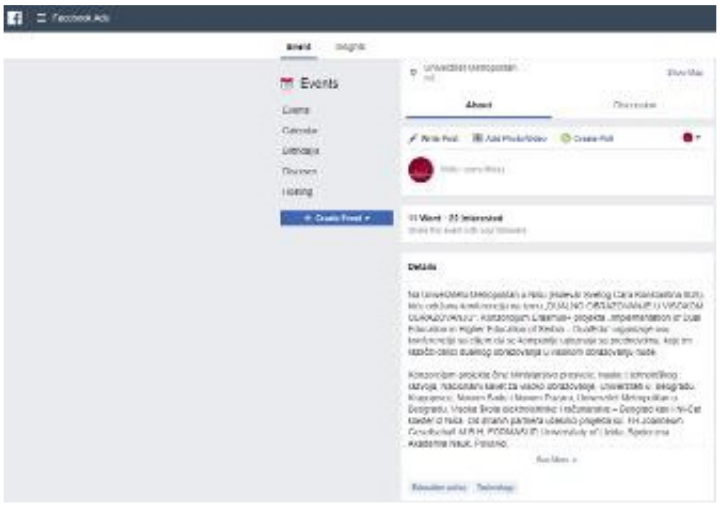
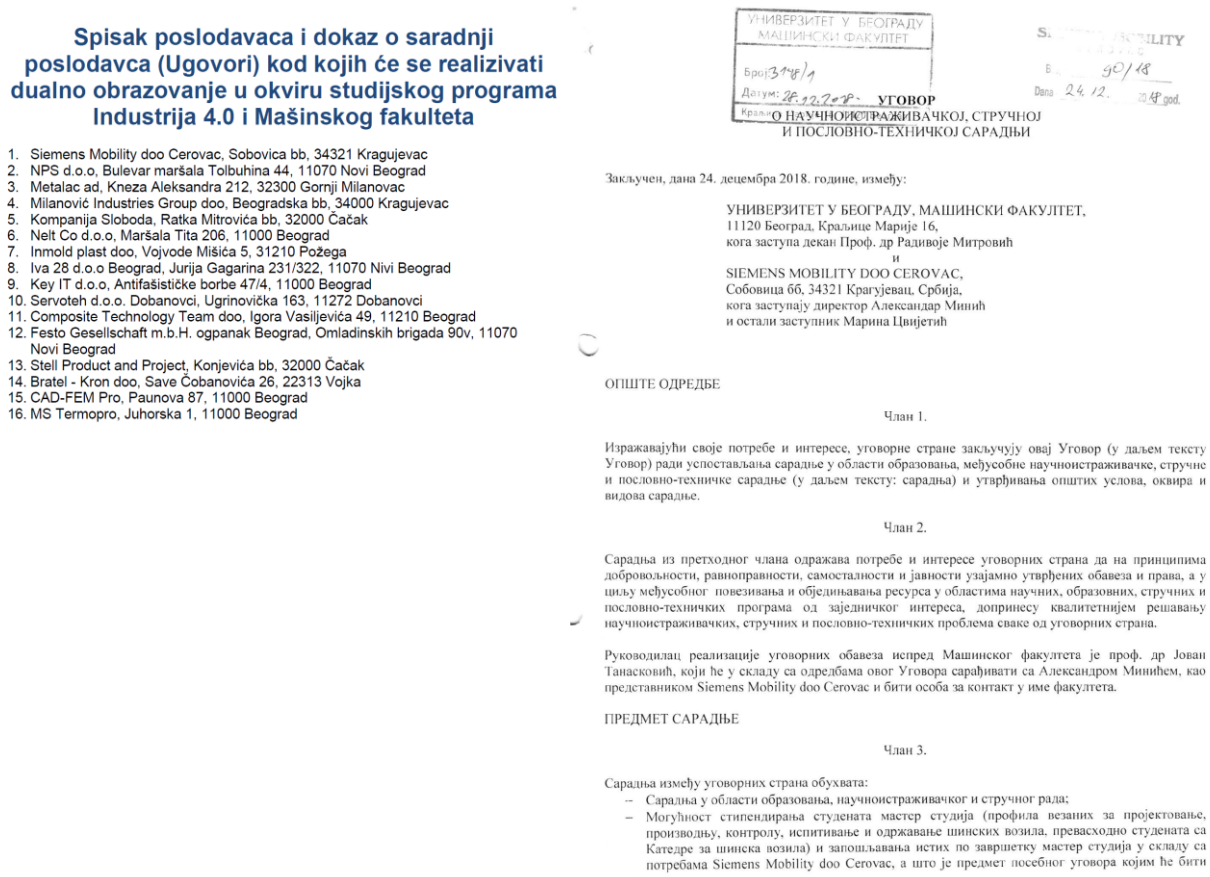



Fig. 3: Facebook DualEdu Final conference promotion

The conference started with the registration of the participants which were present on-site (at 8.30 a.m.) and after that the link with the conference video broadcast was activated so other conference participants were allowed to join.

At the beginning of the event (9.00 a.m.), prof. dr-ing. Nenad Zrnić, Project Coordinator and Vice Rector of the University of Belgrade, welcomed all present participants and gave introduction word. After that, he and doc. dr-ing. Žarko Mišković (Project Administrator), presented brief overview of the DualEdu project objectives and goals, as well as achieved outcomes. The focus was on the core activities of the DualEdu project – development and piloting of dual education study programmes / modules, legal basis for dual education imlementation in the high education of Republic of Serbia, and Accreditation standards which Serbian HEIs should fullfill in order to verify dual education study programmes / modules. The special discussion on reasons why new dual education study programmes / modules were not able to be acredited before the end of the DualEdu project realisation was also held within this part of the Final conference.

After the short break, at 10.00 a.m., Nenad Zrnić and Žarko Mišković, together with the prof. dr-ing. Živana Jakovljević and dr Sanja Šešlija (Project co-administrator), presented the dual study model developed at the University of Belgrade. This dual study model was piloted at the study programme 'Industry 4.0' at the Faculty of Mechanical Engineering at the University of Belgrade, since October 2020$^{th}$. In total, 14 students were enrolled, and their expiriences and reccomendations regarding to the dual education were gathered by questionaries and analysed in details. Before that, all steps proposed by DualEdu project team were followed – the companies were contacted (Fig. 4), appropriate contracts have been signed, the book of subjects was adjusted to developed dual study model, the accreditation standards were fullfilled etc. The presentation lasted half an hour and afterwards (at 10.30 a.m.) the representative of Metropolitan University, prof. dr Dragan Domazet, described the dual study model developed at this institution – without presentation, only in oral form.



**Spisak poslodavaca i dokaz o saradnji poslodavca (Ugovori) kod kojih će se realizivati dualno obrazovanje u okviru studijskog programa Industrija 4.0 i Mašinskog fakulteta**

1. Siemens Mobility doo Cerovac, Sobovica bb, 34321 Kragujevac
2. NPS d.o.o, Bulevar maršala Tolbuhina 44, 11070 Novi Beograd
3. Metalac ad, Kneza Aleksandra 212, 32300 Gornji Milanovac
4. Milanović Industries Group doo, Beogradska bb, 34000 Kragujevac
5. Kompanija Sloboda, Ratka Mitrovića bb, 32000 Čačak
6. Nelt Co d.o.o, Maršala Tita 206, 11000 Beograd
7. Inmold plast doo, Vojvode Mišića 5, 31210 Požega
8. Iva 28 d.o.o Beograd, Jurija Gagarina 231/322, 11070 Nivi Beograd
9. Key IT d.o.o, Antifašističke borbe 47/4, 11000 Beograd
10. Servoteh d.o.o. Dobanovci, Ugrinovička 163, 11272 Dobanovci
11. Composite Technology Team doo, Igora Vasiljevića 49, 11210 Beograd
12. Festo Gesellschaft m.b.H. ogpanak Beograd, Omladinskih brigada 90v, 11070 Novi Beograd
13. Stell Product and Project, Konjevića bb, 32000 Čačak
14. Bratel - Kron doo, Save Čobanovića 26, 22313 Vojka
15. CAD-FEM Pro, Paunova 87, 11000 Beograd
16. MS Termopro, Juhorska 1, 11000 Beograd

УНИВЕРЗИТЕТ У БЕОГРАДУ
МАШИНСКИ ФАКУЛТЕТ
Број 3148/1
Датум: 28.12.2018.

УГОВОР
О НАУЧНОИСТРАЖИВАЧКОЈ, СТРУЧНОЈ
И ПОСЛОВНО-ТЕХНИЧКОЈ САРАДЊИ

Закључен, дана 24. децембра 2018. године, између:

УНИВЕРЗИТЕТ У БЕОГРАДУ, МАШИНСКИ ФАКУЛТЕТ,
11120 Београд, Краљице Марије 16,
кога заступа декан Проф. др Радивоје Митровић
и
SIEMENS MOBILITY DOO CEROVAC,
Собовица бб, 34321 Крагујевац, Србија,
кога заступају директор Александар Минић
и остали заступник Марина Цвијетић

ОПШТЕ ОДРЕДБЕ

Члан 1.

Изражавајући своје потребе и интересе, уговорне стране закључују овај Уговор (у даљем тексту Уговор) ради успостављања сарадње у области образовања, међусобне научноистраживачке, стручне и пословно-техничке сарадње (у даљем тексту: сарадња) и утврђивања општих услова, оквира и видова сарадње.

Члан 2.

Сарадња из претходног члана одражава потребе и интересе уговорних страна да на принципима добровољности, равноправности, самосталности и јавности узајамно утврђених обавеза и права, а у циљу међусобног повезивања и обједињавања ресурса у областима научних, образовних, стручних и пословно-техничких програма од заједничког интереса, допринесу квалитетнијем решавању научноистраживачких, стручних и пословно-техничких проблема сваке од уговорних страна.

Руководилац реализације уговорних обавеза испред Машинског факултета је проф. др Јован Танасковић, који ће у складу са одредбама овог Уговора сарађивати са Александром Минићем, као представником Siemens Mobility doo Cerovac и бити особа за контакт у име факултета.

ПРЕДМЕТ САРАДЊЕ

Члан 3.

