

# Fostering excellence in engineering education through an international co-teaching framework as part of NextGEng Project

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# NextGEng Project

## Project Type

- Cooperation Partnerships in Higher Education - KA220-HED

## Title

- International Cooperation Framework for Next Generation Engineering Students [NextGEng]

## Coordinator

- Technical University of Cluj-Napoca

## Budget

- 400.000 Euro

## Time frame

- 1 Oct 2022 – 30 Sept 2025 (36 months)



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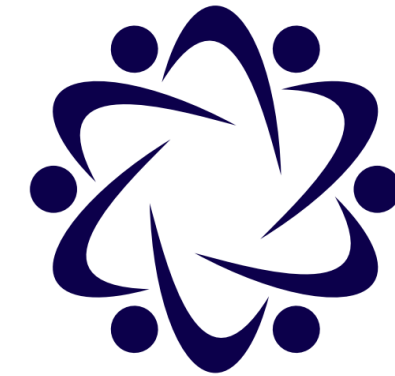
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# Project Objective

- The aim of NextGEng is to **develop an international cooperation framework** between consortium partners that **promote international team-teaching** with the support of **new learning material and teaching methods** that are aligned with the European Education Area 2025 and are in accordance with labor market needs.



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# Project beneficiaries

## ❑ Target groups

- HEI students

## ❑ Needs addressed

- collaboration with industry as part of the curricula activities
- courses learning outputs/ competences adapted to the labor market needs
- learning and working in an international environment
- increase the content quality of courses (integrates state of the art topics in engineering, integrates examples of applied theory in real study cases from industry)



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# Project beneficiaries

## ❑ Target groups

- HEI students
- HEI teachers

## ❑ Needs addressed

- exchange experience (teaching & research) with European teachers in the same engineering field
- close collaboration with industry in education and research
- create new course content that is aligned with the latest industry development
- increase students' motivation to actively participate in the course and laboratory activities



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# Project beneficiaries

## ☐ Target groups

- HEI students
- HEI teachers
- Company experts

## ☐ Needs addressed

- develop new competences in their field of activity
- get in touch with potential new collaborators in HEIs
- identify potential new employees from the HEI students



