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SHARING STRENGTHS TO IMPROVE INTERNATIONAL COLLABORATIVE LEARNING AND TEACHING PROCESSES IN HIGHER EDUCATION: THE NEXTGENG PROJECT

S. Satorres-Martínez[1], J.I. Jiménez-González[1], R. Dorado-Vicente[1], E. Muñoz-Cerón[1], A. Kakko[2], C. Lapusan[3]

[1] University of Jaén (Spain)
[2] JAMK University of Applied Sciences (Finland)
[3] Technical University of Cluj-Napoca (ROMANIA)

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NextGEng

Content

This **paper** presents the goals and major features of the International Cooperation Framework for Next Generation Engineering Students (**NextGEng**) project

NextGEng

It is a recently granted Erasmus+ Cooperation partnership in higher education project that involves a consortium of **six partners** from European **universities** and **companies**

Aim

To develop an international cooperation framework that promotes international team-teaching aligned with the European Education Area 2025 and labour market needs, including actions to support collaborative international and experiential learning in engineering

- Tailored training process for teachers
- International team teaching pilot program
- Cases for experiential learning

Taking advantage of past collaborations ……

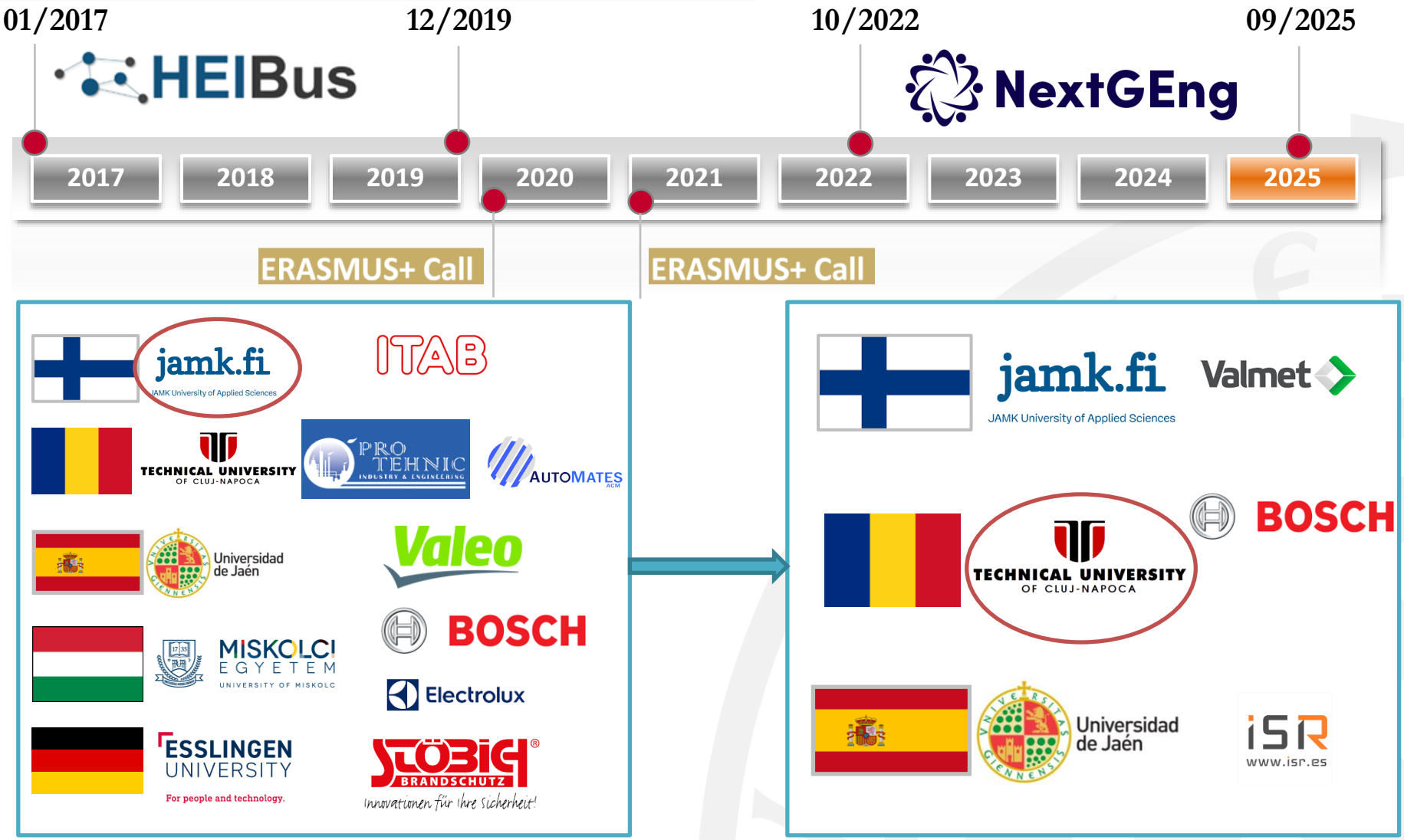
HEIBus

Smart HEI-Business collaboration for skills and competitiveness [HEIBus] is an Erasmus + Knowledge Alliances 2 project that aims to develop **smart and innovative models** for Higher Education Institution (HEI) -company cooperation

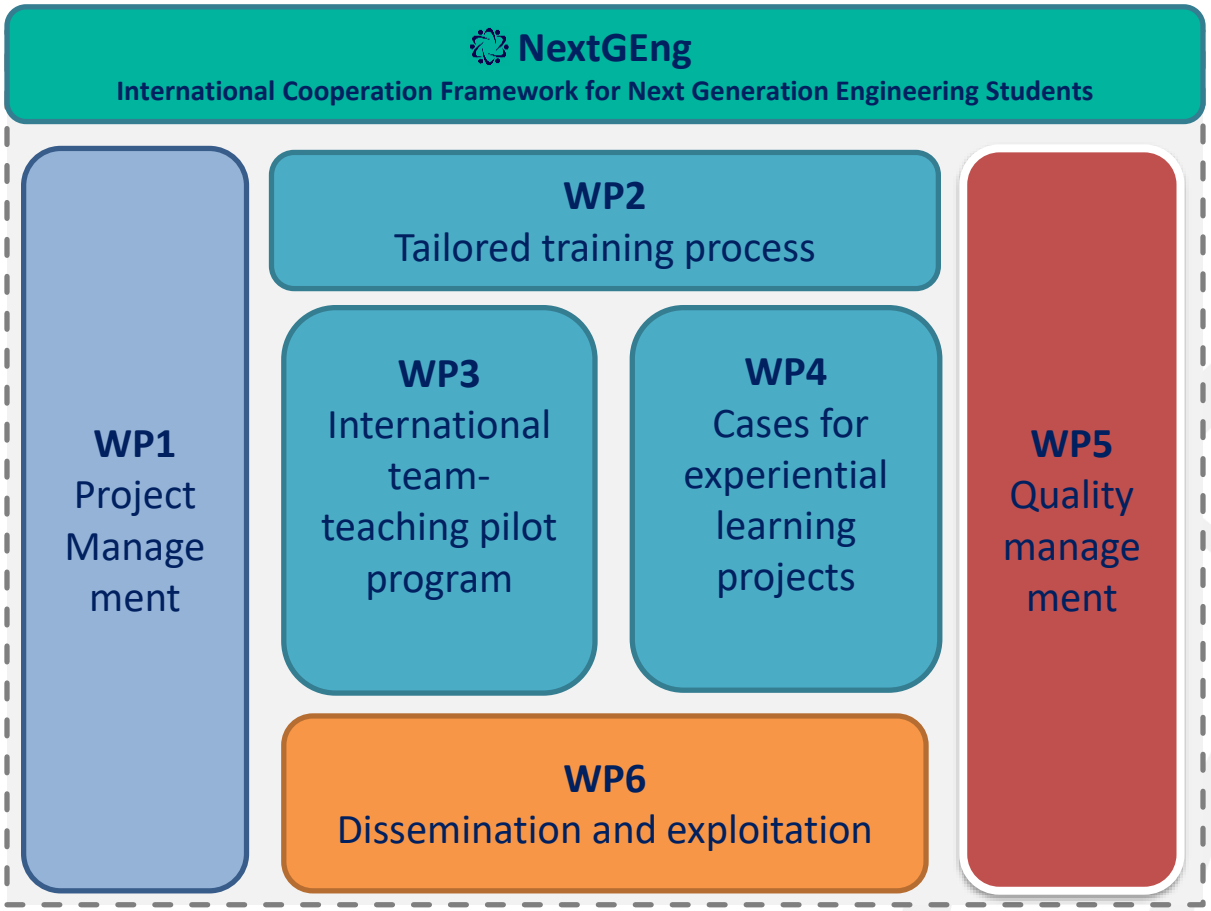
- **Multidisciplinary Real Life Problem Solving (RLPS)**
- Expert Level Real Life Problem Solving (EXPERT)
- Flexible Student Mentoring by Companies (Flex Mentoring)