Сарадња између уговорних страна обухвата:
- Сарадња у области образовања, научноистраживачког и стручног рада;
- Могућност стипендирања студената мастер студија (профила везаних за пројектовање, производњу, контролу, испитивање и одржавање шинских возила, превасходно студената са Катедре за шинска возила) и запошљавања истих по завршетку мастер студија у складу са потребама Siemens Mobility doo Cerovac, а што је предмет посебног уговора којим ће бити

Fig. 4: Some of the companies where the ’Industry 4.0’ study programme is realised

At 11.00 a.m. representatives of University of Kragujevac (prof. dr Nenad Stanišić supported online by prof. dr Vesna Mandić) have presented the dual study model they developed and piloted on their HEI.

Namely, they applied developed study model at three study modules:

- MAS Information Technology
- MAS Mehatronics
- MAS Business Informatics

They pointed out that the QAC (Quality Assurance Commission of the University of Kragujevac) have already issued an opinion on the proposal of the dual model of study where it is stated that developed study model is in full accordance with the acts of the University and the Rulebook on standards. They also presented the Rulebook on the dual model of studies at the University of Kragujevac as well as the first study program which will be acredited according to the dual model of studies at the University of Kragujevac.

After the University of Kragujevac presentation, at the 11.30h, the representatives of University of Novi Sad described their expirience with the dual education study model implementation. Prof. dr Mirko Savić stated that the dual study model developed at the University of Novi Sad is piloted at the Faculty of Economics in Subotica, at the study programme Agricultural Economics and Agribusiness. The applied course structure is shown at Table 1.

| Name of the course | Status (obligatory or compulsory) | Number of theoretical classes per week | Number of practical classes per week | Number of other classes | ECTS |
|---|---|---|---|---|---|
| Methodology of scientific research | O | 3 | 0 | | 6 |
| Agricultural trade and policy | O | 3 | 2 | | 8 |
| Economics of agricultural investments | O | 2 | 3 | | 8 |
| Agribusiness strategy | O | 3 | 2 | | 8 |
| Compulsory 1 | C | 2 | 2 | | 6 |
| Compulsory 2 | C | 2 | 2 | | 6 |
| Work-based learning | O | | | 210 | 6 |
| Master Thesis | O | | | | 12 |
| List of compulsory courses: | | | | | |
| World food system | C | 2 | 2 | | 6 |
| Economic development of agroindustrial system of Serbia | C | 2 | 2 | | 6 |
| Multicriteria decision making | C | 2 | 2 | | 6 |
| Risks and insurance | C | 3 | 2 | | 8 |

Tab. 1: Piloted course structure at the University of Novi Sad

At the 12.00 a.m. the Rector of the University of Novi Pazar – prof. dr Miladin Kostić, together with his associate dr Senad Ganić, presented a dual study model they piloted at the Department of Technical Sciences of the State University of Novi Pazar, at the study program "Civil Engineering“. A special attention was paid to Legal framework of dual study programme implementation, as well as elaborate and specific distribution of student engagement during learning through work – Table 2.

| Study program | Month | II semester | | | | | |
|---|---|---|---|---|---|---|---|
| | | II | III | IV | V | VI | Total |
| Civil Ingineering | Hours at the employer | 60 | 60 | 80 | 100 | 150 | 450 |

Tab. 2: Structure of student engagement during learning through work at the University of Novi Pazar

At the end of their presentation, prof. Kostić and Ganić described in details the procedure for introducing a dual model of studies at the State University of Novi Pazar.

After the presentation held by the representatives of the University of Novi Pazar, at 12.30, the representatives of the Academy of Technical and Art Applied Studies (Scholl of Electrical anad Computer Engineering) presented the key results they’ve obtained during the DualEdu project realisation. They’ve also presented their pilot study module with the distribution of students’ engagement shown in Table 3.

| Course | Semester: | Number of active classes (hours) |
|---|---|---|
| **Student Internship 1** | 2nd | 180 |
| **Student Internship 2** | 3rd | 180 |
| **Applied Research Work** | 4th | 240 |
| **Master Thesis Work** | 4th | 480 |
| **TOTAL:** | | **1080** |

Tab. 3: Structure of student engagement at the Scholl of Electrical anad Computer Engineering (Academy of Technical and Art Applied Studies)

Beside the piloted dual study model, the representatives of the Scholl of Electrical anad Computer Engineering (Academy of Technical and Art Applied Studies) have presented the training material they developed as well as the equipment they acquired within DuelEdu project.

At 1.00 p.m., after brief discussion, the Final conference was officially concluded by the Project Coordinator, prof. dr-ing. Nenad Zrnić, who invited present guest to lunch break – where COVID-19 pandemic recomended measures were fully followed.

In total, the Final conference was attended by more than 60 participants, among them – 19 were present on-site (Fig. 5 – Attendance list), and rest of them followed the conference by provided video link. The main impression of the conference was very positive as presentations held by expirienced professors were very interesting to the audience, especially taking into account that the following discussion was really successful.

The positive atmosfere of the Final conference is best described by the photo galery (Annex 1) and provided presentations (Annex 2).

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DualEdu Erasmus+

Implementation of Dual Education in Higher Education of Serbia
Kraljice Marije 16, 11120 Belgrade 35, Republic of Serbia

email: nzrnic@mas.bg.ac.rs

Faculty of Mechanical Engineering

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# ATTENDANCE LIST

TYPE OF THE EVENT: Meeting
**FINAL CONFERENCE / LOCAL COMMITTEE**

contacts: Prof. Dr.-Ing. Nenad Zrnić, tel: +381-63-287-193
Dr.-Ing. Žarko Mišković, +381-64-18-32-989

**Date and place of the event: 08/07/2021 UB (University of Belgrade – Faculty of Mechanical Engineering), Kraljice Marije 16, 11120 Belgrade 35**

$08^{30} - 19^{30}$h

| No. | Name and Surname | E-mail adress | Phone | Institution | Signature |
|---|---|---|---|---|---|
| 1. | MILADIN KOSTIĆ | miloslicg... | | SUNP | |
| 2. | NENAD STAMBOLIĆ | ... | | UKG | |
| 3. | OLIVERA MIJAJLOVIĆ | ... | | UNIKG | |
| 4. | MILICA STOJANOVIĆ | ... | | UNIKG | |
| 5. | MARKO LUKIĆ | ... | | UNIKG | |
| 6. | GORAN DIKIĆ | ... | | VISER | |

| | | | | | |
|---|---|---|---|---|---|
| 7. | NENAD ZELNIC | | | UB | |
| 8. | VERA PETROVIĆ | | | GAIUSS/ VISER | |
| 9. | DRAGAN DAMJANOVIĆ | | | BMG | |
| 10. | BOJANA DAMJANOVIĆ | | | RMU | |
| 11. | Ljilica Ilić | | | NiCAT | |
| 12. | Milijana Marinović | | | NiCAT | |
| 13. | LJUBORAG TOJSIĆ | | | MF-Beograd | |
| 14. | JASMINA DELIBAŠIĆ | | | SUNP | |
| 15. | Senad Gronić | | | SUNP | |
| 16. | Snežana Dragićević | | | UHIKG | |
| 17. | DANIJELA MILOSEVIĆ | | | UHIKG | |
| 18. | SANJA SEFEROVIĆ | | | UB | |
| 19. | MARKO MIŠKOVIĆ | | | UB-FME | |
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| 35. | | | | | |

2

Fig. 5: DualEdu Final conference Attendance list

# Annex 1

DualEdu Final conference Photo Galery


Project summary - REMINDER
After analysis best practices in Europe and worldwide, and after interviewing interested companies in Serbia what DHE models are the most suitable to them, the project will specify a flexible and generic DHE model from which different specific DHE models could be derived and implemented according to companies requirements. The project plans to propose amendments to the corresponding legislation (Law on Dual Education, Law on Higher Education, Labour Law) and to accreditation standards. The selected DHE models will be tested during their pilot implementations by all Serbian HEIs participating in the project and with companies - its associate members, during the second half of this 3-years project. At the end, a survey and interviews of companies with and without DHE students will identify benefits of introducing DHE in Serbia.

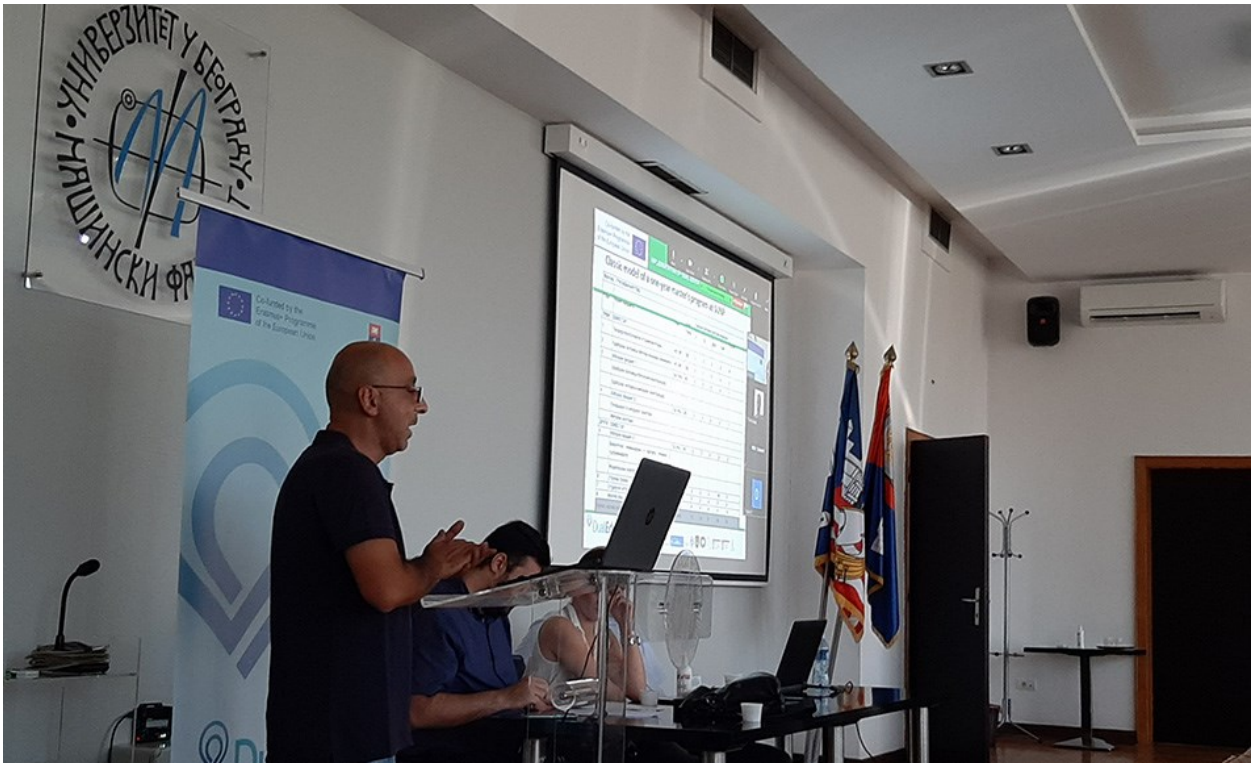

DualEdu


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УНИВЕРЗИТЕТ У БЕОГРАДУ
МАШИНСКИ ФА






