



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

ERASMUS+ MODELLING CYBPHYS 609557

Kryvyi Rih National University
Project Team presentation



IMPLEMENTATION OF THE PROJECT

Quality assurance



The Quality Assurance Plan (QAP) is led by the University of Cyprus and aims to establish quality procedures that will promote a uniform approach in realizing and delivering all project tasks and deliverables. The latest revision of this document of 14.10.2020. It is available through the link from project web site <https://cybphys.rtu.lv/reports/>

The methodology for internal quality assurance with distinct set of criteria, questionnaires and analysis of responses will be developed by Quality Assurance and Monitoring Team (QAMT). Volodymyr Sistuk as a consortium member was included into QAMT from KNU team.

Due to the Project Manual (PM) and Logical Framework matrix the following reports have been fulfilled by consortium partners:

WP1 Preparation.

- Survey of industry, research institutions, HEIs and professional association representatives (14.03.2020);
- Study Report on survey results on the specific needs of the labor market (02.05.2020);



IMPLEMENTATION OF THE PROJECT

Quality assurance

- Ex-Ante Reports elaboration report on the compatibilities of educational regulations (30.04.2020);

WP3 Development of innovative ICT based teaching and learning environment

Development of novel virtual environments for distance learning: e-library, the number of teaching/didactic materials uploaded to e-library, Virtual lab practices in a framework of the developed SMSE platform (14.03.2020);

WP7 Management

The first Financial reports (15.09.2020);
The first Activity reports: integrated report on project progress, development of curricula (15.09.2020).

The latest milestones for QAP will be discussed by QAMT at Management Meetings and presented by 30.12.2020.

IMPLEMENTATION OF THE PROJECT

Quality assurance

According to the chapter 3.2 of QAP “For external quality control and monitoring, two experts from EU academic institutions that are not part of the consortium will be subcontracted in order to deploy and implement a set of external quality control activities. The external evaluation will take place during the second and third year of the project, before and after the course implementation”.

The principal aim of the QAP is to ensure quality of training material being developed. The objective must be achieved by means of the following efforts:

- Intended learning outcomes are established and are included in the newly developed syllabi;
- Industry representatives and students participate in the syllabi design;
- Curriculum and program design and content, as well as the output of each Work Package, are reviewed and evaluated by all involved parties and stakeholders suggestions are offered and follow-up procedures are established;
- The specific needs of the various modes of delivery, such as lectures, lab work, online learning and target pool of students are taken into consideration;
- Multiple learning resources are accessible to teachers and students;
- Formal program approval procedures are initiated by the appropriate academic institution units and are completed in a timely manner;
- The progress and performance of participating students are effectively monitored.

IMPLEMENTATION OF THE PROJECT

Visualization. Website

Information is represented on the official website of International Office of KNU

<http://doir.knu.edu.ua/npoekmu/>

In order to present achievements and information about the project the group on FB is created:

<https://www.facebook.com/groups/227194018274534>

A separate section, dedicated to the project has been created on site of Automaton, Computer Sciences and Tech department