Consortium: 5 universities and 7 company partners from five different EU member countries

Taking advantage of past collaborations ……



NextGEng



- **WP1** deals with the overall project management
- **WP2**, **WP3** and **WP4** are implementation work packages
- **WP5** provides guidelines for quality assurance and evaluation
- **WP6** focuses on the dissemination and exploitation of the project's activities and results

WP2: Tailored training process

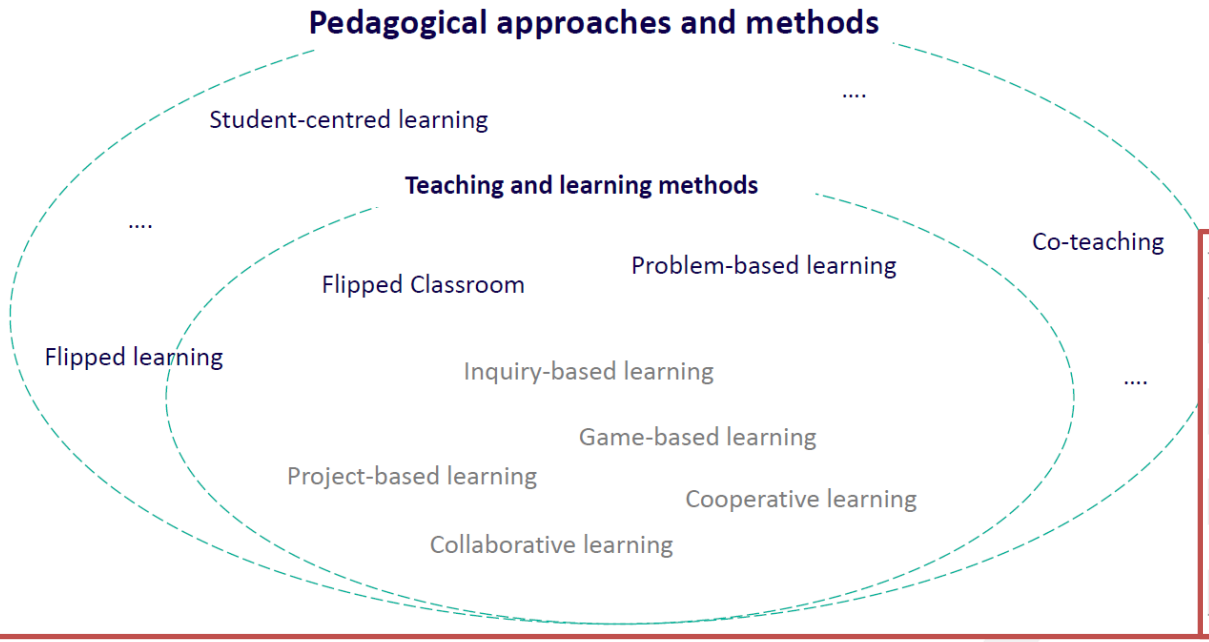
10/2022-03/2024

Aim

First **analyze** and then **improve** the pedagogical tools used in each of the HEI partners. Through the analysis, lecturers become aware of methods used elsewhere, get help to evaluate their own ones, and are involved in creating and evaluating new cooperative international teaching methods.

Training seminar (30-31/01/2023) was organized by one of the HEI partners, the JAMK University from Finland. **JAMK** is forerunner in developing student-centered, competency-based education, digital learning, lifelong learning and reforming work-related pedagogy and teacher training.

