Chernihiv Polytechnic National University

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D1.1 Ex-ante report from MD-UA universities and a consolidated report

CPNU Ex-ante report contains:

a)   a review and comparative analysis of existing curricula and study programs;

b) proposed modifications/additions and its Justification;

c) a study of CPNU and partners digital and labs resources for the integration into Digital Learning Ecosystem of DIGITRANS

d) motivation for DIGITRANS project development

Review of existing curricula and study programs

In DIGITRANS project CPNU proposed to upgrade the next existing study programs:

- **Computer engineering** (*bachelor's level*) - validity period of the accreditation certificate until **01.07.2025**;

- **Telecommunications and radio engineering** (*bachelor's level*) - validity period of the accreditation certificate until **01.07.2027**;

- **Telecommunications and radio engineering** (*master's level*) - validity period of the accreditation certificate until **01.07.2026**;

- **Electronics of robotic systems and complexes** (*bachelor's level*) - validity period of the accreditation certificate until **01.07.2025**.

The accreditation certificate is issued for the first time for a period of five years, and during the second and subsequent accreditations - for a period of 10 years. The next (regular) accreditation is carried out during the last year of validity of the accreditation certificate. During war in Ukraine the validity period of accreditation certificates can be continue every year on 1 year. **In validity period of accreditation certificate all changing of curricula and study programs are confirmed by academic council of CPNU.**

Comparative analysis of existing curricula and study programs

Program name	Level	Mandatory courses, ECTS credits	Elective courses, ECTS credits	Total ECTScredits
Computer engineering	bachelor	174	66	240
Telecommunications and radio engineering	bachelor	180	60	240
Telecommunications and radio engineering	Master	65	25	90
Electronics of robotic systems and complexes	bachelor	180	60	240

Proposed modifications / additions

During DIGITRANS project CPNU plans to develop 3 new courses and to update 3 courses:

Study program/ Course /Lab title	Updated or new	Level: Bachelor, Master, other	ECTS credit	Mandatory of elected course
Study program "Computer Engineering":				
Microcontroller Systems Programming	new	Bachelor	6	elected
Systems on Chip	new	Bachelor	4	elected
Design of Digital Devices	new	Bachelor	5	Mandatory
Study program "Telecommunications and Radio Engineering":				
Electrical Circuit Design	updated	Bachelor	12	Mandatory
Digital Systems of Telecommunications	updated	Master	5	Mandatory
Study program "Electronics of robotic systems and complexes"				
Digital electronics devices	updated	Bachelor	11	Mandatory
Total			43	

Justification of proposed modifications / additions

The need to modify educational programs is justified both by the general trend in the development of digitalization in Ukraine and by the needs of the CPNU in this direction.

General trend (on September 5, 2022 in Brussels Ukraine joined the Digital Europe Program until 2027) includes three strategic goals:

Strategic goal 1. "The digital educational environment is accessible and modern":
- equipped with equipment for creating a digital educational environment;
- broadband Internet access.

Strategic goal 2. "Employees in the field of education possess digital competences":
- development of digital competences based on modern requirements.

Strategic goal 3. "Educational content meets modern requirements":
- educational programs in the field of ICT have been updated with availability of accessible digital content.

Internal needs of the CPNU is connected, at the first, with such university's stratedgic aims and development of methodics and resourses of student training in Educational and Scientific Institute of Electronic and Information Technologies of CPNU:
- creation of smart classrooms equipped with access to electronic resources;
- creation of new experimental educational laboratories;
- expansion of internship, retraining and professional development programs using e-learning technologies.