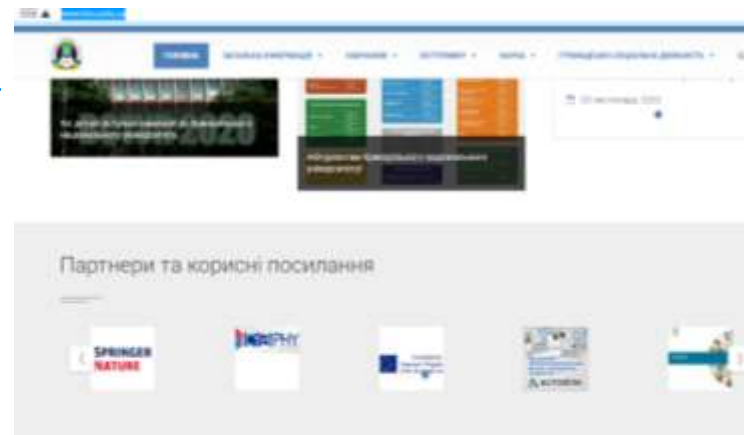
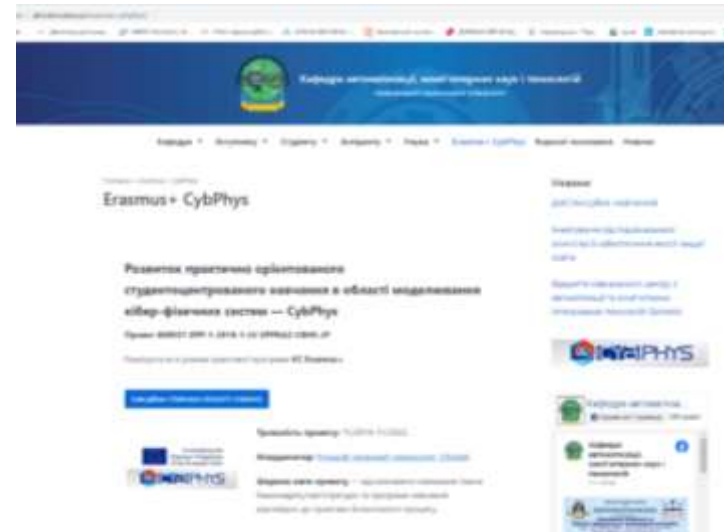
<http://aknt.knu.edu.ua/erasmus-cybphys/>

Project news are shown on the FB pages of the ACST department:

<https://www.facebook.com/groups/aknt.knu>

On the official website of KNU Logo with link on the Project webpage is in section Partners and useful links:

<https://knu.edu.ua>



IMPLEMENTATION OF THE PROJECT

Budget used

Level of project budget used so far - 3020 EUR (travel costs).

KNU project team members participated in 2 meetings:

- Kick-off meeting (Minsk, 05-06 Dec.2019) - 3 persons;
- MC (Minsk, 10-11 March 2020) - 2 persons.

In view of gender equality it is 3 feminine/ 2 masculine)

ANNEX VI - FINAL FINANCIAL STATEMENT											
Project Number		889557-EPF-1-2019-1-LV-EPFKA2-CBHE-IP					Co-financing (for information only)		752,00		
Budget Headings		1. Grant Awarded (in EUR)			2. Budget Spent (in EUR)						
1. Staff Costs		23 892.00			0.00						
2. Travel Costs		11 222.00			1 100.00						
3. Costs of Stay		25 890.00			1 920.00						
4. Equipment Costs		28 000.00			0.00						
5. Subcontracting Costs		0.00			0.00						
6. Exceptional Costs		0.00			0.00						
Total Grant requested from the European Union		89 381.00			3 820.00						
DISTRIBUTION OF THE GRANT BY ORGANISATION (in EUR)											
Partner N°	Name of Partner	Country	Role Code	Programme Country / Partner Country	1. Staff Costs	2. Travel Costs	3. Costs of Stay	4. Equipment Costs	5. Subcontracting Costs	6. Exceptional Costs	Total (in EUR)
P1					--	--	--	--	--	--	
P2					--	--	--	--	--	--	
P3					--	--	--	--	--	--	
P4					--	--	--	--	--	--	
P5					--	--	--	--	--	--	
P6					--	--	--	--	--	--	
P7					--	--	--	--	--	--	
P8					--	--	--	--	--	--	
P9					--	--	--	--	--	--	
P10	Kyivskiy Rn National University	Ukraine	Partner	Partner Countries	--	1 100.00	1 920.00	--	--	--	3 020.00
P11					--	--	--	--	--	--	
P12					--	--	--	--	--	--	
P13					--	--	--	--	--	--	
P14					--	--	--	--	--	--	
P15					--	--	--	--	--	--	
P16					--	--	--	--	--	--	
P17					--	--	--	--	--	--	
P18					--	--	--	--	--	--	
P19					--	--	--	--	--	--	
Total											

IMPLEMENTATION OF THE PROJECT

Equipment

After the first coordinating meeting the KNU project team improved the concept of educational platform and its functioning aims. It allowed to correct hardware and software and presented our renewed list of equipment which was agreed with coordinator and Brussel. After this it was registered at the Cabinet of Ministers.