(i) Pedagogical tools analysis

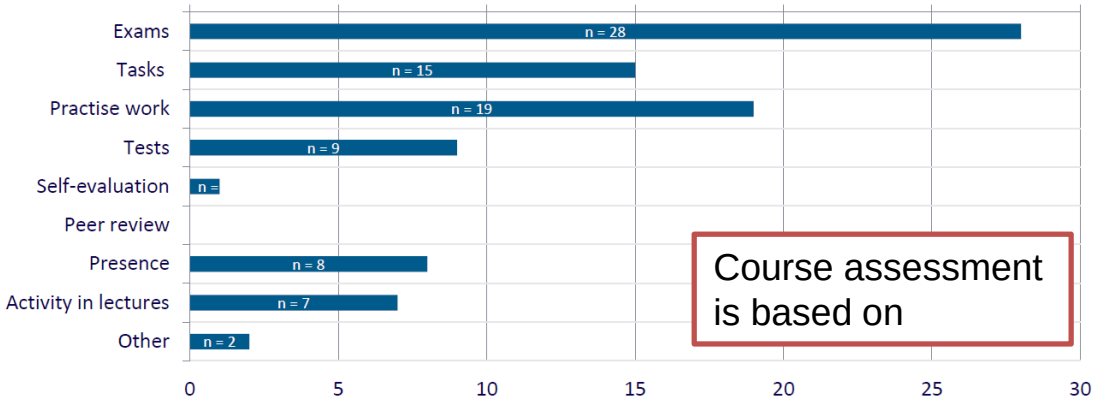


Pre-assignment:

Courses for the international team teaching pilot program (upgraded courses)

Courses	n
C1: Strength of Materials	7
C2: Industrial automation	6
C3: Design projects	4
C4: Quality assurance and applied methods	3
C5: Computer aided design	4
C6: Manufacturing Technology	4
Respondents	*28*

75%of respondents have teacher-centred approach as a main teaching method



Course assessment is based on

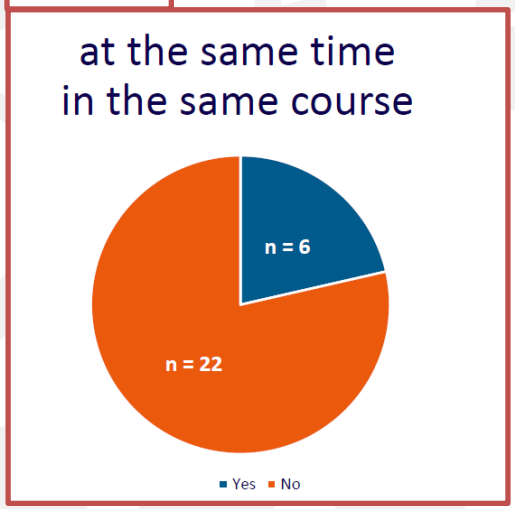
Future plans ….

(ii) Pedagogical tools improvement

1. Problem-based learning (14)
2. Project-based learning (13)
3. Collaborative (14) and Cooperative learning (12)
4. Flipped Classroom (13)
5. Learning by teaching (11)
6. Game-based learning (8)
7. Inquiry-based learning (6)
8. Others: Blended learning, Thinking Routines

Teaching together

Now



Expectations from co-teaching

- Should be well coordinated
- Roles and tasks should be clear
- Need to be willingness to improve the process
- Requires trust and transparency
- Can activate students and enrich the learning process
- Courses could be more interactive
- Deepens teachers' knowledge and competence

WP2: Tailored training process

Development of a pedagogical tailored training program for sustaining the skill improvement of HEIs partners through workshops and guidance material

Summary of expected results

Activity	Results
Background research of the teaching method	Internal report based on the pre-assignment task of the training seminar (**DONE**)
Training seminar of teaching first round	Training seminar (30-31/01/2023) at the University of Applied Science, JAMK (Finland) (**DONE**)
Assessment of the quality of seminar and workshops	Creating a survey to find out how training days have changed the learner-centeredness of curricula and the planned use of teaching methods and digital tools
Research on implementation quality for upgraded courses	Creating a survey for the teachers and students of the upgraded courses to find out the situation after upgrade of the selected courses
Training seminar of teaching second round	Virtual seminar for co-teaching improvement (02-03/2024)

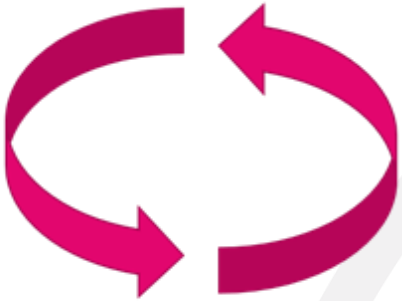
WP3: International team teaching pilot program → 12/2022-09/2025

Aim

Develop a **PILOT PROGRAM** that promotes and implements **international team-teaching** as part of the educational process in al HEI partners for specific **engineering courses** in their curricula

Six upgraded joint courses (C1-C6)

C1 – Strength of Materials
C2 – Industrial Automation
C3 – Design Projects
C4 – Quality Assurance and Applied Methods
C5 – Computer Aided Design
C6 – Manufacturing Technology



Developed by a co-teaching team

For each of the courses (C1-C6) an international co-teaching team is created that includes **HEI course responsible teachers** and **company experts** that work together in the development of **new teaching materials** and **teaching methods**.