Digital and labs resources for the integration into Digital Learning Ecosystem

In CPNU the direction of Digital Transformation is supported by EDUCATIONAL-SCIENTIFIC INSTITUTE OF ELECTRONIC AND INFORMATION TECHNOLOGIES consisting of:

Department	Specialty
Electrical Engineering and Information Measuring Technologies	Electrical engineering and electromechanics
Electronics, Automation, Robotics and Mechatronics	Electronics
Radio Engineering and Embedded Systems	Electronic communications and radio engineering
Information and Computer Systems	Computer Engineering
Information Technologies and Software Engineering	Software Engineering
Cyber Security and Mathematical Modeling	Cyber Security

A set of specialized labs includes:

Embedded systems lab, Renewable Energy Sources lab, Simulation of Cyber-Physical Systems lab, Cyber Security lab, VoIP technologies lab, Network technologies lab. , Electrical Cars lab
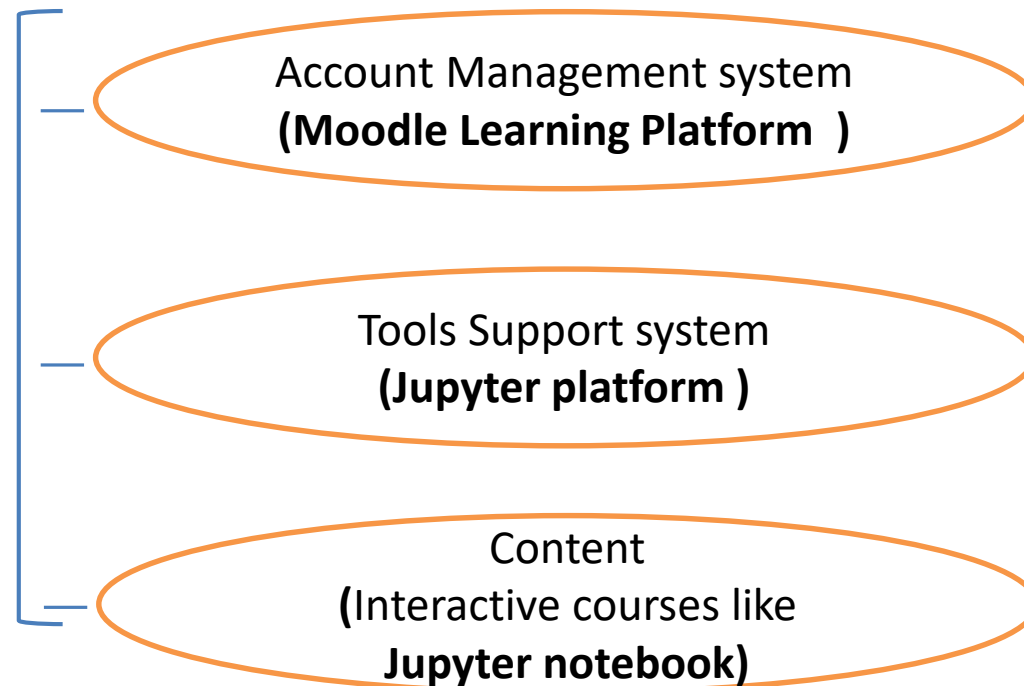

Partner companies:

Shared Modelling and Simulation Environment (SMSE)

Developed during Erasmus+ project: **CybPhys - Development of practically-oriented student-centred education in the field of modelling of Cyber-Physical Systems (2019-2023)**

SMSE architecture

Account Management system
(Moodle Learning Platform)

Tools Support system
(Jupyter platform)