Olivera Mijatovic

# Annex 2

DualEdu Final conference Presentations

UNIVERSITY OF BELGRADE

# Implementation of Dual Education in Higher Education of Serbia / DualEdu – PROJECT SCOPE AND OBJECTIVES

Prof. dr.-Ing. Nenad Zrnić



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

EACEA 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP
IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

## Project summary - REMINDER

- After analysis best practices in Europe and worldwide, and after interviewing interested companies in Serbia what DHE models are the most suitable to them, the project will specify a flexible and generic DHE model from which different specific DHE models could be derived and implemented according to companies requirements. The project plans to propose amendments to the corresponding legislation (Law on Dual Education, Law on Higher Education, Labour Law) and to accreditation standards. The selected DHE models will be tested during their pilot implementations by all Serbian HEIs participating in the project and with companies - its associate members, during the second half of this 3-years project. At the end, a survey and interviews of companies with and without DHE students will identify benefits of introducing DHE in Serbia.

# What was planned to be achieved within Dualedu project – by the Project proposal?



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

## Project aims and objectives

- Aims:
  - Accessibility of the higher education is addressed by providing students possibility to work and learn during their studies.
  - By implementing DHE, Serbia converges its HE system with EU development in HE.
- Objectives:
  - By integrating classroom learning and work practice, DHE will have a positive impact to HE quality, i.e. its relevance for the labour market and society.
  - By setting the legislation for DHE, national authorities will modernize Serbian HE system.Dissemination activities are defined in separate work package – WP 6

## Specific project objectives

- To enable students to acquire more relevant knowledge and skills by combining formal education with training acquired at the work place.
- To propose the changes to legislation/regulations to adapt to Dual Higher Education in the Republic of Serbia
- To develop flexible and generic Dual Higher Education Model (DHEM) to support different needs and interests of employers, higher education institutions (HEIs) and students in different industrial sectors and to provide recommendations to HEIs for implementation of Dual Higher Education
- To raise the motivation of students to study and interest of HEIs and companies to support and implement Dual Higher Education and to decrease drop-out of students.



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

## Which organisations were participating in realisation of planned aims and objectives?

# Participants – Partner organisations

| Partner no | PIC | Role | Organisation Name | City | Country |
|---|---|---|---|---|---|
| P1 | 999641843 | Applicant Organisation | UNIVERZITET U BEOGRADU | BEOGRAD | Serbia |
| P2 | 999489456 | Partner Organisation | FH JOANNEUM GESELLSCHAFT M.B.H. | GRAZ | Austria |
| P3 | 944015835 | Partner Organisation | Formasup | Villeneuve d'Ascq | France |
| P4 | 999838559 | Partner Organisation | UNIVERSIDAD DE LLEIDA | LLEIDA | Spain |
| P5 | 967298357 | Partner Organisation | SPOLECZNA AKADEMIA NAUK | LODZ | Poland |
| P6 | 913947581 | Partner Organisation | PowMio GmbH | Karlsruhe | Germany |
| P7 | 960092227 | Partner Organisation | VISOKOSKOLSKA USTANOVA METROPOLITANUNIVERZITET U BEOGRADU | Belgrade | Serbia |



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EACEA 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP
IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# Participants – Partner organizations

| Partner no | PIC | Role | Organisation Name | City | Country |
|---|---|---|---|---|---|
| P8 | 998833833 | Partner Organisation | UNIVERZITET U NOVOM SADU | NOVI SAD | Serbia |
| P9 | 998850323 | Partner Organisation | UNIVERZITET U KRAGUJEVCU | KRAGUJEVAC | Serbia |
| P10 | 933416257 | Partner Organisation | DRZAVNI UNIVERZITET U NOVOM PAZARU | NOVI PAZAR | Serbia |
| P11 | 940285603 | Partner Organisation | VISOKA SKOLA ELEKTROTEHNIKE I RACUNARSTVA STRUKOVNIH STUDIJA | Belgrade | Serbia |
| P12 | 999821681 | Partner Organisation | MINISTARSTVO PROSVETE, NAUKE I TEHNOLOSKOG RAZVOJA | BELGRADE | Serbia |
| P13 | 947217708 | Partner Organisation | National Council for Higher Education of the Republic of Serbi | Belgrade | Serbia |
| P14 | 915736261 | Partner Organisation | Cluster Ni-CAT | Nis | Serbia |

# Participants – Associated Partners

| Ref.nr | Name of organisation | Type of institution | City | Country | Role in the project |
|---|---|---|---|---|---|
| 1. | NetCast doo | SME | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 2. | URIDIUM DOO VALJEVO | SME | Valjevo | Serbia | Survey of needs and potential DHEM implementation |
| 3. | NGSOFTWARE DOO | SME | Niš | Serbia | Survey of needs and potential DHEM implementation |
| 4. | MELANY TEAM DOO | SME | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 5. | S-Cube Solution d.o.o. | SME | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 6. | Mladen Trisic PR Konsultantske usluge u oblasti Informacione Tehnologije | SME | Obrenovac | Serbia | Survey of needs and potential DHEM implementation |
| 7. | Fox Electronics doo | SME | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 8. | Mihajlovic Soft d.o.o. | SME | Niš | Serbia | Survey of needs and potential DHEM implementation |
| 9. | JAVNO PREDUZECE EMISIONA TEHNIKA I VEZE BEOGRAD | National public body | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 10. | FUL Elektro d.o.o. | SME | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 11. | Vojvodina ICT Cluster | NGO | Veternik | Serbia | Survey of needs and potential DHEM implementation |
| 12. | Seavus d.o.o. | SME | Belgrade | Serbia | Survey of needs and potential DHEM implementation |
| 13. | Innovative Software Technologies - IST | SME | Niš | Serbia | Survey of needs and potential DHEM implementation |



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# How the planned results were supposed to be achieved?

# Work Packages and tasks

- **WP1 - Preparation**
  - 1.1. Analysis of EU practices and experiences
  - 1.2. Study visits of EU partners
  - 1.3. Survey of companies needs for DHE in Serbia
- **WP2 - Development**
  - 2.1. Development of a flexible and generic Dual Higher Education Model for Serbia
  - 2.2. Conference on DualEdu added value on industrial sector
  - 2.3. Discussion Forum on the proposed DHEM model with key stakeholders and policy makers
- **WP3 - Development**
  - 3.1. Creating amendments to the Law on Dual Education and Law on Higher Education of Serbia
  - 3.2. Creating amendments to the Labour Law
  - 3.3. Creating amendments to the Accreditation Standards
  - 3.4. Discussion forum on draft proposals of amendments
  - 3.5. Creating recommendations to HEIs in Serbia how to implement DHE
- **WP4 - Development**
  - 4.1. Identification and conceptual definition of specific DHEMs
  - 4.2. Presenting specific DHEMs to companies and making agreements for participation
  - 4.3. Planning of pilot testing of specific DHEMs
  - 4.4. Purchase of equipment
  - 4.5. Development of training materials
  - 4.6. Purchase of equipment
  - 4.7. Analysis of the results of pilot testing
- **WP5 - Quality plan**
  - 5.1. Creating quality and evaluation strategy and project quality monitoring
  - 5.2. Preparation of the interim evaluation report
  - 5.3. Preparation of the final evaluation report
- **WP6 - Dissemination & Exploitation**
  - 6.1. Defining dissemination and exploitation plan
  - 6.2. Preparation of dissemination products
  - 6.3. Preparation of the interim dissemination and exploitation report
  - 6.4. Preparation of the final dissemination and exploitation report
  - 6.5. Final Conference
- **WP7 - Management**
  - 7.1. Overall project management
  - 7.2. 5 Steering Committee meetings
  - 7.3. 7 Local Committee meetings
  - 7.4. Monitoring and interim report
  - 7.5. Final report



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# Work Plan for year 1

| Activities | | Total duration (number of weeks) | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref.nr/ Sub-ref nr | Title | | | | | | | | | | | | | |
| 1.1. | Analysis of EU practices and experiences | | 4X= | 4X= | 4X= | 4X= | 4X= | 4X= | | | | | | |
| 1.2. | Study visits of EU partners | | | 1= | 1= | 1= | 1= | 1= | | | | | | |
| 1.3. | Survey of companies needs for DHE in Serbia | | 4X | 4X | 4X | 4X | | | | | | | | |
| 2.1. | Development of a flexible and generic Dual Higher Education Model for Serbia | | | | 4X | 4X | 4X | 4X | 4X | | | | | |
| 2.2. | Conference on DualEdu added value on industrial sector | | | | | | | 2X | | | | | | |
| 2.3. | Discussion Forum on the proposed DHEM model with key stakeholders and policy makers | | | | | | | | 4X | | | | | |
| 3.1. | Creating amendments to the Law on Dual Education and Law on Higher Education of Serbia | | | | | | | 4X | 4X | 4X | | | | |
| 3.2. | Creating amendments to the Labour Law | | | | | | | 4X | 4X | 4X | | | | |
| 3.3. | Creating amendments to the Accreditation Standards | | | | | | | 4X | 4X | 4X | | | | |
| 3.4. | Discussion forum on draft proposals of amendments | | | | | | | | | 4X | | | | |
| 3.5. | Creating recommendations to HEIs in Serbia how to implement DHE | | | | | | | | | | | | | |
| 4.1. | Identification and conceptual definition of specific DHEMs | | | | | | | | | | 4X | 4X | 4X | 4X |

