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Project title International Cooperation Framework for Next Generation Engineering Students
Project acronym NextGEng
Project contract no. 2022-1-RO01-KA220-HED-000088365

NextGEng Project

WORK PACKAGE 4

CASES FOR EXPERIENTIAL LEARNING PROJECTS

R4.3.a

Brochure for students

November, 2023



WP4	R4.3.a Brochure for marketing CELs 1st round
Authors	Silvia Satorres-Martínez
Short Description	The report presents the dissemination activities developed for students for the participant selection of the first round of CEL projects
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0.1	15/11/2023	Silvia Satorres	First Draft
0.2	30/11/2023	Ciprian Lapusan	Review
Final	04/12/2023	Silvia Satorres	Final Version

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1. Introduction

The aim of the report is to show the information that was presented to students as first step of the participant selection process for the first round of CEL projects. Each of the host universities made this activity to inform and motivate students to take part in one of the offered CEL projects.

This report is one of the results of the activity: A4.3. Participant selection. In particular, this report is the result: R4.3.a Brochure for students

2. Brochure for students

The following figures show the information that was presented to students as the first step of the participant selection process. The presentation covered the following issues:

- Goal of the NextGEng project and partners (Figs. 1, 2).
- Description of a CEL project (Figs. 3, 4).
- CEL project for the first round (Figs. 5, 6, 7).
- Schedule (Fig. 8).
- How to apply (Figs. 9, 10).

The aforementioned figures are screenshots of the presentation made at the University of Jaén. Similar presentations were made at the other universities (JAMK, TUCN).



About NextGEng

The International Cooperation Framework for Next Generation Engineering Students project, NextGEng, is an international consortium with the aim of creating new international teaching models in close collaboration with companies. It comprises three types of activities:

- **Training.** Experts in pedagogy and teacher training sustain the skill improvement of HEIs partners in new/innovative teaching methods.
- **Team Teaching.** Upgrade a set of engineering courses, belonging to the HEI partners curricula, in close collaboration with companies' partners.
- **CEL projects.** Type of projects where students learn by doing in an international and multidisciplinary environment.

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 **ISR**
www.isr.es

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Fig. 1. The NextGEng project



Fig. 2. The NextGEng partners

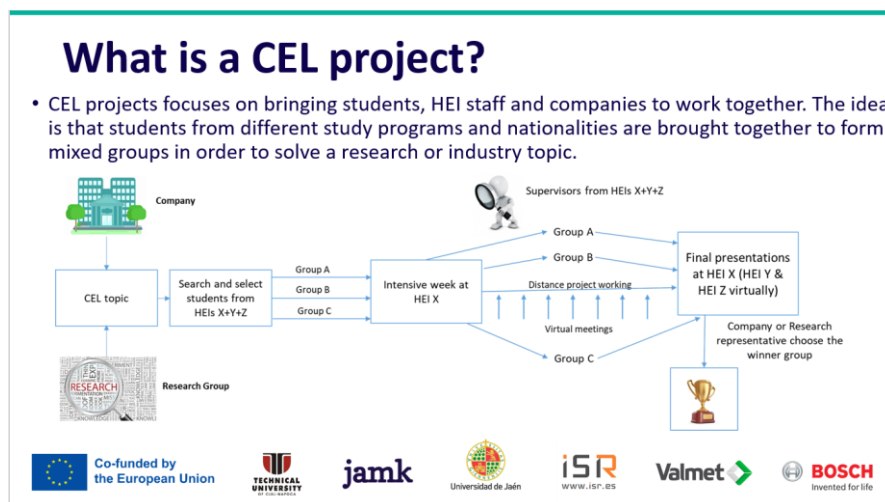


Fig. 3. Description of a CEL project

What is a CEL project?