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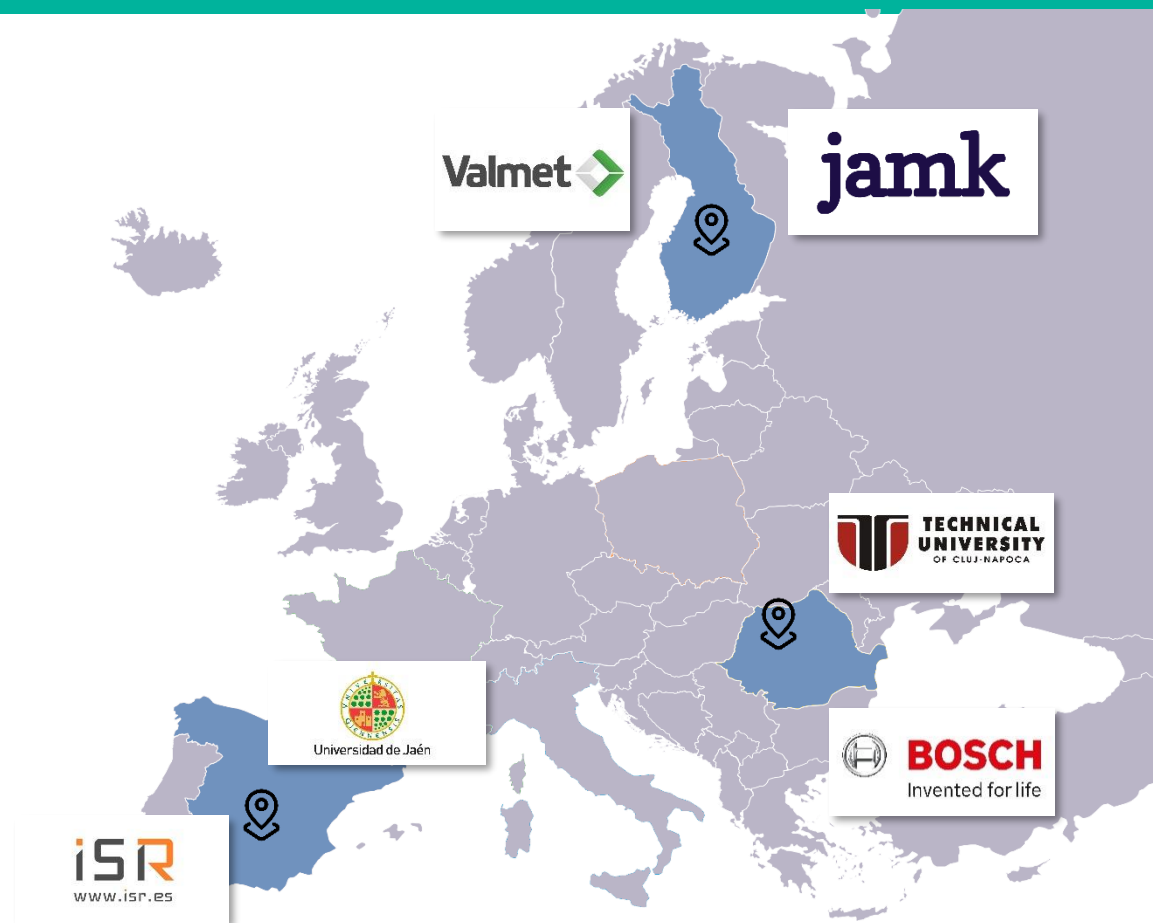




# NextGEng Project

## □ Consortium partners

- Co - Technical University of Cluj-Napoca (Romania)
- P1 - JAMK University of Applied Science (Finland)
- P2 - University Of Jaen (Spain)
- P3 -Integración Sensorial y Robótica (Spain)
- P4 - Valmet Technologies (Finland)
- P5 - Robert Bosch Cluj Plant (Romania)



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# NextGEng Work Packagase

## ☐ Lines of action:



### Training

Tailored training program for teachers that sustain the skill improvement of HEI partners staff in new/innovative teaching methods.



### International Team-Teaching

International Team-Taching Pilot Program.  
Upgrade a set of engineering courses, belonging to the HEI partners curricula, in close collaboration with companies' partners.



### CEL Projects

Cases of Experiential Learning projects.  
Type of projects where students learn by doing in an international and multidisciplinary environment.



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# Tailored Training Process

- initial **Training Program** for the **teachers** that participate in the project is organized
- Organizer: Jamk University of Applied Sciences
- Period : 30 – 31 Jan 2023
- Participants: 29 teachers (TUCN, JAMK & UJA)

C1 – Strength of Materials; C2 – Industrial Automation;

C3 – Design Projects; C4 – Quality Assurance and Applied Methods;

C5 – Computer Aided Design ; C6 – Manufacturing Technology



*Jyvaskyla, Jan 2023*



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# Tailored Training Process

## ❑ Planned activities, Day 1:

- Current status in partner universities - Summary of the survey and pre-assignments
- Planning, implementing and assessing courses in a student-centered way
- Development of particular implementation solutions for student-centered learning in pilot courses and the possibilities for joint implementation
- Social event – networking with dinner



*Jyväskylä, Jan 2023*



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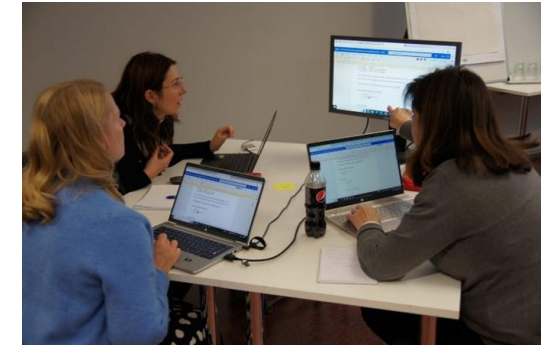