# Work Plan for year 1

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.2. | Presenting specific DHEMs to companies and making agreements for participation | | | | | | | | | | | 4X | 4X |
| 4.3. | Planning of pilot testing of specific DHEMs | | | | | | | | | | | 2X | 2X |
| 4.4. | Purchase of equipment | | | | | | | | 2X | 2X | 2X | 2X | 2X |
| 4.5. | Development of training materials | | | | | | | | | | | 4x | 3x |
| 5.1. | Creating quality and evaluation strategy and project quality monitoring | | 4X= | 4X= | 4X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= |
| 6.1. | Defining dissemination and exploitation plan | | 4X | 4X | | | | | | | | | | |
| 6.2. | Preparation of dissemination products | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 7.1. | Overall project management | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 7.2. | 5 Steering Committee meetings | | 1X | | | | | | | 1X | | | | |
| 7.3. | 7 Local Committee meetings | | | 1X | | | | | 1X | 1X | | | | |



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# Work Plan for year 2

| Activities | | Total duration (number of weeks) | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref.nr/ Sub-ref nr | Title | | | | | | | | | | | | | |
| 4.1. | Identification and conceptual definition of specific DHEMs | | 4X | | | | | | | | | | | |
| 4.2. | Presenting specific DHEMs to companies and making agreements for participation | | 4X | 4X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 4.3. | Planning of pilot testing of specific DHEMs | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 4.4. | Purchase of equipment | | 2X | 2X | 2X | | | | | | | | | |
| 4.5. | Development of training materials | | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X |
| 4.6. | Pilot implementation and testing of specific DHEMs | | | | | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X |
| 5.1. | Creating quality and evaluation strategy and project quality monitoring | | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= |
| 5.2. | Preparation of the interim evaluation report | | | | | | 4X | | | | | | | |
| 6.1. | Defining dissemination and exploitation plan | | 4X | 4X | | | | | | | | | | |
| 6.2. | Preparation of dissemination products | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 6.3. | Preparation of the interim dissemination and exploitation report | | | | | 2X | 4X | 4X | | | | | | |
| 7.1. | Overall project management | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 7.2. | 5 Steering Committee meetings | | 1X | | | | | | | 1X | | | | |
| 7.3. | 7 Local Committee meetings | | 1X | | | | | | | | | | | 1X |
| 7.4. | Monitoring and interim report | | | | | | | 4x | | | | | | |

# Work Plan for year 3

| Activities | | Total duration (number of weeks) | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref.nr/ Sub-ref nr | Title | | | | | | | | | | | | | |
| 3.5. | Creating recommendations to HEIs in Serbia on how to implement DHE | | | | | | | | 4X | 4X | 4X | 4X | 4X | 4X |
| 4.2. | Presenting specific DHEMs to companies and making agreements for participation | | 1X | 1X | 1X | | | | | | | | | |
| 4.3. | Planning of pilot testing of specific DHEMs | | 1X | 1X | 1X | | | | | | | | | |
| 4.5. | Development of training materials | | 4X | 4X | 4X | 2X | | | | | | | | |
| 4.6. | Pilot implementation and testing of specific DHEMs | | 4X | 4X | 4X | 4X | 4X | 4X | 4X | 4X | | | | |
| 4.7. | Analysis of the results of pilot testing | | | | | | | | 4X | 4X | 4X | 4X | 4X | |
| 5.1. | Creating quality and evaluation strategy and project quality monitoring | | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= | 1X= |
| 5.3. | Preparation of the final evaluation report | | | | | | | | | | | 4X | 4X | 4X |
| 6.1. | Defining dissemination and exploitation plan | | 4X | | | | | | | | | | | |
| 6.2. | Preparation of dissemination products | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 6.4. | Preparation of the final dissemination and exploitation report | | | | | | | | | | | 2X | 4X | 4X |
| 6.5. | Final Conference | | | | | | | | | | | | 4X | 4X |
| 7.1. | Overall project management | | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X | 1X |
| 7.2. | 5 Steering Committee meetings | | | | | | | | | | | | | 1X |
| 7.3. | 7 Local Committee meetings | | | | | | | | 1X | | | | | 1X |
| 7.5. | Preparation of final report | | | | | | | | | | | | | 4x |

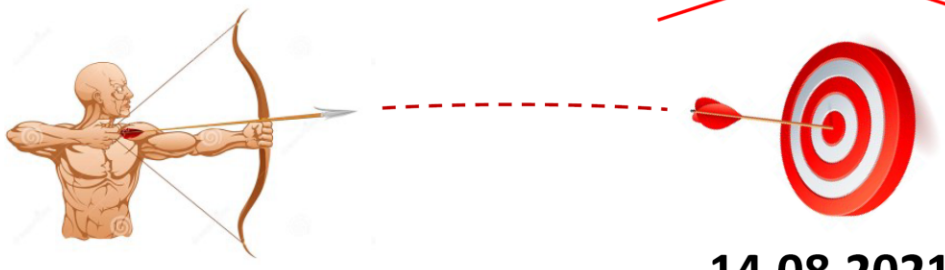




# Project start and end date – CHANGED DUE COVID 19

**15.10.2017.**

~~**14.10.2020.**~~



**14.08.2021.**

# Project management team – responsible for the control of the project realisation?





# Steering committee



# Planned activities after Intermediate Report?





## PROJECT STATE AND ONGOING ACTIVITIES – AFTER INTERMEDIATE

- Preparation and implementation od dual education study programmes (including training materials etc.)
- Pilot testing of dual education study programmes
- Evaluation of pilot study programmes success
- Writting of reccomendation for HEI how to implement Dual education
- Preparation of final Report on project realisation (Intermediate Report was successfully send to EC – project progress was assessed as good and according to plan)

**How much of the planned goals and objectives are finished and what else needs to be done before the end of the project?**

**THIS WILL BE ANSWERED by the Doc.dr-ing. Žarko Mišković**



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THANK YOU FOR YOUR ATTENTION!




*Parole: ON THE ROAD TO SUCCESS, THERE ARE NO SHORTCUTS*

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DualEdu +Erasmus

# Description and Concept of the proposed Specific DHEM at the University of Belgrade


Prof. dr.-Ing. Nenad Zrnić
Prof. dr.-Ing. Živana Jakovljević
Doc. dr.-Ing. Žarko Mišković
dr.-ing. Sanja Šešlija





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## WP4 - *Pilot testing of the flexible and generic DHEM – first step: elaborate*



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**Д4.1 Опис и концепт специфичног дуалног модела студија на Универзитету у Београду**
**D4.1 Description and Concept of Specific DHEM at the University of Belgrade**


contacts: Prof. Dr.-Ing. Nenad Zrnić, tel: +381-63-287-193
Dr.-Ing. Žarko Mišković, +381-64-18-32-989


| | |
|---|---|
| Project acronym: | DUALEDU |
| Project full title: | Implementation of Dual Education in Higher Education of Serbia |
| Project No: | 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP (2017-2962/001-001) |

**ЕЛАБОРАТ О СТУДИЈСКОМ ПРОГРАМУ КОЈИ СЕ РЕАЛИЗИЈЕ ПО ДУАЛНОМ МОДЕЛУ СТУДИЈА У ВИСОКОМ ОБРАЗОВАЊУ**

У складу са чланом 4 Закона о дуалном моделу студија и високом образовању

**ФОРМА И САДРЖАЈ ЕЛАБОРАТА**

Елаборат треба да обезбеди следеће информације:

1 **Назив и седиште високошколске установе**

**Универзитет у Београду – Машински факултет, Краљице Марије 16, 11000 Београд**

2 **Подаци о студијском програму**

Студијски програм Мастер академске студије Индустрија 4.0 је акредитован од стране Националног тела за акредитацију и проверу квалитета у високом образовању – Уверење број 612-00-00332/6/201-03 од 04.10.2019.

Активна настава за студенте који у оквиру овог студијског програма студирају по дуалном моделу врши се обједињено са студентима који не студирају по дуалном моделу.

- Студијски програм треба да је претходно акредитован у складу са стандардима за акредитацију студијских програма
- Информација да ли је реализација студијског програма (активна настава) обједињена за све студенте тог студијског програма, или се држи посебна настава само за студенте студијског програма. ВШУ може да предвиди више различитих могућности које нуди послодавцима и студентима.

# WP4 - *Pilot testing of the flexible and generic DHEM – time schedule*

| | ПОНЕДЕЉАК | УТОРАК | СРЕДА | ЧЕТВРТАК | ПЕТАК |
|---|---|---|---|---|---|

**ПРВИ СЕМЕСТАР**

**Семестар траје 15 календарских седмица и три дана. Понедељак у петој, уторак у шестој и среда у петнаестој календарској седмици су за студенте по дуалном моделу код послодавца где обављају друге облике наставе, а студенти по класичном моделу су слободни; понедељак, уторак и среда у 16. календарској седмици су на ВШУ. Студенти по дуалном моделу су слободни током ДОН на ВШУ.**

| | | | | | |
|---|---|---|---|---|---|
| **14:00 – 20:00 (настава на ВШУ) Код послодавца 8 сати по договору** | Увод у производне системе | Савремени менаџмент и мрежна организација предузећа | Статистика за аутоматску анализу података | Роботика и вештачка интелигенција 0 или 24 радна сата | Алгоритми и структуре података |

**ДРУГИ СЕМЕСТАР**

**Семестар траје 17 календарских седмица и два дана. Понедељак у 4, 9 и 14, уторак у 5, 10 и 15, среда у 6 и 11, четвртак у 7 и 12 и петак у 8 и 13 календарској седмици су за студенте по дуалном моделу код послодавца где обављају друге облике наставе, а студенти по класичном моделу су слободни. Студенти по дуалном моделу су слободни током ДОН на ВШУ.**

| | | | | | |
|---|---|---|---|---|---|
| **14:00 – 20:00 (настава на ВШУ) Код послодавца 8 сати по договору** | Машинско учење интелигентних роботских система 0 или 48 радних сати | Кибернетско физички системи 0 или 24 радна сата | Група изборних предмета М1 0 или 24 радна сата | Група изборних предмета Р1 | Пројектовање пословних модела у Индустрији 4.0 |