At present Kryvyi Rih National University is in the process of purchasing equipment. It is realized in the system of PROZORRO. There are several lots which have been already set and equipment is supplied. The agreements are signed according to tender procedure.

All the documents are agreed with the coordinator.

The planned cost of equipment is 28000 Euro.

IMPLEMENTATION OF THE PROJECT

Curriculum development aspects

The key result of the project for Kriviy Rih National University is the implementation and accreditation of a new master's course
"Cyberphysical systems in business, industry and transport"

Field of knowledge - 15 Automation and instrumentation.

Specialty - 151 Automation and computer-integrated technologies.

Specialization - "Cyber-physical systems"

Term of study: 1 year 4 months

90 ECTS credits (selective disciplines take 25% of the educational program, this allows to form students' individual learning trajectories)

HPK - level 8, FQ-EHEA - second cycle, EQF LLL - level 7.

In September 2020, a new Standard for specialty - 151 (master's level) was published.

At the moment, the educational program is brought in accordance with the new Standard.

IMPLEMENTATION OF THE PROJECT

Curriculum development aspects

In 2019, the accreditation procedure for educational programs has been changed in Ukraine. The function of the accreditation body has been transferred to the National Agency for Quality Assurance in Higher Education, which is officially registered with EQAR.

The accreditation process includes the preparation of substantiated documentation, formation and publication of a report on the self-analysis of the educational program after the first year of curricula testing, examination by the NAQAHE commission, approval of the commission report, publication of the commission report with a recommendation for accreditation.

At the moment, the process of accreditation of the educational master's program 151- “Cyber-physical systems” at KNU is at the stage of preparation and validation of documentation and development of high-quality educational and teaching materials for courses

- ▣ The development/update tasks - 35%
- ▣ The recognition/accreditation tasks - 10%
- ▣ The percentage of courses already implemented/delivered to the target group(s) - 0%

IMPLEMENTATION OF THE PROJECT

Curriculum development aspects

Kriviy Rih National University declared development and implementation of 7 courses (3 new/4 updated). These courses will be included in 2 curricula - 151-Cyber-physical systems (Master Program) and 275 - Transportation technologies (Bachelor Program)

Information about courses:

1. Machine Learning for Cyber Physical Systems and Industry 4.0 (new) - syllabus and teaching materials are in progress - 35%
2. Smart manufacturing based on cyber-physical systems (new) - syllabus and teaching materials are in progress - 35%
3. Transportation Cyber-Physical Systems (new)- study program, syllabus, teaching materials are in progress - 20%.
4. Open-Pit Transport Cyber Physical Systems (updated) - study program and syllabus approved by KNU authorities, teaching materials are in progress - 50%.
5. Modern Information Technologies in Transport (updated) - study program and syllabus approved by KNU authorities, teaching materials are in progress - 50%.
6. Adaptive and Robust Systems - (updated) - syllabus and teaching materials are in progress - 35%.
7. Project approach to the designing of cyber-physical systems - (updated) - syllabus and teaching materials are in progress - 35%.

IMPLEMENTATION OF THE PROJECT

Training/mobility activities

Due to the COVID-19 Pandemic, all mobility activities have been postponed.