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

ROUND	Company/research group 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)	30/05/2024 (M20)	3 projects in 2024, spring semester (ISR+TUCN research group+Valmet)
2	01/06/2024 (M21)	30/07/2025 (M34)	3 projects in 2025, spring semester (UJA RG + Bosch + JAMK RG)

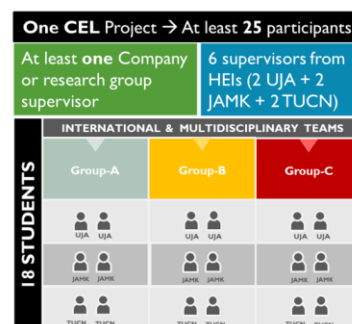


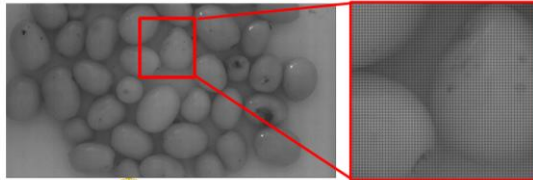
Fig. 4. Participants in a CEL project

First round. CEL1 → ISR

ISR.es

<https://isr.es/>

- **Title:** Design of an olive quality control system
- **Objective:** Design and develop a station (machine vision system) able to classify the olive quality based on multispectral and or hyperspectral images of olive fruits.
- **Student tasks:**
 - Project planning.
 - Acquisition station CAD design.
 - Development of computer vision algorithms for quality assessment
- **Student profile:** Multidisciplinary



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Fig. 5. CEL1 - ISR

First round. CEL2 → TUCN RG

Research Group of the
Applied Mechatronics
Research Laboratory

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<https://www.utcluj.ro/>

- **Title:** 3-axes GANTRY ROBOT (3GR)
- **Objective:** Design a 3-axes GANTRY ROBOT subject to the following requirements:
 - the movement along the X, Y, Z axes is carried out using electric motors mounted on the fixed base of the robot (they must not be mounted on moving parts)
 - the transmission of the movement for the axes (X, Y, Z) is done using toothed belts
 - the robot workspace is 300 x 400 x 200 mm³ (X, Y, Z)
 - on the Z axis a gripper is attached; the gripper must be able to manipulate workpieces with cylindrical geometry: 30 mm (diameter), 30 (height), 50 grams (mass); the gripper can be operated by any technology
- **Student tasks:**
 - Conceptual design of 3GR and gripper
 - Virtual prototyping and validation
 - Result analysis: benefits and drawbacks
- **Student profile:** Multidisciplinary (mechanics, robotics, control etc.)



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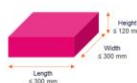
Fig. 6. CEL2 - TUCN

First round. CEL3 → Valmet

Valmet

<https://www.valmet.com/>

- **Title:** Design of a test object for a pressing-based manufacturing process
- **Objective:** Conceptualizing and designing a "test object" for a pressing-based manufacturing process. The knowledge from such tests can be used to adjust process parameters and mechanics for totally new concept of pressing wood-based materials
- **Student tasks:**
 - Project planning
 - Working with test object for a pressing-based manufacturing process
 - 3D models and/or concept-level technical drawings
 - Hand-drawn or digital illustrations (e.g. PowerPoint, Photoshop, Paint) or low- to medium-fidelity physical prototypes made from materials such as wood, plastic (3D-printing) or modelling clay
- **Student profile:** Multidisciplinary