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# Tailored Training Process

## ❑ Planned activities, Day 2:

- Planning the international co-teaching for the subject area and increasing the student-centered orientation of the course
- Companies on stage - Opportunities and plans for co-operations to participate in the study courses
- Visit to Jamk DigiCenter – development of digital learning material
- Group presentations of the workshop results



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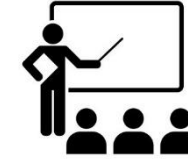
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# International team-teaching pilot program

## 1. Tailored Training Process

- Jan 2023
- Organized by P1-JAMK



## 2. Course upgrading process (Round 1) [C1...C4]

- Feb - Sept 2023
- CO-TUCN, P1-JAMK, P2-UJA, P3-ISR, P4-Valmet, P5-Bosch



## 3. Implementation of the Team-Teaching Pilot Program

- Sept 2023-June 2024
- CO-TUCN, P1-JAMK, P2-UJA



## 4. Course upgrading process (Round 2) [C5,C6]

- Feb - Sept 2024
- CO-TUCN, P1-JAMK, P2-UJA, P3-ISR, P4-Valmet, P5-Bosch



## 5. Implementation of the Team-Teaching Pilot Program

- Sept 2024-June 2025
- CO-TUCN, P1-JAMK, P2-UJA



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# International team-teaching pilot program

- The **ITT pilot program** supports the development of an **international teaching framework** where teachers and industry experts collaborate in the **development of new course content** and **specific teaching methods for engineering**.



## 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



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# International team-teaching pilot program

## ❑ Development of new course content

- ✓ **Modularity of contents and levels** - for each joint **course modules are defined**, facilitating in this way the **team-teaching process** and allowing flexible content implementation each course in all HEIs
- ✓ **Student-centered elements** - develop new content that put students at the center of learning process and make use of experiential learning in close collaboration with real life case studies from industry
- ✓ **Eco-friendly concepts** - new eco-friendly concepts are integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the design and life span of a certain engineering product
- ✓ **Material compatible with digital teaching and learning**



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# International team-teaching pilot program

## Teaching methods applied for engineering learning process

- ✓ Co-teaching/cooperative teaching
- ✓ Blended learning as part of cooperative teaching
- ✓ Student centered teaching
- ✓ Project-based learning
- ✓ Digital teaching and learning



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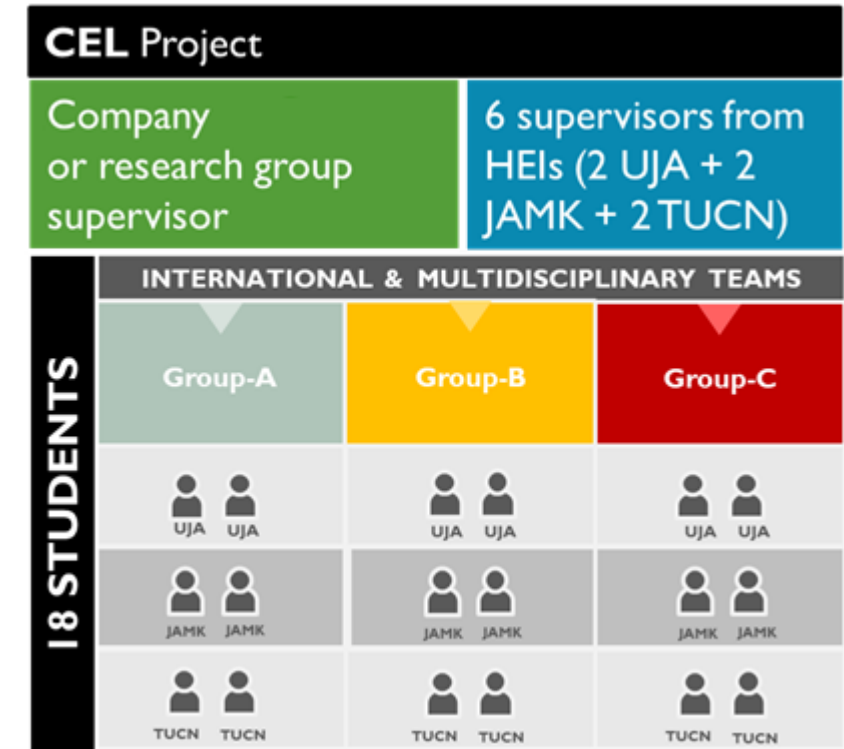