Methodologies adopted by KNU for informing, identifying and selecting the participants who will be involved in mobility activities :

- The process of informing about upcoming mobile activities (for both teachers and students) and the selection of participants is carried out by the Team Manager, members of the project team, the Department of International Relations by means of notification on the official website of the KNU and the FB page of the university.
- Heads of departments in the relevant areas (in accordance with the specifics of mobile activity) form a list of recommended participants for activity (both for teachers and for students) and send them to the Project Manager.
- Selection of participants is carried out by the Project Manager in agreement with the project team. Selection criterion for teachers: degree of involvement in the project, scientific interests and results, level of English proficiency. Selection criteria for students: academic performance, level of English proficiency.
- Compliance with the principles of gender equality.

IMPLEMENTATION OF THE PROJECT

Publications



KNU project team participates in development of 2 E-books:

- **6. Cyber-Physical Systems modelling and simulation**
 - 6.2. Big Data and the need for Data Processing (Natalia Morkun)
 - 6.5. Transportation Systems (including e-vehicles, simulation, modelling, traffic video analysis, impact on the grid) (Volodymyr Sistuk)

- **7. Cyber-Physical Systems for Clean Transportation**
 - 7.6. Specifics of applying the project approach to the development of Cyber Physical Systems for Clean Transportation (Natalia Morkun, Iryna Zavsiehdashnia)
 - 7.7. Intelligent information technologies and systems in transport (S. Ruban, V. Tron)
 - 7.10. Road Traffic Cyber-Physical Systems Microsimulation (Volodymyr Sistuk, Yurii Monastyrskyi)

E-books chapters prepared for the 1st draft (on Ukrainian before translation)



IMPLEMENTATION OF THE PROJECT

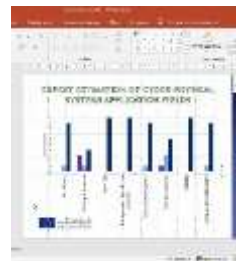
Publications

Together with European and Belorussian partners the scientific paper “Approach for Cross-Domain Study Curricula in Cyber-Physical Systems for Belarusian and Ukrainian Universities” was published in the frame of RTUCON2020 international conference.

Session ID: D2-R114-T3
 Session Title: Education in Engineering - Part I
 Room: 114
 Date: November 6, 2020
 Starts at: 15:00
 Ends at: 17:00
 Chairpersons: Prof. Anastasiya Zhuravetska (Riga Technical University, Latvia)
 Prof. Nadezhda Kunicina (Riga Technical University, Latvia)

From	To	Presenting Author (Affiliation) Paper Authors "Paper Title" (Paper ID)
15:00	15:15	Anton Rassolkin (Tallinn University of Technology, Estonia) Anton Rassolkin, Teemu Vainio, Karolina Kudelina, Mariusz Stepień and Kálmán "EDUTECH – Good Practices in Cooperation between Schools and Academia Att Candidates for Technical Education" (110)
15:15	15:30	Anastasiya Zhuravetska (Riga Technical University, Latvia) Anastasiya Zhuravetska, Jean Peuteman, Nadezhda Kunicina, Lyudmyla Kruhlenko, Dmitri Kovalenko and Anastasiya Zhuravetska "Approach for Cross-Domain Study Curricula in Cyber-Physical Systems for Bela and Ukrainian Universities" (33)
15:30	15:45	Kristaps Vitolis (Riga Technical University, Latvia)

International Conference on
 Science, Engineering &
 Technological Innovation (24 -
 25 October, 2020)
 Jointly organized by Research
 Culture Society (India) and
 Kryvyi Rih National University -
 Automation, Computer Science
 and Technology Department
 (Ukraine)



IMPACT OF THE PROJECT ON SOCIETY DEVELOPMENT



Within the framework of the smart specialization "Industry 4.0 as a tool for sustainable development of an industrial region", the scientific direction of the university "Cyber-physical systems and SMART technologies in the mining and metallurgical complex of Kryvyi Rih region" was formed.