Content
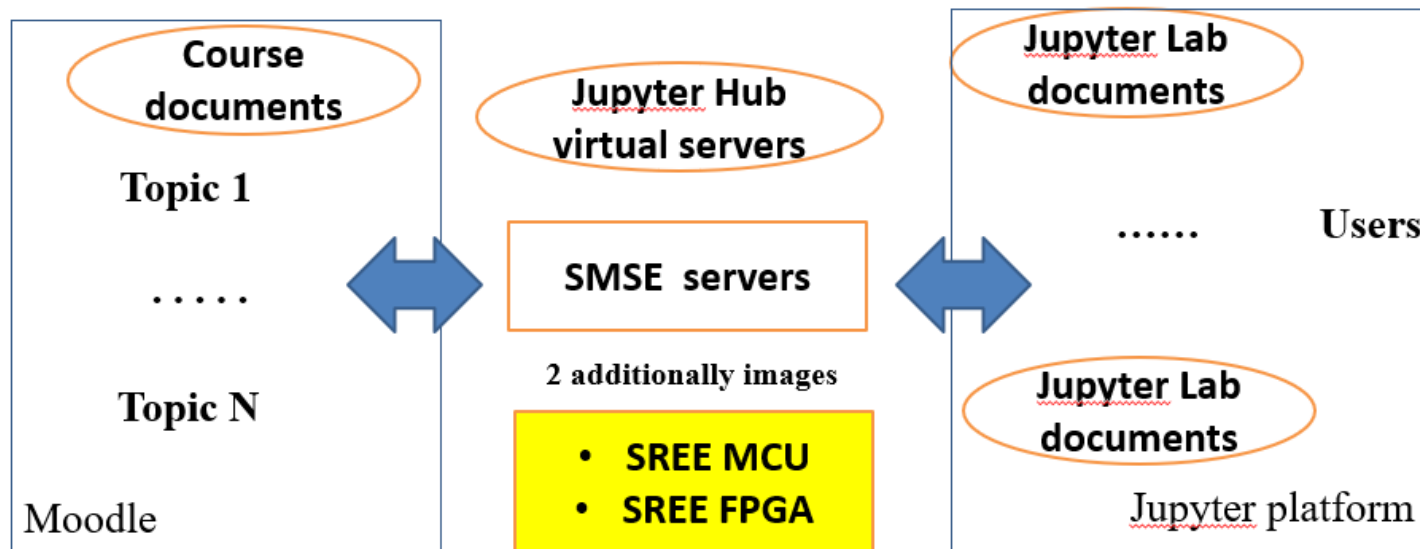**(**Interactive courses like **Jupyter notebook)**