**ТРЕЋИ СЕМЕСТАР**

**Семестар траје 16 календарских седмица и један дан. Понедељак у 3 и 15, уторак у 5, среда у 8, четвртак у 10. и петак у 13. календарској седмици су за студенте по дуалном моделу код послодавца где обављају друге облике наставе, а студенти по класичном моделу су слободни. Студенти по дуалном моделу су слободни током ДОН на ВШУ.**

| | | | | | |
|---|---|---|---|---|---|
| **14:00 – 20:00 (настава на ВШУ) Код послодавца** | Интерфејси за интероперабилност система за Индустрију 4.0 | Група изборних предмета М2 0 или 24 радна сата | Група изборних предмета М3 0 или 24 радна сата | Група изборних предмета Р1 | Пракса – део 1 120 радних сати |

| | | | | | |
|---|---|---|---|---|---|
| **8 сати по договору** | | | | | |

**ЧЕТВРТИ СЕМЕСТАР**

**Семестар траје 15 календарских седмица и три дана. Понедељак у петој, уторак у шестој и среда у петнаестој календарској седмици су за студенте по дуалном моделу код послодавца где обављају друге облике наставе, а студенти по класичном моделу су слободни; понедељак, уторак и среда у 16. календарској седмици су на ВШУ. Студенти по дуалном моделу су слободни током ДОН на ВШУ.Студенти по дуалном моделу имају још пет додатних седмица код послодавца.**

| | | |
|---|---|---|
| **14:00 – 20:00 (настава на ВШУ) Код послодавца 8 сати по договору** | Група изборних предмета М4 0 или 24 радна сата | Пракса – део 2 320 радних сати<br>Мастер рад – истраживање и израда 360 радних сати |





# WP4 - *Pilot testing of the flexible and generic DHEM - courses*

**Табела 5.16.** Распоред предмета по семестрима и годинама студија за за студије другог степена студија: МАС, МСС и САС

| Редни број | Шифра | Назив | Сем. | Активна настава | | | | Ост. | ЕСПБ | Обавезни/ Изборни О/И | Тип предмета |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | П | В | ДОН /учење кроз рад | Учење кроз рад | | | | |
| ПРВА ГОДИНА | | | | | | | | | | | |
| 1. | 9000 | Увод у производне системе | Први | 45 | 30 | | | | 6 | О | Теоријско-методолошки |
| 2. | 9001 | Савремени менаџмент и мрежна организација предузећа | Први | 30 | 45 | | | | 6 | О | Теоријско-методолошки |
| 3. | 9002 | Статистика за аутоматску анализу података | Први | 30 | 45 | | | | 6 | О | Теоријско-методолошки |
| 4. | 9003 | Роботика и вештачка интелигенција | Први | 45 | 15 | 15/24 | | | 6 | О | Стручно-апликативни |
| 5. | 9004 | Алгоритми и структуре података | Први | 45 | 30 | | | | 6 | О | Теоријско-методолошки |
| 6. | 9005 | Пројектовање пословних модела у Индустрији 4.0 | Други | 45 | 30 | | | | 6 | О | Теоријско-методолошки |
| 7. | 9006 | Машинско учење интелигентних роботских система | Други | 30 | 15 | 30/48 | | | 6 | О | Научно-стручни |
| 8. | 9007 | Кибернетско физички системи | Други | 45 | 15 | 15/24 | | | 6 | О | Стручно-апликативни |
| Група изборних предмета М1 (студент бира 1 предмет) | | | | 30 | 30-45 | 0-15/0-24 | | | 6 | | |
| 9. | 9012 | Дистрибуирани системи у машинству | Други | *30* | *30* | *15/24* | | | *6* | И | Стручно-апликативни |
| 10. | 9013 | Управљање ланцима снабдевања | Други | *30* | *45* | | | | *6* | И | Стручно-апликативни |
| 11. | 9014 | Дигитални мерни системи | Други | *30* | *30* | *15/24* | | | *6* | И | Стручно-апликативни |
| Група изборних предмета Р1 (студент бира 1 предмет) | | | | 30 | 45 | | | | 6 | | |
| 12. | 9016 | Рачунарска интелигенција | Други | *30* | *45* | | | | *6* | И | Научно-стручни |
| 13. | 9015 | Машинско учење | Други | *30* | *45* | | | | *6* | И | Научно-стручни |
| 14. | 9017 | Увод у биоинформатику | Други | *30* | *45* | | | | *6* | И | Научно-стручни |
| 15. | 9018 | Истраживање података | Други | *30* | *45* | | | | *6* | И | Научно-стручни |
| Укупно часова (предавања+вежбе, ДОН, остали часови) и ЕСПБ на години | | | | 375 | 300-315 | 60-75/**96-120** | | | 60 | | |
| Укупно часова активне наставе на години | | | | 675-750 | | | | | | | |
| Укупно радних сати учења кроз рад на години | | | | **0-120** | | | | | | | |
| ДРУГА ГОДИНА (ЗАВРШНА ГОДИНА) | | | | | | | | | | | |
| 16. | 9008 | Интерфејси за интероперабилност система за Индустрију 4.0 | Трећи | 45 | 30 | | | | 6 | О | Теоријско-методолошки |
| Група изборних предмета Р1 (студент бира 1 предмет) | | | | 30 | 45 | | | | 6 | | |
| 12. | 9016 | Рачунарска интелигенција | Трећи | *30* | *45* | | | | *6* | И | Научно-стручни |

# WP4 - *Pilot testing of the flexible and generic DHEM - courses*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13. | 9015 | Машинско учење | Трећи | *30* | *45* | | | | *6* | И | Научно-стручни |
| 14. | 9017 | Увод у биоинформатику | Трећи | *30* | *45* | | | | *6* | И | Научно-стручни |
| 15. | 9018 | Истраживање података | Трећи | *30* | *45* | | | | *6* | И | Научно-стручни |
| Група изборних предмета М2 (студент бира 1 предмет) | | | | 45 | 15-30 | 0-15/0-24 | | | 6 | | |
| 17. | 9020 | Управљање квалитетом и ризиком у индустрији 4.0 | Трећи | *45* | *30* | | | | *6* | И | Научно-стручни |
| 18. | 9021 | Индустријски интернет ствари и сајбер безбедност | Трећи | *45* | *15* | *15/24* | | | *6* | И | Научно-стручни |
| 19. | 9019 | Виртуелна реалност | Трећи | *45* | *30* | | | | *6* | И | Научно-стручни |
| Група изборних предмета М3 (студент бира 1 предмет) | | | | 30 | 30-45 | 0-15/0-24 | | | 6 | | |
| 20. | 9024 | Дигитална фабрика и интелигентно одржавање | Трећи | *30* | *45* | | | | *6* | И | Стручно-апликативни |
| 21. | 9022 | Експлоатација података | Трећи | *30* | *45* | | | | *6* | И | Стручно-апликативни |
| 22. | 9023 | Терминирање технолошких система и процеса | Трећи | *30* | *30* | *15/24* | | | *6* | И | Научно-стручни |
| 23. | 9009 | Пракса, 1. Део | Трећи | | | | 120 | | 6 | О | Стручно-апликативни |
| Група изборних предмета М4 (студент бира 1 предмет) | | | | 30 | 30-45 | 0-15/0-24 | | | 6 | | |
| 24. | 9025 | Пословна интелигенција и пословна аналитика | Четврти | *30* | *30* | *15/24* | | | *6* | И | Научно-стручни |
| 25. | 9026 | Флексибилни и реконфигурабилни технолошки системи | Четврти | *30* | *45* | | | | *6* | И | Стручно-апликативни |
| 26. | 9028 | Примене теорије игара у инжењерству и менаџменту за Индустрију 4.0 | Четврти | *30* | *45* | | | | *6* | И | Научно-стручни |
| 27. | 9027 | Предузетништво и организационе културе | Четврти | *30* | *45* | | | | *6* | И | Стручно-апликативни |
| 28. | 9010 | Пракса, 2.део | Четврти | | | | 320 | | 9 | О | Стручно-апликативни |
| 29. | 9011 | Мастер рад – истраживање и израда | Четврти | | | | 360 | | 12 | О | Стручно-апликативни |
| 30. | 9029 | Мастер рад – одбрана | Четврти | | | | | 15 | 3 | О | Стручно-апликативни |
| Укупно часова (предавања+вежбе, ДОН, СИР/ПИР, остали часови) и ЕСПБ на години | | | | 180 | 150-195 | 0-45/**0-72** + **800** | | 15 | 60 | | |
| Укупно часова активне наставе на години | | | | 330-375 | | | | | | | |
| Укупно радних сати учења кроз рад на години | | | | **800-872** | | | | | | | |
| Укупно часова активне наставе и осталих часова за све године студија | | | | 1005-1125 | | | | 15 | | | |
| Укупно радних сати учења кроз рад за све године студија | | | | **920-992** | | | | | | | |
| Укупно бодова за све године студија | | | | | | | | | 120 | | |
| **Напомена:** Изборни предмети по групама су у осенченим пољима | | | | | | | | | | | |



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EACEA 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP
IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# WP4 - *Pilot testing of the flexible and generic DHEM – accreditation standards*

**Стандард 13: Дуално образовање**

Опис концепта дуалног образовања на студијском програму. Навести како послодавац испуњава услове ради извођења учења кроз рад према закону. (1000 речи)

**Опис**

У оквиру студијског програма Мастер академских студија (МАС) Индустрија 4.0 уводи се дуални модел студија за заинтересоване студенте. У оквиру дуланог модела студенти предмете Пракса - део 1 у трајању од 120 радних сати (један дан седмично током 15 седмица у трећем семестру), Пракса – део 2 у трајању од 320 радних сати (осам радних седмица током четвртог семестра) и Мастер рад – истраживање и израда у трајању од 360 радних сати током четвртог семестра обављају код послодавца. Поред тога, студенти који студирају по дуалном моделу морају извршити избор изборних предмета током студија који обезбеђује да су други облици наставе заступљени са укупно минимално 75 часова за све предмете током читавих студија (минималан број предвиђен за студијски програм који се изводи без дуалног модела је 60, а максималан 120 часова). Други облици наставе се у договору са предметним наставником изводе код послодавца у односу 5 часова других облика наставе одговара једном радном дану (8 радних сати). На овај начин студенти минимално остварују 120, а максимално 192 радна сата.

Укупно оптерећење студената током двогодишњег студијског програма је 1005-1125 часова активне наставе и 920-992 сати учења кроз рад у зависности од изборних предмета и других облика наставе који се изводе код послодавца.

Послодавцу ће бити достављено упутство за поступање са студентима на основу кога ће студентима доделити индустријског ментора који ће са ментором са Универзитета у Београду – Машински факултет или Универзитета у Београду – Математички факултет заједнички формирати план развоја студента и квантификативне показатеље његовог напретка на основу којих ће студент добити оцену.