In order to cooperate effectively in the specialists' training and the development of the mining and metallurgical complex of Ukraine, the introduction of the latest control systems for technological processes in the mining and metallurgical industries, the establishment of interaction networks and strengthening of cooperation with the leading industrial enterprises of the Kriviy Rih iron ore basin, memorandums of cooperation were signed with Metinvest Holding LLC., PJSC ArcelorMittal Kryvyi Rih, a subsidiary of Siemens AG, Schneider Electric Ukraine, etc.



IMPACT OF THE PROJECT ON THE SPHERE OF HIGHER EDUCATION

- ◎ The key strategic direction of the educational and professional program “Cyber-physical systems in business, industry and transport” will be the training of highly qualified personnel in the field of cyber-physical systems for the implementation of innovative solutions in the mining, metallurgical industry and socio-economic activities of the region, capable of performing practical and research tasks with understanding of the specifics of the industry, the features of the functioning of information flows in the production process and the corresponding modern technological equipment and specialized software.
- ◎ Accordingly, when formulating the goals and program learning outcomes, the requirements for the key competencies of specialists were taken into account, which are put forward by the stakeholders - employers (leading enterprises of the mining and metallurgical complex, software development companies for the conditions of mining and metallurgical enterprises and IT companies in the region).
- ◎ In order to take into account the regional specifics of the EPP “Computer Sciences” about the peculiarities of technological and information processes of geographically distributed enterprises of the mining and metallurgical complex and organizations that ensure their production activities, the Department of Automation of Computer Science and Technology cooperates with representatives of the Academy of Mining Sciences of Ukraine.

IMPACT OF THE PROJECT ON SOCIETY DEVELOPMENT

On the basis of the Kryvyi Rih National University together with the Siemens Ukraine company with foreign investments and with the support of Metinvest Holding LLC and the Kryvyi Rih Fund of the Future the training center “Automation and computer-integrated technologies of Siemens” was established in order to acquire practical skills in the use of equipment for solving problems of automation of technological processes of the mining and metallurgical complex of Ukraine using the Industry 4.0 technology.



Industry 4.0

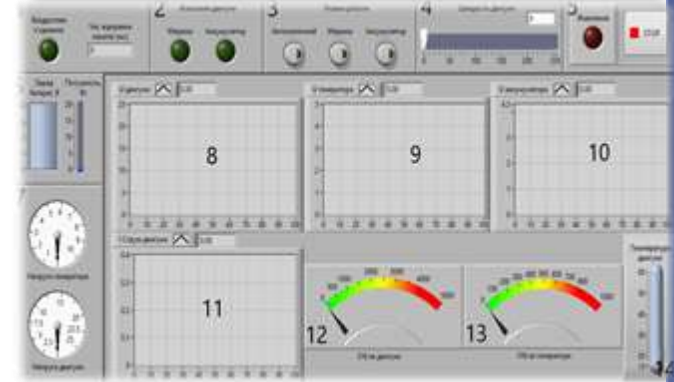
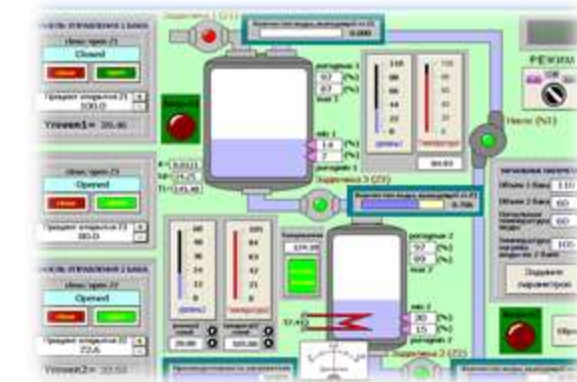
RELEVANCE OF THE PROJECT TO THE CONTEXT OF THE ENVIRONMENT

The needs of the modern labor market, the development of the IT industry in the region, the existence of a large number of high-tech industries in the Kryvyi Rih region, the growth in the scale and complexity of mining and metallurgical production, the tendency to digitalize familiar business processes, as well as the introduction of remote mode into the functioning of most enterprises in all spheres of life, along with the need to improve the quality of information services, cause a high demand for highly qualified specialists in cyber-physical systems and the need to prepare a second (Master) level of higher education at the Kryvyi Rih National University in the specialty “Cyberphysical systems in business, industry and transport”.