Valmet

Minimum letter
height ~3 mm



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Fig. 7. CEL3 - VALMET

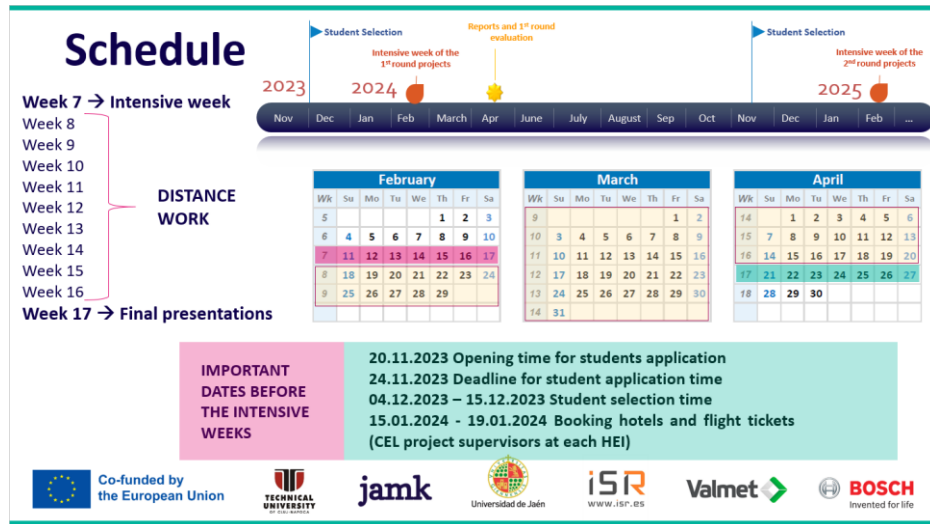


Fig. 8. Schedule for the first round

How to apply

Fill in the participation form:
20/11/2023 – 24/11/2023

Contact details	
Name and Surname	
Identity card	E-mail
Degree or Master	Phone
& course	
Estimated date of completion of studies	
CEL Project preference CEL 1. ISR CEL 2. TUON CEL 3. VALMET	
Motivation (Write in 200 words maximum why you want to participate in this project)	
Contribution (Write in 200 words maximum what you think you can contribute to this project)	
Highlights (Write in 100 words maximum other aspects that you would like to communicate to the people selecting the team that will develop this project. Aspects related to your skills, your training in other aspects that you consider should be taken into account as well as your capacity for effort and commitment)	
Date and Signature	

(Do not write more than two pages). Please also attach an informative note about your academic record and level of English.

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Fig. 9. How to apply (1)

How to apply

REQUIREMENTS

- NOT finish your studies before **June 2024**
- High level of English (B2 or higher recommended)
- Ability to work in a team
- Basic knowledge of the chosen CEL topic

BENEFITS OF DOING A CEL PROJECT

- Certification of the activity
- Possibility of doing the bachelor thesis in the CEL subject
- Multidisciplinary cooperation
- International cooperation
- Solving a case of study from Industry
- Solving a case of study of a Research Group

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Fig. 10. How to apply (2)

3. Website promotion

The information related to the CEL projects selection process, the selection criteria and information of the documents and how to apply were also posted on the project website in Newsfeed section.

The link of the post is:

<https://nextgeng.eu/students-selection-cel-project-round-1/>

Student Selection – CEL Projects 1st Round

December 4, 2023

Student Selection – CEL Projects 1st Round

The 1st NextGEng CEL Projects Round is organized in the spring semester of 2024. These projects focused on solving a proposed topic from a company or research group over one academic semester. In this way we facilitate close collaboration between students, HEI staff and company experts in an international environment that stimulates experiential learning.

The topics for the first round are:

- CEL1 topic: Design of an olive quality control system (proposed by ISR)
- CEL2 topic: Design of a 3-axes GANTRY ROBOT (3GR) (proposed by TUCN RG)
- CEL 3 topic: Design of a test object for a pressing-based manufacturing process (proposed by Valmet)

A detailed description of the topics and the CEL Project concept is presented [HERE](#).

For this round a number of 54 students from University of Jaén, Technical University of Cluj-Napoca and JAMK University of Applied Sciences (18 from each university) will be selected to participate in the project. We invite you to get in contact with the CEL Project representative from your university and apply for participation.

The selection criteria are:

- Transcript of records
- Motivation: reasons why they wanted to participate in the project
- Contribution: according to the chosen CEL project, the student explains how he or she can contribute to the group (knowledge acquired from the degree or master course he or she is studying, basic knowledge of the chosen CEL topic, etc)
- Highlights: students describe aspects related to their skills, training in other aspects and capacity for effort and commitment
- English level

Contact:

University of Jaén (Spain): Silvia Satorres Martínez (satorres@ujaen.es) / José Ignacio Jiménez González (jjnacio@ujaen.es)

Technical University of Cluj Napoca (Romania): Ciprian Lapusan (ciprian.lapusan@mdm.utcluj.ro)

JAMK University of Applied Sciences (Finland): Anneli Kakko, (anneli.kakko@jamk.fi)

Useful docs: [NextGEng CEL Project Participation Form](#) ; [NextGEng CEL Project 1st Round topics](#)

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)	
INTERNATIONAL & MULTIDISCIPLINARY TEAMS		
Group A	Group B	Group C
18 STUDENTS	18 STUDENTS	18 STUDENTS
18 STUDENTS	18 STUDENTS	18 STUDENTS
18 STUDENTS	18 STUDENTS	18 STUDENTS
18 STUDENTS	18 STUDENTS	18 STUDENTS