Course Upgrade → Cooperative teaching implementation → Analysis & Improvement

Two rounds

WP3: International team teaching pilot program

Development of an international team teaching pilot program for upgrading a number of six joint courses belonging to the HEI partners' curricula

Summary of expected results

Activity	Results
Course upgrading first round (**C1-C4**)	**24** new course modules (2 modules/course, 8 modules/HEI) **11** new laboratory work/tailored seminars from companies (ISR:3, VALMET:4, BOSCH:4)
Cooperative teaching implementation first round at TUCN / JAMK / UJA	At each HEI: **8** course team-teaching sessions. **11** laboratory team-teaching sessions with participation of BOSCH, ISR and VALMET experts
Course upgrading second round (**C5-C6**)	**12** new course modules (2 modules/course, 4 modules/HEI) **5** new laboratory work/tailored seminars from companies (ISR:1, VALMET:2, BOSCH:2)
Cooperative teaching implementation second round at TUCN / JAMK / UJA	At each HEI: **12** course team-teaching sessions **16** laboratory team-teaching sessions with participation of BOSCH, ISR and VALMET experts
Analyses of pilot program implementation and continuous improvement	Feedback questionnaires & reports

WP4: Cases for experiential learning

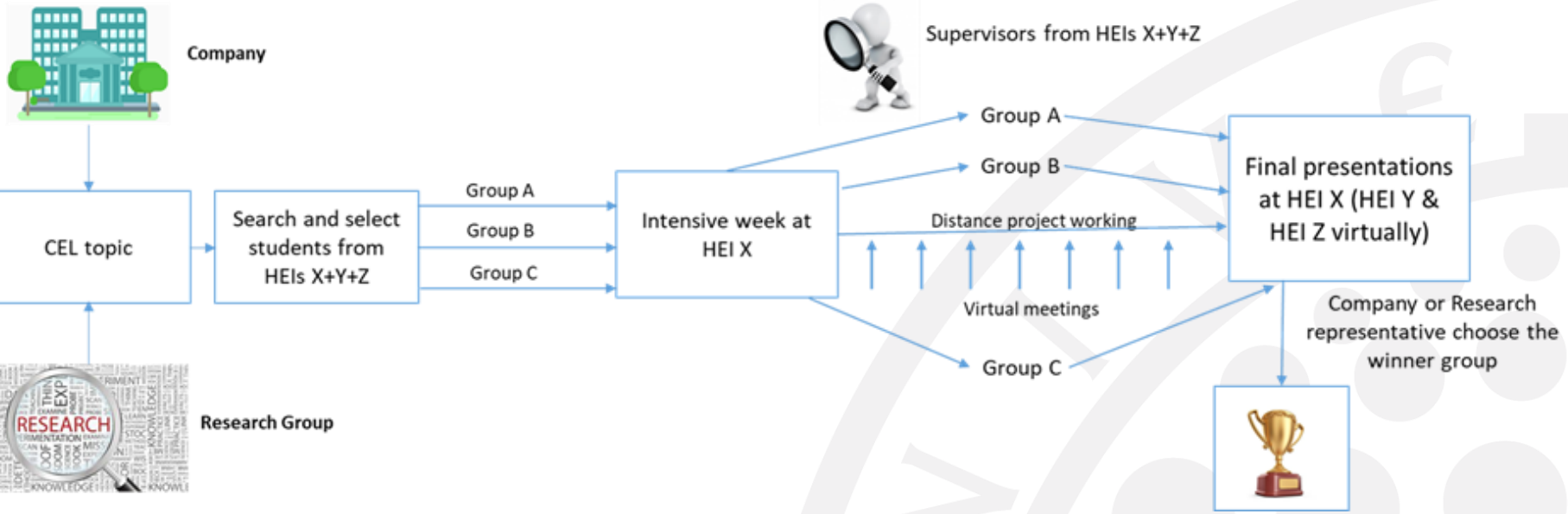
03/2023-09/2025

HEIBus RLPS

Upgraded

Aim

Design and implement Cases for Experiential Learning, **CEL** projects



CEL projects: Bring students, HEIs researchers and company experts to work together solving a case of study proposed by a company or by a research group

