





Chernihiv Polytechnic National University



Erasmus+ project 609557-EPP-1-2019-1-LV-EPPKA2-CBHE-JP "Development of practically-oriented student-centred education in the field of modelling of Cyber-Physical Systems", Acronim "CybPhys"

Riga, April 27-28, 2023

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CybPhys CPNU outcomes

- 1. Establishing of New Education Program "Computer engineering and Industrial Automation" (accreditation: 2021, graduation: 2021, 2022, 2023 -planned)
- 2. Developing and testing of 5 new master courses and 2 updated bachelor courses.
- 3. Participation in two e-books:
 - Model-oriented control in Intelligent Manufacturing Systems (leader CPNU)
 - Cyber-Physical Systems modelling and simulation
- 4. Creation a two new Cyber-Physical Systems Modelling & Simulation laboratory
- 5. Developing the Sharing Modelling and Simulation Environment (SMSE)
- 6. Mobility
- 7. Dissemination and Sustainability
- 8. Financial reports









Courses developing and testing

1.	5 new master's courses for new master's educational program	credits
	"Computer Engineering and Industrial Automation":	
•	Programming of automation systems	5
•	Modeling and measurement of physical processes in robotics	5
•	Model-oriented control in digital manufacturing	5
•	Design and modeling of power electronics components	5
•	Simulation of Manufacturing Environment	5
2.	Upgrading of two bachelor's courses for bachelor's program	
	"Electronics of robotic systems and complexes":	
•	Introduction to electronic systems	6
•	Development of electromechanical robotic systems	4
	Total:	35

3. Testing by student, teaches and stakeholders -2021, 2022







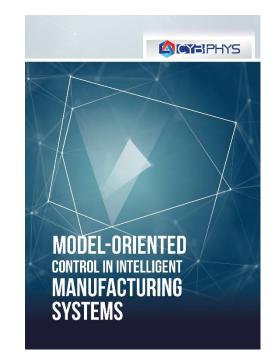
E-books developing

1. Developed E-book (leader – CPNU, RTU and V. M. Glushkov Institute of Cybernetics of NASU)

Model-oriented control in Intelligent Manufacturing Systems

Intelligent Manufacturing Systems and Industry 4.0 Concept
 The principles of Model-oriented control
 Implementation Models of Control Algorithms
 Predictive Models and Dynamic Model Checking
 Recovery Models and their Construction
 Software and Hardware Tools for MOC
 Examples of MOC application

Published by RTU Press Riga Technical University, 2022. – 258 pages.



Participation in developing of e-book
 Cyber-Physical Systems modelling and simulation (*leader – University of Cyprus*)







3 equipment purchases

- 1. The opening of the new CPS modeling and simulation laboratory (2021)
- 2. New SMSE servers and ICT infrastructuer 2022
- 1. New SMSE leducation aboratory 2023



In 2023, thanks to this laboratory, a new national project "A multi-agent system for the protection of critical infrastructure facilities based on a swarm of multicopter drones" was won.







Shared Modelling and Simulation Environment (SMSE)

SMSE provides educational participants with shared, controlled access to modeling course materials and modeling tools using Moodle and Jupyter Notebook documents through the Jupyter Virtual Lab.

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Mobility

- 3 student schools in Riga Technical University, KE Leuven, University of Cyprus
- Teacher English school in KU Leven university
- 6 offline and monthly on-line meeting Highly qualified teaching staff, familiar with modern needs, educational technologies and targeting needs.







Dissemination and Sustainability

1. Project site developed

https://stu.cn.ua/mizhnarodna-diyalnist/mizhnarodni-programy-ta-proekty/proyekt-cybphys/

2. Project documentation on CPNU Moodle located <u>https://eln.stu.cn.ua/course/index.php?categoryid=476</u>

3. Two participation in Erasmus+ days in Ukraine with information of project



- 5. Three agreements of cooperation were signed:
- Riga Technical University (2022)
- KU Leuven University (2023)
- Association of Industrial Automation of Ukraine (APPAU) (2021)







Financial report

Budget Headings	1. Grant Awarded (in EUR)	2. Budget Spent (in EUR)
1. Staff Costs	23 856,00	20 420,00
2. Travel Costs	8 865,00	5 775,00
3. Costs of Stay	22 560,00	<mark>1</mark> 5 970,00
4. Equipment Costs	73 040,00	72 646,05
5. Subcontracting Costs	6 500,00	6 542,56
6. Exceptional Costs	0,00	0,00
Total Grant requested from the European Union	134 821,00	121 353,61

Advance payments : 121 339