Fig. 11. NextGEng Website – promotion of CEL 1st round

CEL projects. Agreement form

Contact details				
Name and Surname				
Identity card		E-mail		
Degree or Master & course			Phone	
Estimated date of completion of studies				
Valmet CEL activity will be held from February 11 st to February 14 th at JAMK University of Applied Sciences (Jyväskylä, Finland). To ensure attendance at the event, the outbound trip will take place on February 10 th and the return trip on February 15 th				
<p>This form serves to express my interest and agreement in participating in the upcoming Valmet CEL project activity, Jyväskylä, Finland, as part of the NextGeng EU project.</p> <p>By signing this document, I acknowledge that:</p> <ul style="list-style-type: none"> I have been selected among a group of students who showed interest in this activity, and I understand the importance of my participation. I understand that my participation is crucial, and non-attendance will only be justified under exceptional circumstances of force majeure (e.g., unforeseen medical issues or emergencies), which must be duly documented. <p>Failure to comply with this commitment without proper justification may affect my eligibility for similar opportunities in the future.</p>				
Date and Signature				

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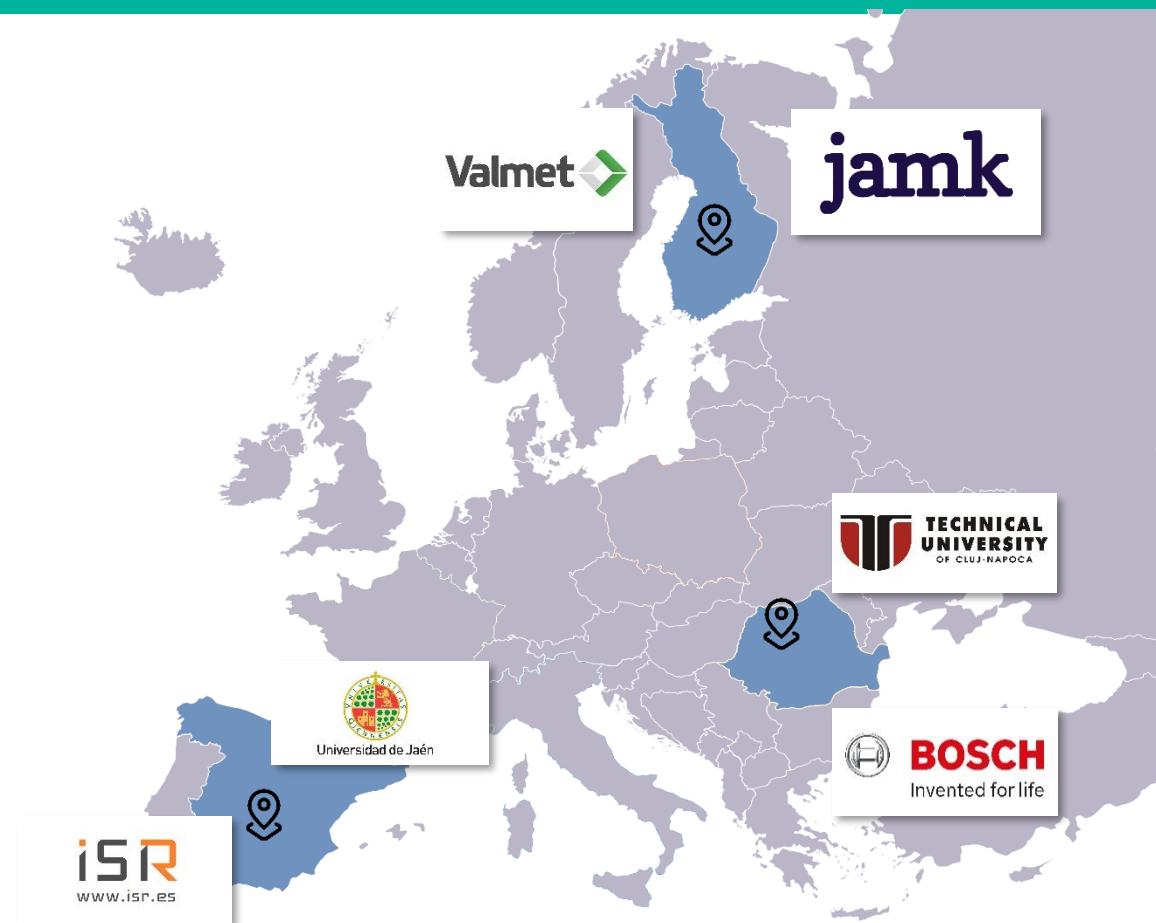