The main task of SMSE is to support in online mode the individual work of students with the course materials (lectures, practical or laboratory works) stored in Moodle.. SMSE creates for every user his own remote JupyterLab, which runs the software kernels to execute the program code directly from Jupyter Notebook documents.
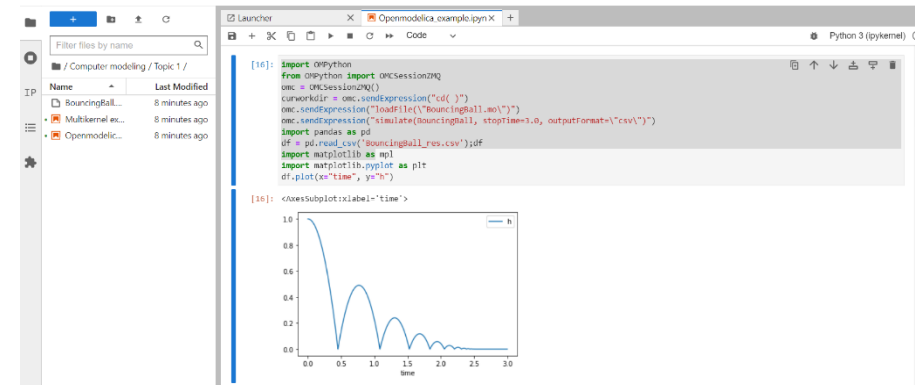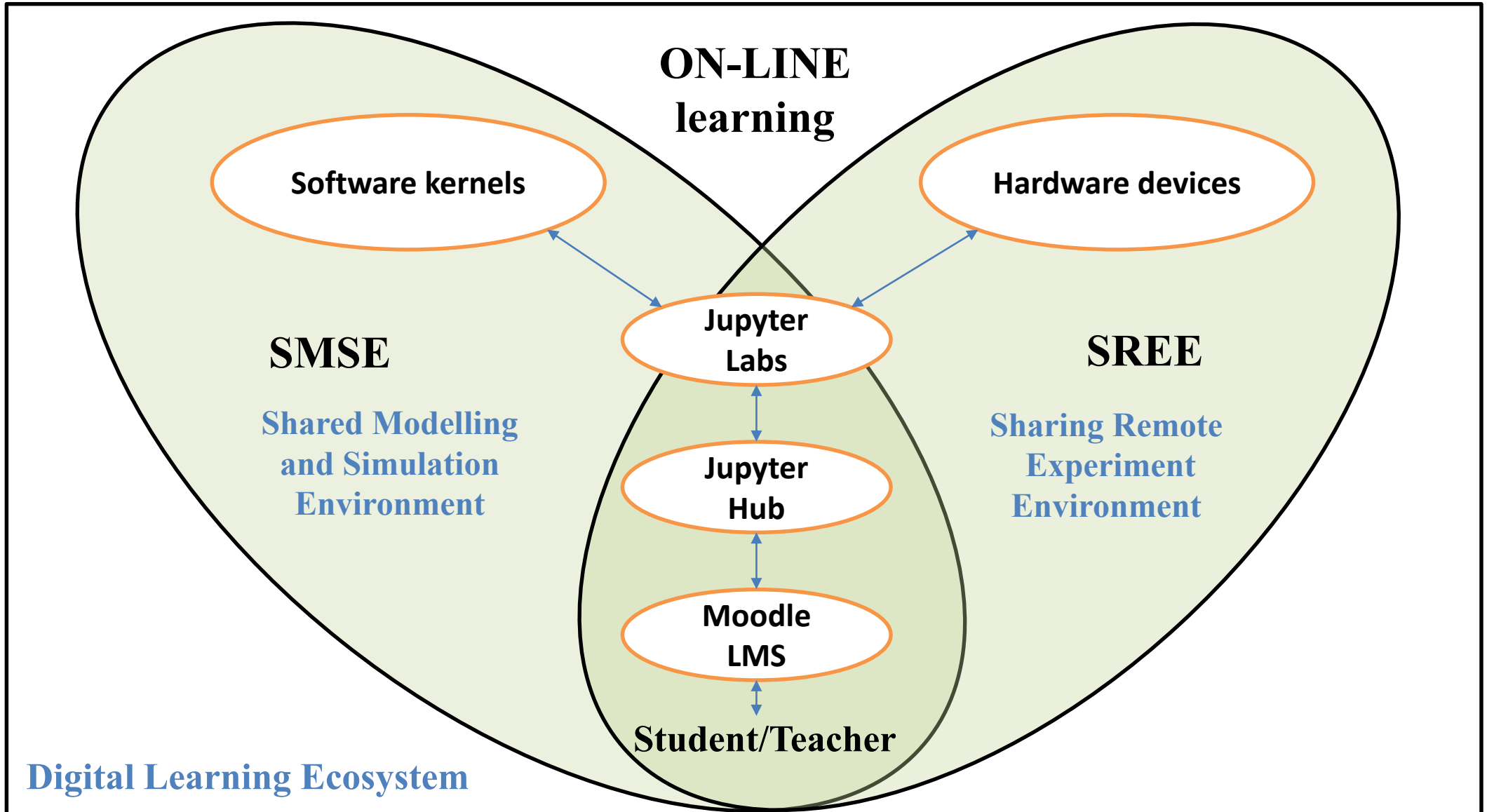
Motivation for DIGITRANS project development

Based on European program and experience in directions of creation the Digital Learning Ecosystem, the task of CPNU in framework of DIGITRANS project is to develop of Sharing Remote Experiment Environment (SREE). Particular objectives will be include:

▪ to develop the platform for on-line laboratory works with physical equipment of remote laboratories;
▪ to integrate SREE with SMSE
▪ to create methodology of implementing and sharing remote applications of the HEIs laboratories' equipment and software tools for distance usage based on ICT tools.

ON-LINE
learning

Software kernels

Hardware devices

Jupyter
Labs

SMSE

**Shared Modelling
and Simulation
Environment**

SREE

**Sharing Remote
Experiment
Environment**

Jupyter
Hub

Moodle
LMS

Student/Teacher

Digital Learning Ecosystem

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