RELEVANCE OF THE PROJECT TO THE CONTEXT OF THE ENVIRONMENT

- ◉ The proposed Professional Education Program (EPP) will provide solid theoretical and practical training in specialized disciplines to fulfill responsibilities in the design and management of cyber-physical systems to address digitalization and industrial development issues at the regional level.
- ◉ Graduates of this EPP have employment prospects, since the university operates in a powerful industrial region of Ukraine, which includes one of the world's largest metallurgical plants - ArcelorMittal Kryvyi Rih, four mining and processing plants (North, Central, South, Ingulets), mines, mechanical engineering and other enterprises.



SYNERGY OF THE PROJECT WITH TEMPUS PROJECT HETES

***(Higher engineering training for environmentally sustainable
industrial development)***

The Information and Communication Center for Sustainable Development, which was opened as a result of the implementation of the project **HETES** 543966-TEMPUS-1-2013-1-BE-TEMPUS-JPCR (2013-2017), is actively used not only in the educational process, but serves as the basis of an innovative educational system, a platform for communication between academia, industry and authorities, including in the process of finding new ways of cooperation in the implementation of the **CybPhys** project. On the basis of the center, meetings, videoconferences, presentations with online broadcasting are constantly held. The software allows you to display information on the screen of various sources, visualizes the process of discussion and problem solving. The audience is also used for a visual demonstration of presentation material, training, business games, online testing.



ACTIVITIES IN PARTNERSHIP AND COOPERATION



МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
КРИВОРІЗЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ

НАКАЗ

26 листопада 2019 р. м. Кривий Ріг

№ 441

Про формування робочої групи по проєкту

У зв'язку з початком реалізації проєкту програми Erasmus+ "Development of practically-oriented student-centered education in the field of modelling of Cyber-Physical Systems (CybPhys)"

СФОРМУВАТИ

з 18.11.2019 робочу групу та покласти обов'язки згідно розподілу функцій в проєкті:

- 1) Project managers: Ступнік М.І., Кругленко Л.В.
- 2) Researchers: Моргун Н.В., Завсєдлашніа І.В. – відповідальні за впровадження проєкту на факультеті інформаційних технологій; Сістук В.О., Монастирський Ю.А. – відповідальні за впровадження проєкту на транспортному факультеті; Федотов В.О., Козакевич І.А. – відповідальні за впровадження проєкту на електро-технічному факультеті
- 3) Administrative staff: - Леонова І.Б., Барчак О.М.

Ректор

М.І. Ступнік

Головний бухгалтер

І.Б. Леонова

Начальник юридичного відділу

О.М. Барчак

Начальник відділу міжнародних зв'язків

Л.В. Кругленко

At the beginning of the project the key persons of team was approved by the university statement.

All the financial issues are agreed with the senior accountant of the university, juridical department and rector.

In our actions we follow all the documents required.

DEVELOPMENT OF PARTNERSHIP AND COOPERATION



For now Kryvyi Rih National University has academic mobility agreement with Catholic University of Leuven (KA1), but in view of pandemic situation it is difficult to develop anything as all the motilities planned within the project were postponed.

In the prospect of future we would like to organize academic mobility with our European partners, i.e. Riga Technical University and University of Cyprus.



DEVELOPMENT OF PARTNERSHIP AND COOPERATION

Within the project there were held some conferences including students and teaching staff as well as foreign students. Visiting professor from Australia David Leneghan was the key speaker. All the issues were devoted to learning foreign languages and academic mobility.



KRIVYI RIH NATIONAL UNIVERSITY -

***WE ARE READY FOR ERASMUS +
MODELLING CYBPHYS
609557 CHALLENGES!***