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NextGEng Project

□ 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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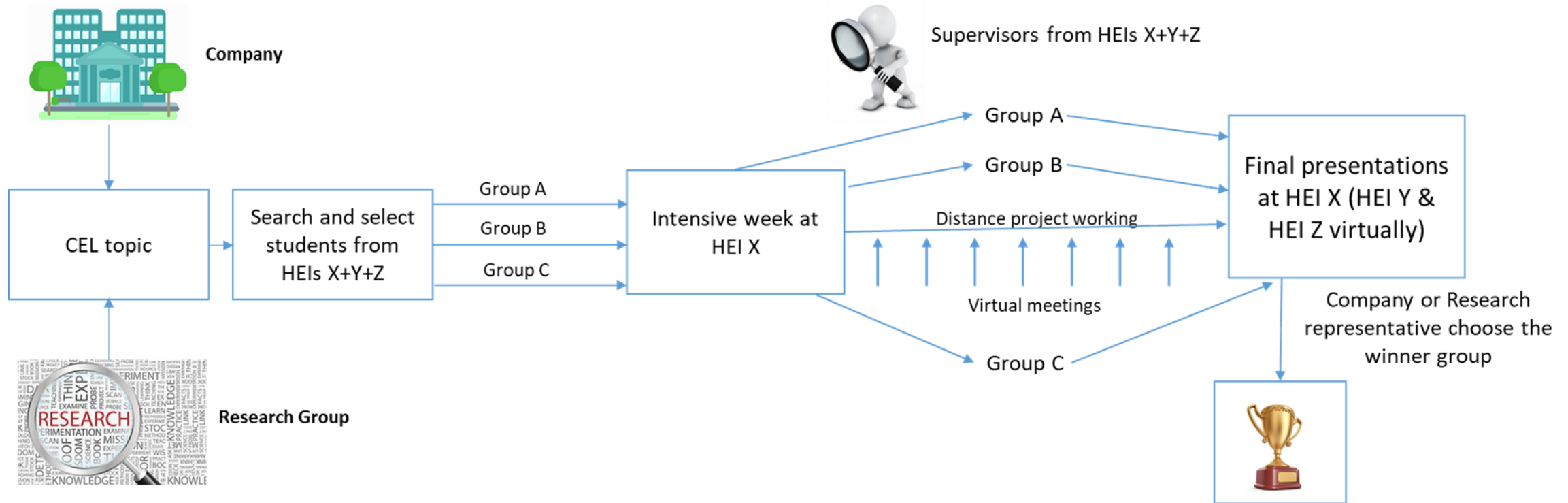


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What is a CEL project?

- CEL projects focus on bringing students, HEI staff and companies to work together. The idea is that students from different study programs and nationalities are brought together to form mixed groups in order to solve a research or industry topic.



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What is a CEL project?

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2	01/06/2024 (M21)	30/07/2025 (M34)

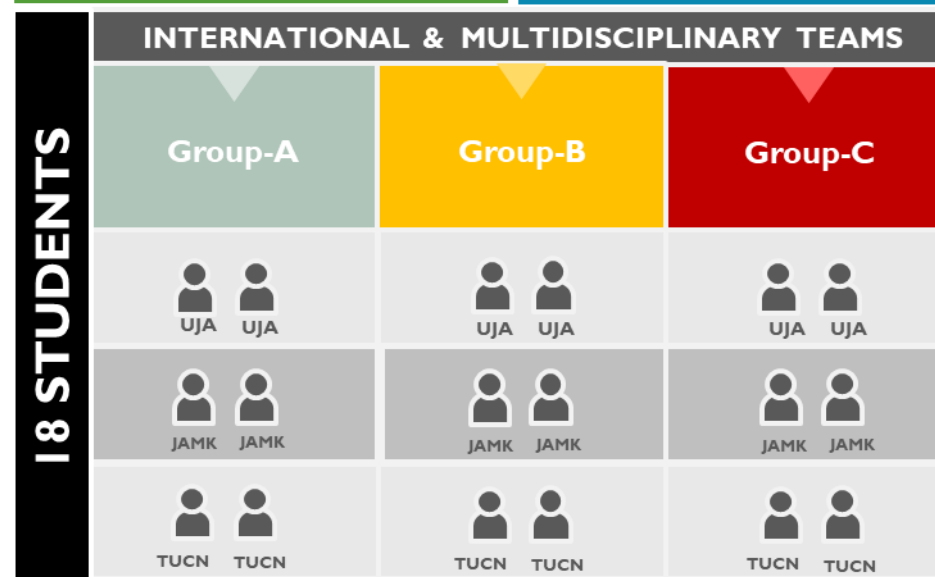
3 projects in 2024, spring semester
(ISR+TUCN research group+Valmet)