Прилози 13.2, 13.6 и 13.9 ће бити достављени када од стране Националног тела за акредитацију буде омогућена акредитација студијских програма по дуалном моделу студија.

Прилог 13.4 ће бити креиран за сваког послодавца понаособ у складу са динамиком укључивања послодаваца у студијски програм.

**Табела 13.1** Табела са основним елементима везаним за дуално образовање

**Табела 13.2** Табела са списком послодаваца код којих ВУ упућује студенте на учење кроз рад

**Евиденција:**

**Прилог 13.1** Елаборат о реализацији дуалног модела студија, са планом и програмом реализације учења кроз рад

**Прилог 13.2** Одлука стручног органа самосталне високошколске установе о усвајању елабората

**Прилог 13.3.а** Копије уговора о дуалном образовању које је ВУ склопила са послодавцима

**Прилог 13.3.б** Копије изјаве о намерама послодаваца

**Прилог 13.4** Докази да послодавац испуњава услове за извођење учења кроз рад, а који су у складу са законом. (Члан 11 Закона о дуалном моделу студија у ВО)

**Прилог 13.5** Распоред часова активне наставе и учења кроз рад по недељама, за целу школску годину и за сваку годину студија појединачно

**Прилог 13.6** Општи акт којим је утврђен начин провере компетенција ментора код послодавца

**Прилог 13.7** Општи акт којим су утврђени специфични услови за упис студената на студијске програме по дуалном моделу, као и услови преласка студената са дуалног на друге моделе студија, односно преласка на дуални модел студија

**Прилог 13.8** Општи акт у којем је уређено оцењивање студента по дуалном моделу

**Прилог 13.9** Копије дописа установе о томе да је обавестила Министарство и Привредну комору о закљученим уговорима са послодавцима

**Прилог 13.10** Интернет линк ка страници која садржи основне информације о студијском програму и друге информације од значаја за извођење учења кроз рад

**Прилог 13.11** У случају да се део учења кроз рад реализује кроз рад на самој ВШУ или код ТРЕЋЕГ лица, доказ да они поседују материјалне, техничке и кадровске услове (Члан 6, став 3, Закона о дуалном моделу студија у ВО)

**Прилог 13.12.** Књига предмета МАС Индустрија 4.0

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# WP4 - *Pilot testing of the flexible and generic DHEM – time distribution between lectures in company and at the FME*

**Табела 13.1** Табела са основним елементима везаним за дуално образовање

| | |
|---|---|
| Обим учења кроз рад исказан у радним сатима и ЕСПБ<br><br>(на свим годинама студија) | 920-1040 радних сати<br><br>27 ЕСПБ |
| Обим теоријске наставе исказан у часовима и ЕСПБ<br><br>(на свим годинама студија) | 1005-1125 часова активне наставе<br><br>93 ЕСПБ |
| Укупно часова и ЕСПБ (на свим годинама студија) | |
| Број послодаваца код којих ВУ упућује студенте на учење кроз рад | 18 |
| Максималан број студената које ВУ упућује на учење кроз рад према склопљеним уговорима | 5 |
| Планирани број студената на студијском програму | 35 |
| Датум када је ВУ обавестила надлежно министарство о закљученим уговорима са послодавцима | - |
| Датум када је ВУ обавестила привредну комору о закљученим уговорима са послодавцима | - |



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# WP4 - *Pilot testing of the flexible and generic DHEM – list of companies which signed contracts with FME regarding to the dual education*

## Spisak poslodavaca i dokaz o saradnji poslodavca (Ugovori) kod kojih će se realizivati dualno obrazovanje u okviru studijskog programa Industrija 4.0 i Mašinskog fakulteta

1. Siemens Mobility doo Cerovac, Sobovica bb, 34321 Kragujevac
2. NPS d.o.o, Bulevar maršala Tolbuhina 44, 11070 Novi Beograd
3. Metalac ad, Kneza Aleksandra 212, 32300 Gornji Milanovac
4. Milanović Industries Group doo, Beogradska bb, 34000 Kragujevac
5. Kompanija Sloboda, Ratka Mitrovića bb, 32000 Čačak
6. Nelt Co d.o.o, Maršala Tita 206, 11000 Beograd
7. Inmold plast doo, Vojvode Mišića 5, 31210 Požega
8. Iva 28 d.o.o Beograd, Jurija Gagarina 231/322, 11070 Nivi Beograd
9. Key IT d.o.o, Antifašističke borbe 47/4, 11000 Beograd
10. Servoteh d.o.o. Dobanovci, Ugrinovička 163, 11272 Dobanovci
11. Composite Technology Team doo, Igora Vasiljevića 49, 11210 Beograd
12. Festo Gesellschaft m.b.H. ogpanak Beograd, Omladinskih brigada 90v, 11070 Novi Beograd
13. Stell Product and Project, Konjevića bb, 32000 Čačak
14. Bratel - Kron doo, Save Čobanovića 26, 22313 Vojka
15. CAD-FEM Pro, Paunova 87, 11000 Beograd
16. MS Termopro, Juhorska 1, 11000 Beograd



УГОВОР
О ПАРТНЕРСТВУ ВИСОКОГ СТРУЧНОГ И ПОСЛОВНО-ТЕХНИЧКОГ САРАДЊИ

Закључен, дана 24. децембра 2018. године, између:

УНИВЕРЗИТЕТ У БЕОГРАДУ, МАШИНСКИ ФАКУЛТЕТ,
11120 Београд, Краљице Марије 16,
кога заступа декан Проф. др Радивоје Митровић
и
SIEMENS MOBILITY DOO CEROVAC,
Собовица бб, 34321 Крагујевац, Србија,
кога заступају директор Александар Миљић
и остали заступници Марина Цицварић

ОПШТЕ ОДРЕДБЕ

Члан 1.

Испуњавајући своје потребе и интересе, уговорне стране закључују овај Уговор (у даљем тексту: Уговор) ради успостављања сарадње у области образовања, међународне научноистраживачке, стручне и пословно-техничке сарадње (у даљем тексту: сарадња) и утврђивања општих услова, оквира и видова сарадње.

Члан 2.

Сарадња из претходног члана одражава потребе и интересе уговорних страна да на принципима добровољности, равноправности, самосталности и јавности унапређују општи друштвени обичаји и права, а у циљу међусобног повећавања и обједињавања ресурса у областима научних, образовних, стручних и пословно-техничких програма од заједничког интереса, допринесу квалитетнијем решавању научноистраживачких, стручних и пословно-техничких проблема свих од уговорних страна.

Руководиоци реализације уговорних обавеза испред Машинског факултета је проф. др Јован Танасијевић, који ће у складу са одредбама овог Уговора сарађивати са Александром Миљићем, као представником Siemens Mobility doo Cerovac и бити особа за контакт у име факултета.

ПРЕДМЕТ САРАДЊЕ

Члан 3.

Сарадња између уговорних страна обухвата:
- Сарадња у области образовања, научноистраживачког и стручног рада;
- Мотивисност студената студента мастер студија (профила инжењер за предузетништво, производња, контрола, испитивање и одржавање индустријских погона, превасходно студената са Катедре за дизајн машина) и запошљавања истих, по завршетку мастер студија у складу са потребама Siemens Mobility doo Cerovac, а што је предмет посебног уговора којим ће бити

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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# WP4 - *Pilot testing of the flexible and generic DHEM – pilot testing*

**At the moment 14 students are enrolled!**




http://i40.mas.bg.ac.rs/

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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# WP4 - *Pilot testing of the flexible and generic DHEM – official start of the pilot study programme*

**Lectures sterted from October 1st 2020 - Combined teching model (online+live)**



Република Србија
МИНИСТАРСТВО ПРОСВЕТЕ,
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА
Број: 612-00-00660/2020-06
Датум: 16. 06. 2020. године
Београд
Немањина 22-26

УНИВЕРЗИТЕТ У БЕОГРАДУ
МАШИНСКИ ФАКУЛТЕТ
БЕОГРАД
Краљице Марије 16

Поводом обраћања број: 796/1 од 12. јуна 2020. године у вези са утврђивањем почетка остваривања права и обавеза студената који су у летњем семестру школске 2019/2020. године уписани на студијски програм мастер академских студија: Индустрија, који заједнички изводе Машински факултет (у даљем тексту: Факултет) и Математички факултет, Универзитета у Београду и чије је финансирање одобрено по основу учешћа на Јавном конкурсу за избор мастер студијских програма из области информационих технологија, програмирања, анализе пројеката и организације, наводимо:

С обзиром на непредвиђене околности које су настале услед ширења заразе COVID 19 и обавезу поштовања уредбом Владе утврђених мера за спречавање и сузбијање те заразне болести, мишљења смо да је оправдан предлог Факултета да за студенте који су у летњем семестру школске 2019/2020. године уписани на студијски програм мастер академских студија: Индустрија, а за које није могла бити одржана настава и обавезна стручна пракса у складу са студијским програмом, сва права и обавезе почињу да теку почев од школске 2020/2021. године, уз задржавање статуса у погледу финансирања студија, као и да се упис нове генерације студената на том студијском програму обави у уобичајеном јесењем уписном року.

МИНИСТАР

DualEdu
July 8th, 2021

# Discussion?

THANK YOU FOR YOUR ATTENTION!




*Parole: ON THE ROAD TO SUCCESS, THERE ARE NO SHORTCUTS*

# Annex 2

DualEdu Final conference Presentations

UNIVERSITY OF KRAGUJEVAC

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EACEA 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP
IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

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# Presentation of the developed dual study model at the University of Kragujevac

Prof. dr Nenad Stanišić

1

## Piloting a dual model of study at the University of Kragujevac

- Dual study model - MAS Information Technology
- Dual study model - MAS Mehatronics
- Dual study model - MAS Business Informatics

- Learning through work with the employer in the above programs is realized through the following activities:

- Professional practice in the second (summer) semester, 90-150 hours
- Study research work on the theoretical basis of the master's thesis during the second (summer) semester, 150 hours
- Master's thesis in the second (summer) semester, during the first year of schooling, 450 hours

## Rulebook on the dual model of studies at the University of Kragujevac

**PROCEDURES**

- The Faculty submits to the University a request for the adoption of a dual model of studies, and with the request submits the following documents:
  - the decision of the teaching-scientific council on determining the proposal of the dual model of studies;
  - opinion of the council of employers of the faculty on the proposal of the dual model of studies;
  - Elaborate on the dual model of study;
  - evidence of fulfillment of conditions for performing a dual model of studies, in accordance with the standards.
- The University Secretariat submits complete and valid documentation to the University Quality Assurance Commission.
- The QAC issues an opinion on the proposal of the dual model of study of the faculty or the University in accordance with the acts of the University and the Rulebook on standards.