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# Cases for experiential learning projects

- CEL projects are **project-based learning activities** that are designed in collaboration with **companies** and **HEIs research groups**
- facilitate **close cooperation** between students, HEI staff, researchers, and industry experts on **real-life industrial/research project topics**
- Two rounds of projects
  - 3 projects proposed by research groups from UJA, JAMK and TUCN
  - 3 project proposed by companies: ISR, Valmet and Bosch



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# NextGEng Publications

## ❑ Scientific Papers

- Satorres-Martínez, S., et al, Sharing strengths to improve international collaborative learning and teaching processes in higher education: the NextGEng project, INTED2023 Conference, Valencia, Spain, 4-6 Mar. 2023.
- Anneli KAKKO , International Cooperation Framework For Next Generation Engineering Students, SEFI 2023 Conference, Dublin, Ireland, 11-14 Sep. 2023.
- Dorado-Vicente, et al, The NextGEng Project: First Steps of an International Co-Teaching Experience, INDOTEC 2023 Conference, Granada, Spain, 26-27 Oct 2023.



## ❑ Oral presentations

- C. Lapusan - 14th International Forum of Mechanical and Mechatronics Engineering, Nov. 2022
- A. Kakko - 16th International Conference of Education, Research and Innovation, Nov. 2023



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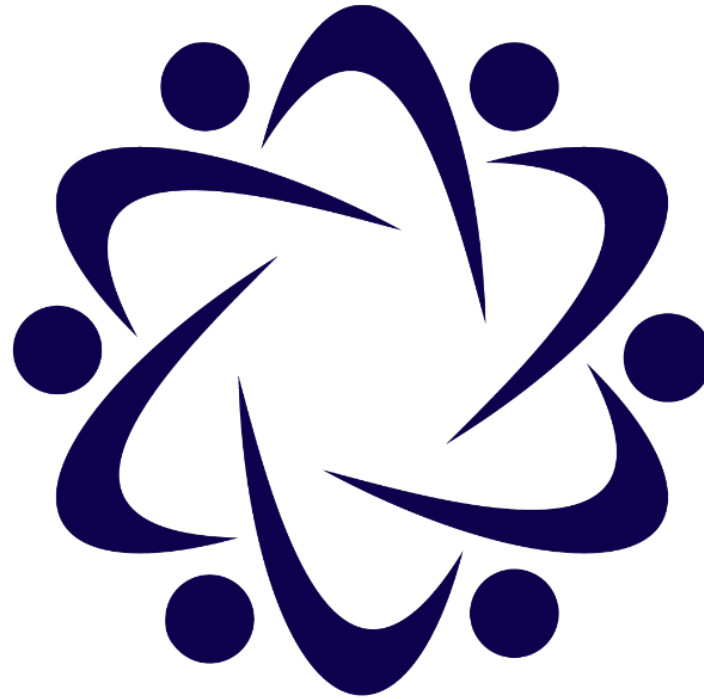
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**Thank you!**

**Kiitos!**

**Gracias!**



**Multumesc!**

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