3 projects in 2025, spring semester
(UJA RG + Bosch + JAMK RG)

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)



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1R of CEL projects. Topics

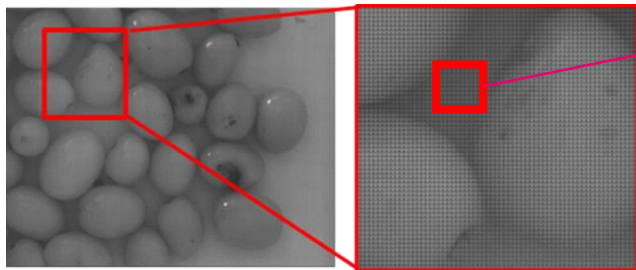
CEL1. Design of an olive quality control system



Design MVS able to classify the olive quality based on multispectral and or hyperspectral images of olive fruits.

Tasks

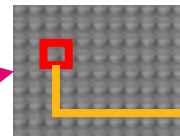
- Project planning
- Acquisition station CAD design
- Development of computer vision algorithms for quality assessment



Profiles

- Students: multidisciplinary
- HEIs supervisors: involved in the following courses: C3 - Design Projects, C4 - Quality Assurance and Applied Methods or C5 - Computer Aided Design. Other profiles are also welcomed

Snapshot

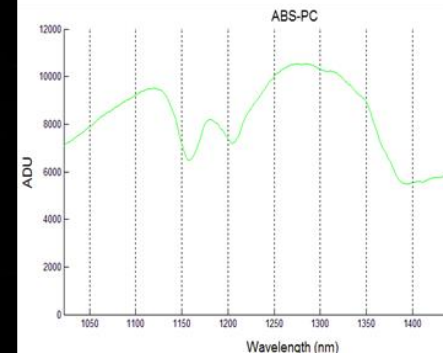
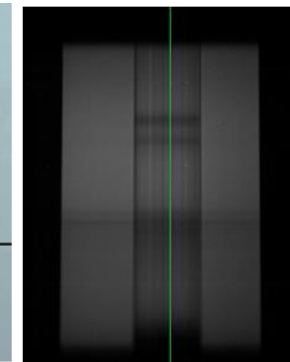
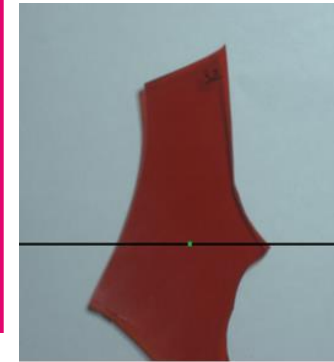


1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

- Spectral range: 665 - 975nm
- 25 spectral channels

PUSH-BROOM

- Spectral range: 400-1000 nm
- 281 spectral channels



Seminars

- Olive defectology & engineering solutions
- Computer vision-based quality control solutions
- Demonstration of different computer-vision based industrial stations



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1R of CEL projects. Topics

CEL2. 3-axes GANTRY ROBOT (3GR)



Design a 3-axes GANTRY ROBOT subjected to a predefined requirements

Tasks

- Conceptual design of 3GR and gripper
- Virtual prototyping and validation
- Result analysis: benefits and drawbacks