WP4: Cases for experiential learning

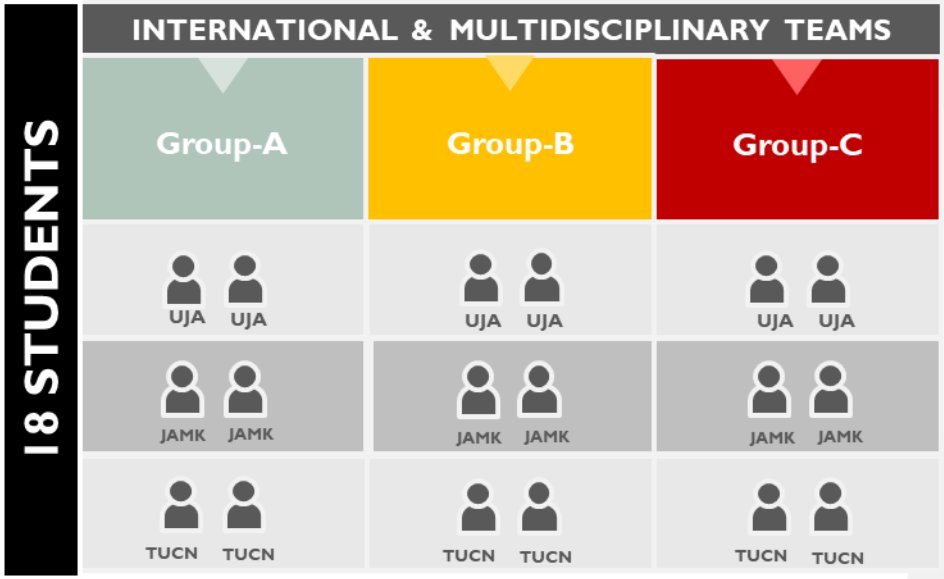
03/2023-09/2025

- Two rounds of CEL projects → 3 per round
- At least 150 participants in total

One CEL Project → At least **25** participants

At least **one** Company or research group supervisor

6 supervisors from HEIs (2 UJA + 2 JAMK + 2 TUCN)



RD	Company/RG representative	HEIs supervisors	Students
1	At least 3	18	54
2	At least 3	18	54

ROUND	Start Date	End Date
1	01/03/2023 (M6)	30/07/2024 (M22)
2	01/08/2024 (M23)	30/07/2025 (M34)

3 projects in 2024, spring semester (Valmet+Bosch+UJA research group)

3 projects in 2025, spring semester (TUCN RG +JAMK RG+ISR)

WP4: Cases for experiential learning

Implementation of **six CEL projects** where international teams of students are involved in solving research or an industrial challenge in direct collaborations with HEI researchers and company experts

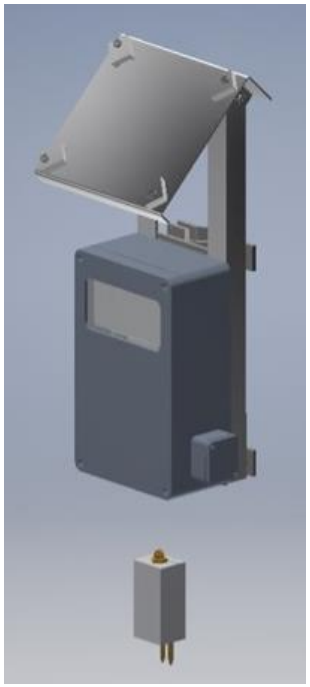
Summary of expected results

Activity	Results Two rounds
List of companies and research groups for CEL projects	**1** report with the CEL project subject proposals
Schedule and detailed plan	**For each round**: **3** reports (one for each CEL project) including: (i) detailed information about the kick-off meeting; (ii) intensive week schedule; (iii) distance working week schedule
Intensive week at TUCN, JAMK, UJA	**For each round:** **3** face-to-face intensive weeks, events, (hosted by TUCN, JAMK and UJA)
Reports and evaluation	**For each round:** **3** virtual seminars for the assessment of the CEL projects

HEIBus RLPS ← An example of what we can achieve with CEL projects

Prototypes capable of measuring different meteorological and ground variables

Design



Construction and Installation

Main features

Autonomous and low cost multisensor system measuring:

- Relative humidity
- Environmental temperature
- Soil humidity
- Soil temperature
- Rain fall
- Solar radiation

Sharing strenghts: Main benefits in a nutshell

- New teaching models featuring a student-centered approach in cooperation with other international institutions and companies
- Tailored training program for sustaining the skill improvement of HEIs partners
- Multidisciplinary and international cooperation
- Real life problems from industry and HEIs research groups