## Rulebook on the dual model of studies at the University of Kragujevac

- The Secretariat of the University submits complete and valid documentation to the Council of Employers of the University.
- The University Employers' Council issues an opinion on the proposal of a dual study model.
- After giving the opinion of QAC and the Employers' Council, the proposal of the dual model of study of the faculty or the University is considered by the University Council formed for the appropriate educational-scientific field or educational-artistic field and gives an opinion to the University Senate.
- The University Senate makes the appropriate decision on the proposal of the dual model of studies by a majority vote of the total number of members of the Senate.

## Rulebook on the dual model of studies at the University of Kragujevac

**STUDENT ENROLLMENT**

By a general act, the higher education institution determines specific conditions for enrollment of students in study programs according to the dual model, as well as the conditions for the transition of students from dual to other study models, ie the transition to a dual study model.

**EVALUATION**

Student assessment according to the dual model of studies is regulated by a general act of the higher education institution that implements the dual model of studies.

## The first study program according to the dual model of studies at the University of Kragujevac

Study program of vocational studies of ***Clothing Engineering and Design***, with two modules, which is planned for realization according to the classical and dual model of studies at the Faculty of Technical Sciences in Čačak, with a scope of 180 ECTS (3 years).

| | |
|---|---|
| **Обим учења кроз рад исказан у часовима и ЕСПБ* (на свим годинама студија)*** | 45 ЕСПБ/ 1350 сати |
| **Обим теоријске наставе исказан у часовима и ЕСПБ* (на свим годинама студија)*** | 135 ЕСПБ |
| **Број послодаваца код којих ВУ упућује студенте на учење кроз рад*** | 9 |
| **Изјава послодаваца да ће учествовати у реализацији учења кроз рад*** | 9 |
| **Максималан број студената које високошколска установа упућује на учење кроз рад према закљученим уговорима*** | 60 |
| **Планирани број студената на дуалном моделу*** | 20 x 3 |

# Annex 2

DualEdu Final conference Presentations

STATE UNIVERSITY OF NOVI PAZAR

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# Description and Concept of the proposed Specific DHEM at the State University of Novi Pazar

Prof.dr. Miladin Kostić
Prof.dr. Senad Ganić



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## Specific 'MAS DHEM' proposed at SUNP

- The specific study model will be proposed at the Department of Technical Sciences of the State University of Novi Pazar- the study program "Civil Engineering".
- Study program in "Civil Engineering" and the experiences gained within this one-year master's program, which already envisages and applies student internship, served as the basis for proposing a dual model of one-year study master program.

## Legal framework

Law on Higher Education („*Службени гласник РС*)“, бр. 18/17, 27/18, 73/18) adopted in September 2017.

This Law in article 39 defines the engagement of students through student internships that are realized with business entities.

Article 96 provides the higher education institution with the opportunity to organize a student internship **within the study program**, which carries a certain number of ECTS points.



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## Legal framework

- Article 60 of the Law on Higher Education establishes a new body - the Council of Employers, in order to achieve cooperation between universities and employers through their involvement in the work of this body, primarily in designing and approving study programs in accordance with labor market needs.
- Article 80 of the Law on Higher Education enables, under appropriate conditions, hiring ‘non-employed lecturers’ in professionally applicable subjects of the study program.

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## Legal framework

- With the adoption of the Law on the dual model of studies in higher education in September 2019, an appropriate legal framework was created, framework that defines the content and manner of implementation of the dual model of studies in higher education, mutual rights and obligations of students, higher education institutions and employers, as well as other issues of importance for the realization of studies according to the dual model.



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## Legal framework

- The law provides a legal framework that is sufficiently general, but at the same time flexible, and is applied depending on the needs of the higher education institution, the possibilities and needs of partner companies and the students' interest in acquiring knowledge in the process of learning through work.

## The goal of the dual model

- The goal of the dual model of studies in higher education is reflected in overcoming the gap between theoretical and practical acquired knowledge, and quickly adapting students to changes in society and their efficient and effective inclusion in real work activities.



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

## Elaborate

- The purpose of the elaborate is to provide the necessary informations, in accordance with the standards for accreditation in higher education, in order to obtain accreditation and permission to implement a study program according to the dual model at the Department of Technical Sciences SUNP, all in accordance with article 5 of the Law on dual model of studies in higher education in the Republic of Serbia.

## An option proposed at State University of Novi Pazar

- We decided to propose accreditation of master studies as classic ones, which already include 90 hours of practice, and to provide possibility for a certain number of students to attend a dual model of study within the already existing number of students in the accredited study program.



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## Classic model of a one-year master's program at SUNP

| Мастер - ГРАЂЕВИНАРСТВО | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Р.бр. | Назив предмета | Тип | Стат. Пред. | Часови активне наставе недељно | | | | ЕСПБ |
| | | | | П | В | ДОН | СИР | |
| ПРВИ СЕМЕСТАР | | | | | | | | |
| 1 | Теорија пластичности и гранична стања | НС (SP) | ОБ | 3 | 2 | 0 | 0 | 8 |
| 2 | Одабрана поглавља Методе коначних елемената | НС (SP) | ОБ | 3 | 2 | 0 | 0 | 8 |
| 3 | Изборни предмет 1 | СА (РА) | ИЗ | 2 | 3 | 0 | 0 | 7 |
| | Одабрана поглавља бетонских конструкција | | | | | | | |
| | Одабрана поглавља металних конструкција | | | | | | | |
| 4 | Изборни предмет 2 | СА (РА) | ИЗ | 2 | 3 | 0 | 0 | 7 |
| | Поузданост и сигурност конструк. | | | | | | | |
| | Метални мостови | | | | | | | |
| ДРУГИ СЕМЕСТАР | | | | | | | | |
| 5 | Изборни предмет 3 | СА (РА) | ИЗ | 2 | 2 | 0 | 0 | 6 |
| | Енергетски инжењеринг и пратећа техника у грађевинарсту | | | | | | | |
| | Моделирање конструкција применом рачунара | | | | | | | |
| 6 | Стручна пракса | | | 0 | 0 | 0 | 90 | 3 |
| 7 | Студијски истраживачки рад | | | 0 | 0 | 0 | 0 | 6 |
| 8 | Мастер рад | | | 0 | 0 | 0 | 0 | 15 |
| Укупно часова наставе на класичом једногодишњем мастер програму | | | | 12 | 14 | 0 | 90 | 60 |

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- The questionnaire that the students of the Department of Technical Sciences filled out, showed us that students do not have enough knowledge about the dual model of studies, but also a certain degree of interest for such model of studies, which prompted us to consider introducing such a possibility.



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## one-year master program according to the dual model

| Мастер - ГРАЂЕВИНАРСТВО | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Р.бр. | Назив предмета | Тип | Стат. Пред. | Теоријска настава | | Учење код послодавца | | ЕС ПБ |
| | | | | П | В | | СИР | |
| ПРВИ СЕМЕСТАР | | | | | | | | |
| 1 | Теорија пластичности и гранична стања | НС | ОБ | 45 | 30 | 0 | 0 | 8 |
| 2 | Одабрана поглавља Методе коначних елемената | НС | ОБ | 45 | 30 | 0 | 0 | 8 |
| 3 | Изборни предмет 1 | СА | ИЗ | 20 | 15 | 90 | 0 | 4+3 |
| | Одабрана поглавља бетонских конструкција | | | | | | | |
| | Одабрана поглавља металних конструкција | | | | | | | |
| 4 | Изборни предмет 2 | СА | ИЗ | 20 | 15 | 90 | 0 | 4+3 |
| | Поузданост и сигурност конструк. | | | | | | | |
| | Метални мостови | | | | | | | |
| ДРУГИ СЕМЕСТАР | | | | | | | | |
| 5 | Изборни предмет 3 | СА | ИЗ | 20 | 10 | 60 | 0 | 4+2 |
| | Енергетски инжењеринг и пратећа техника у грађевинарсту | | | | | | | |
| | Моделирање конструкција применом рачунара | | | | | | | |
| 6 | Стручна пракса | | | 0 | 0 | 0 | 90 | 3 |
| 7 | Студијски истраживачки рад | | | 0 | 0 | 0 | 0 | 6 |
| 8 | Мастер рад | | | 0 | 0 | 120 | 0 | 11+4 |
| Укупно часова наставе на једногодишњем мастер програму по дуалном моделу студија | | | | 150 | 100 | 360 | 90 | 60 |

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- The tables show the subjects that are studied during the studies in the master's academic study program Civil Engineering, the number of hours of lectures and exercises as well as the corresponding number of ECTS.
- By introducing a dual model of study in higher education, the legislator allows work-based learning, in a minimum time of 450 hours per year.

(120+150+450)



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## Structures of student engagement during learning through work

| Study program | Month | II semester | | | | | |
|---|---|---|---|---|---|---|---|
| | | II | III | IV | V | VI | Total |
| Civil Ingineering | Hours at the employer | 60 | 60 | 80 | 100 | 150 | 450 |

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- Learning by working on a one-year dual master program in Civil Engineering would be realized through the following activities:

1. through professional-applied subjects (elective subjects), (students choose 3 of the offered 9 professional-applicable courses) 240 hours = 8 ECTS
2. Professional practice 90 hours = 3 ECTS
3. Master thesis 120 hours = 4 ECTS





## Study-research work

- The goal of the study-research work is the application of basic, theoretical-methodological, scientific and professional-applied knowledge and methods in solving specific problems within the selected area.
- The student studies the professional literature and performs analyzes in order to find a solution to a specific task that is defined by the task of the master's thesis. Within this part of the master's thesis, the student studies the problem, its structure and complexity and, based on the conducted analyzes, draws conclusions about possible ways of solving it.

## Master thesis

- The content of the master's thesis is defined individually in accordance with the topic of the master's thesis.
- In agreement with his mentor, the student prepares a master's thesis in written form, according to the standards and rules at State University of Novi Pazar. (Department of Technical Sciences, study program "Civil Engineering") and general standards of independent professional –scientific work.