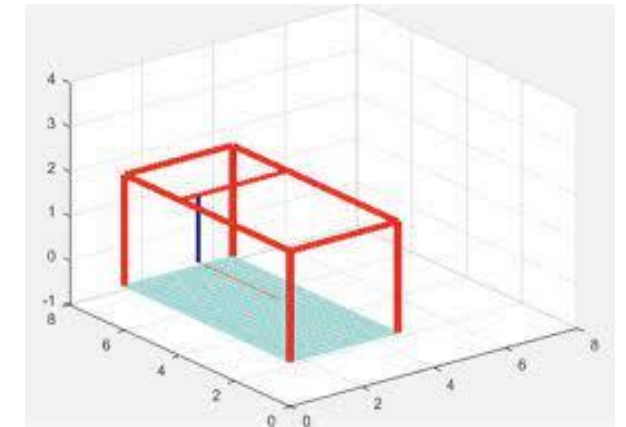


Requirements

- Movement along the X, Y, Z axes is carried out using electric motors mounted on the fixed base of the robot
- Transmission of the done using toothed belts
- the robot workspace is 300 x 400 x 200 (units in mm)
- on the Z axis a gripper must be able to manipulate workpieces with cylindrical geometry: 30 mm (diameter), 30 (height), 50 grams (mass)

Seminars

- Tools for modeling and simulating integrated systems
- Simulate the proposed solutions in an integrated environment (Matlab) to validate the concept and to identify the best solution.
- Comparative analyses of different conceptual solutions of 3GR.



Profiles

- Students: multidisciplinary (mechanics, robotics, control etc.)
- HEIs supervisors: should have competences in one of the following fields: mechanics, mechatronics, robotics, or automation



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1R of CEL projects. Topics

CEL3. Design of a test object for a pressing-based manufacturing process



The knowledge from such tests can be used to adjust process parameters

Tasks

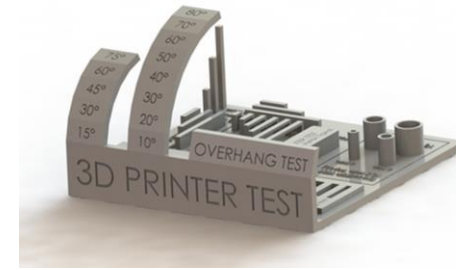
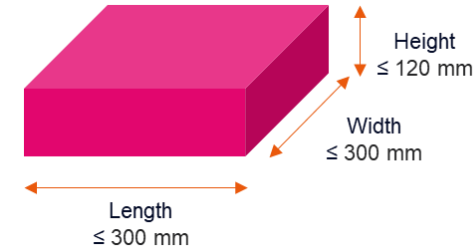
- Project planning
- Working with test object for a pressing-based manufacturing process
- 3D models and/or concept-level technical drawings
- Hand-drawn or digital illustrations (e.g. PowerPoint, Photoshop, Paint) or low- to medium-fidelity physical prototypes made from materials such as wood, plastic (3D-printing) or modelling clay

Profiles

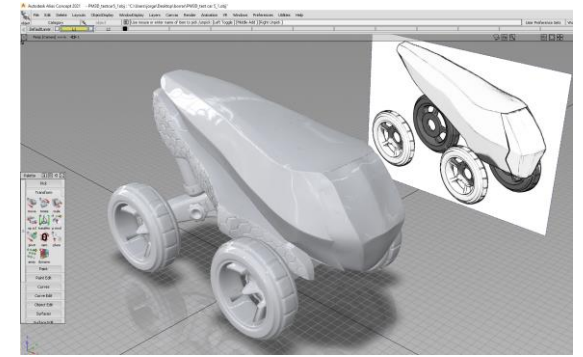
- Students: multidisciplinary
- HEIs supervisors: involved in the following courses: C3 - Design Projects, C5 -Computer Aided Design or C6 – Manufacturing Technology. Other profiles are also welcomed

Seminars

- Test object solutions for a pressing-based manufacturing process
- 3D models and/or concept-level solutions
- Low- to medium-fidelity physical prototype solutions