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## Master thesis

- Master thesis is based on theoretical and / or empirical analysis of a particular problem and is written in general form:

-Introductory terminological aspects,
-Subject of research
-Research methods
-The goal
- Starting hypotheses
-Results of application, discussion and concluding remarks, and aspects of possible application
-Literature and Contributions
-It is expected that the master thesis will help to improve the overall processes in companies

## The procedure for introducing a dual model of studies at the State University of Novi Pazar

- The basis for the implementation of the dual model of study is the study program accredited in accordance with the accreditation standards established and with the laws governing higher education and qualification standards, established in accordance with the law governing the national qualifications framework.
- The proposal for accreditation of the study program have to be prepared at the level of the Department. The proposal of the study will be determined by the Council of the Department, and after that it will be adopted by the Senate of SUNP.



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

## The procedure for introducing a dual model of studies at the State University of Novi Pazar

- SUNP may submit a request for giving consent for the organization of the module within the accredited study program for the realization of the study program according to the dual model, without increasing the number of students from the accreditation.
- The request for giving consent for the organization of a dual module within the accredited study program will be submitted to the National Accreditation Body.
- The form and content of the elaborate is determined by the National Council for Higher Education.

## Contracts with partner companies and other entities

- In accordance with Article 12 of the Law on the Dual Model of Studies in Higher Education, the University signs agreements with companies that regulate their mutual rights and obligations.



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Thanks you for your attention and time.

# Annex 2

DualEdu Final conference Presentations

ACADEMY OF TECHNICAL AND ART APPLIED STUDIES
(SCHOLL OF ELECTRICAL AND COMPUTER ENGINEERING)

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# Presentation of results from DualEdu project Academy of Technical and Art Applied Studies

## Scholl of Electrical anad Computer Engineering

dr Goran Dikić



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## WP4, DEVELOPMENT

- **Title:** Pilot testing of the flexible and generic DHEM
- **Lead Organisation:** School of Electrical and Computer Engineering of Applied Studies [**VISER**], Serbia

# WP4 Analysis (Prepared Report)

✓ 4.1 Identification and conceptual definition of specific DHEMs

| | |
|---|---|
| Title of document: | Description and Concept of Specific DHEMs of HEIs |
| Work package: | WP 4: Pilot testing of the flexible and generic DHEM |
| Activity: | 4.1. Documents on description and concept of specific DHEMS of HEIs |
| Last version date: | 07/10/2019 |
| File name: | Specific DHEM dveloped at VISER v3.0 |
| Number of pages: | 19 |
| Dissemination level: | Consortium |





# WP4 Analysis (Prepared Report - Content)

✓ 4.1 Identification and conceptual definition of specific DHEMs

**1. Introduction** **P.7**

**2. Implementation of the Dual Higher Education Model** **P.8**

**3. Legal conditions for the realisation of the DHEM** **P.13**

3.1. Defining relations between the student, the employer and the institution of higher education P.14

3.1.1. Agreement on the Dual Higher Education Model P.14

3.1.2. Agreement on learning through work P.16

3.2. Register of agreements P.17

3.3. Mentoring at the employer's P.18

3.4. Grading and exams in the Dual Higher Education Model P.18

3.5. Material and financial support for students P.18

3.6. Supervision and penalties P.19

# WP4 Analysis

✓ 4.1 Identification and conceptual definition of specific DHEMs

Completed activity

In accordance with Article 6 of the Law on Dual Model of Higher Education, it is envisaged to study through work with at least 450 hours a year, on average, at the level of the entire study program.

Specific DHEM has been developed at VISER (P11). Dual education at VISER (Master level) is organised in form of

| | | |
|---|---|---|
| Student Intership 1 | - 6 ESPB | (first year) |
| Student Intership 2 | - 6 ESPB | (second year) |
| Applied Research Work | - 8 ESPB | (second year) |
| Master Thesis Work | - 16 ESPB | (second year) |



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

# WP4 Analysis

✓ 4.1 Identification and conceptual definition of specific DHEMs

| Course | Semester: | Number of active classes (hours) |
|---|---|---|
| Student Internship 1 | 2nd | 180 |
| Student Internship 2 | 3rd | 180 |
| Applied Research Work | 4th | 240 |
| Master Thesis Work | 4th | 480 |
| TOTAL: | | **1080** |

# WP4 Analysis (Course strucuture)

✓ 4.1 Identification and conceptual definition of specific DHEMs

| Course | Status (compulsory or elective) | Lectures (no.) | Practical classes (no.) | ECTS |
|---|---|---|---|---|
| **FIRST YEAR** | | | | |
| 1st semester | | | | |
| Research methods | C | 2 | 2 | 6 |
| Students choose three of the electives offered | | | | |
| Automotive Transmissions | E | 3 | 3 | 8 |
| Energy Sources in Power Systems | E | 3 | 3 | 8 |
| Measuring Information Systems | E | 4 | 3 | 8 |
| Design of Electrical Power Converters | E | 3 | 3 | 8 |
| Design of Electronic Devices | E | 3 | 3 | 8 |
| Gasoline Direct Injection Systems | E | 3 | 3 | 8 |
| 2nd semester | | | | |
| Students choose three of the electives offered | | | | |
| Digital Systems Using Programmable Logic | E | 3 | 3 | 8 |
| Diagnostics of Diesel Injection Systems | E | 4 | 3 | 8 |
| Smart Grids | E | 4 | 3 | 8 |
| Signal Processing | E | 4 | 3 | 8 |
| Control of Power Quality | E | 4 | 3 | 8 |
| Process Control | E | 4 | 3 | 8 |
| Internship 1 | C | | | 6 |
| **Total ECTS per year** | | | | **60** |



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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

WP4 Analysis (Course strucuture)

✓ 4.1 Identification and conceptual definition of specific DHEMs

| Course | Status (compulsory or elective) | Lectures (no.) | Practical classes (no.) | ECTS |
|---|---|---|---|---|
| **SECOND YEAR** | | | | |
| 3rd semester | | | | |
| Students choose three of the electives offered | | | | |
| Communications Standards and Technologies | E | 3 | 3 | 8 |
| Automated System Design and Implementation | E | 4 | 3 | 8 |
| Computer-Aided Design of Electric Power Substations | E | 4 | 3 | 8 |
| Special Electrical Installations | E | 4 | 3 | 8 |
| Telecommunication Measurements | E | 4 | 3 | 8 |
| Hybrid and Electric Vehicles | E | 4 | 3 | 8 |
| Internship 2 | C | | | 6 |
| 4th semester | | | | |
| Entrepreneurship and Incentives in the Field of Electrical and Computer Engineering | C | 3 | 3 | 6 |
| Applied Research | C | | | 8 |
| Master Thesis | C | | | 16 |
| **Total ECTS per year** | | | | **60** |

# WP4 Analysis

✓ 4.1 Identification and conceptual definition of specific DHEMs

Table. The structure of students' work with the employers

| | 2nd semester | | | | | | | | 3rd semester | | | | 4th semester | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | I | II | III | IV | V | VI | VII | VIII | IX |
| Hours spent at the employer's | | 60 | 60 | 60 | | | | | 60 | 60 | 60 | | 60 | 130 | 130 | 130 | 130<br>170* | 140<br>100* | | |
| Total | | 180 | | | | | | | 180 | | | | | 240+480=720 | | | | | | |

* alternatively

The complete prepared reports can be viewed at the following links:
Specific DHEM, VISER,eng. and Specific DHEM, VISER, srb.



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# WP4 Analysis

✓ 4.4 Purchase of equipment;

■ All equipment has been purchased, delivered and installed :

| Nature, type and specifications of the item | Amount charged to the project (in EUR) |
|---|---|
| HIOKI PQ3100 ANALYZER +SDHD MEM. CARD 2GB+HIOKI CT7736 CURRENT SENSOR +L9910 | 6.569,59 |
| LARA-100 Power Box- (LARA 100 motherboard, LARA 100 card for pluging into network, LARA 100 card for power drive, LARA 100 communication board, LARA 100 general purpose card (GPIO), PERUN PowerDesk software - permanent licence)+Power part, inverter 5.5kW | 6.278,20 |
| LUCAS NUELLE LNEPR-1 Set of electric drives Lucas Nulle 1 | 9.275,59 |
| LUCAS NUELLE LNEPO-2 Set of electric drives Lucas Nulle 2 | 19.076,28 |
| | **41.199,66** |

# WP4 Analysis

- ✓ 4.4 Purchase of equipment:
- ✓ HIOKI PQ3100 ANALYZER +SDHD MEM. CARD 2GB+HIOKI CT7736 CURRENT SENSOR +L9910









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IMPLEMENTATION OF DUAL EDUCATION IN HIGHER EDUCATION OF SERBIA

WP4 Analysis

- ✓ 4.4 Purchase of equipment:
- ✓ LARA-100 Power Box+Power part, inverter 5.5kW





# WP4 Analysis

## ✓ 4.4 Purchase of equipment

✓ LUCAS NUELLE LNEPR-1 Set of electric drives Lucas Nulle 1+2









# WP4 Analysis

## ✓ 4.4 Purchase of equipment

✓ Installation of the obtained equipment Lucas Nulle and training





# WP4 Analysis

## ✓ 4.4 Purchase of equipment

✓ Installation of the obtained equipment Lucas Nulle and training



The complete prepared reports can be viewed at the following links:
Report Purchase of equipment v 2.0 eng. and Report Purchase of equipment v 2.0 srb.





# WP4- Analysis

## 4.5 – Development of training materials



# WP4- Analysis

## 4.5 – Development of training materials








# WP4 Analysis (Prepared Report)

- ✓ **4.7 Analysis of the results of pilot testing of each of specific DHEM of HEI partners from Serbia**

| | |
|---|---|
| Title of document: | "Result of pilot testing of specific DHEM with HEI from Serbia". |
| Work package: | WP 4: Pilot testing of the flexible and generic DHEM |
| Activity: | 4.7 Analysis of the results of pilot testing of each of specific DHEM of HEI partners from Serbia |
| Last version date: | 28/06/2021 |
| File name: | Report 4.7.1 ANALYSIS OF THE RESULTS OF PILOT TESTING OF EACH OF SPECIFIC **DHEM** OF **HEI** FROM SERBIA |
| Number of pages: | 14 |
| Dissemination level: | National and website |

# THANK YOU FOR YOUR ATTENTION!




*Parole: ON THE ROAD TO SUCCESS, THERE ARE NO SHORTCUTS*