Minimum letter height ~3 mm



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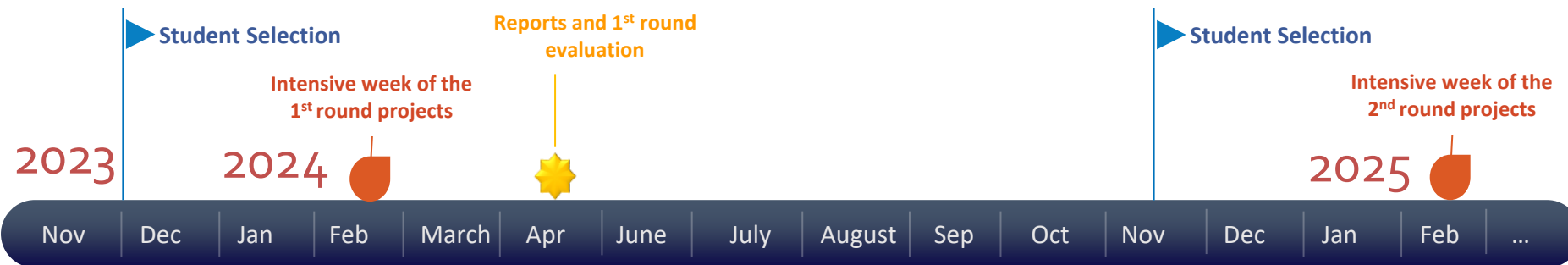
Schedule

Week 7 → Intensive week

Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Week 14
Week 15
Week 16

**DISTANCE
WORK**

Week 17 → Final presentations



February							
Wk	Su	Mo	Tu	We	Th	Fr	Sa
5					1	2	3
6	4	5	6	7	8	9	10
7	11	12	13	14	15	16	17
8	18	19	20	21	22	23	24
9	25	26	27	28	29		

March							
Wk	Su	Mo	Tu	We	Th	Fr	Sa
9						1	2
10	3	4	5	6	7	8	9
11	10	11	12	13	14	15	16
12	17	18	19	20	21	22	23
13	24	25	26	27	28	29	30
14	31						

April							
Wk	Su	Mo	Tu	We	Th	Fr	Sa
14		1	2	3	4	5	6
15	7	8	9	10	11	12	13
16	14	15	16	17	18	19	20
17	21	22	23	24	25	26	27
18	28	29	30				

**IMPORTANT DATES
BEFORE THE
INTENSIVE WEEKS**

5.12.2023 Opening time for students application
11.12.2023 Deadline for student application time
14.12.2023 Evaluation of the application & Student selection
1.01.2024 - 19.01.2024 Booking hotels and flight tickets (CEL project supervisors at each HEI)



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How to apply



CEL projects. Participation form

Contact details			
Name and Surname			
Identity card	E-mail		
Bachelor or Master specialization	Phone		
Estimated date of completion of studies			
CEL Project preference	CEL 1. ISR	CEL 2. TUCN	CEL 3. VALMET
Preferences	II	I	III
Motivation			
(Write in 200 words maximum why you want to participate in this project)			
Contribution			
(Write in 200 words maximum what you think you can contribute to this project)			
Highlights			
(Write in 100 words maximum other aspects that you would like to communicate to the people selecting the team that will develop this project. Aspects related to your skills, your training in other aspects that you consider should be taken into account as well as your capacity for effort and commitment).			
Date and Signature			

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Fill in the **participation form** and send it to:

ciprian.lapusan@mdm.utcluj.ro

Attach:

- **CV**
- **Optional: Certificate of English level**

Obs. - Transcript of records will be also used in the selection process (the document is provided by the Faculty)

Deadline: 11.12.2023

Contact details			
Name and Surname			
Identity card	E-mail		
Bachelor or Master specialization	Phone		
Estimated date of completion of studies			
CEL Project preference	CEL 1. ISR	CEL 2. TUCN	CEL 3. VALMET
Preferences	II	I	III
Motivation			
(Write in 200 words maximum why you want to participate in this project)			
Contribution			
(Write in 200 words maximum what you think you can contribute to this project)			
Highlights			
(Write in 100 words maximum other aspects that you would like to communicate to the people selecting the team that will develop this project. Aspects related to your skills, your training in other aspects that you consider should be taken into account as well as your capacity for effort and commitment).			
Date and Signature			

How to apply

REQUIREMENTS

- High level of English (B2 or higher recommended)
- Ability to work in a team
- Basic knowledge of the chosen CEL topic

BENEFITS OF DOING A CEL PROJECT

- Certification of the activity
- Possibility of doing the bachelor thesis in the CEL subject
- Multidisciplinary cooperation
- International cooperation
- Solving a case of study from Industry
- Solving a case of study of a Research Group

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