NextGEng

International Cooperation Framework for

Next Generation Engineering Students

NextGEng - Cases for Experiential Learning (CEL) Projects

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Content

- Context of the CEL projects
- Background of CEL projects
- What is a CEL project?
- First round of CEL projects
- Conclusions

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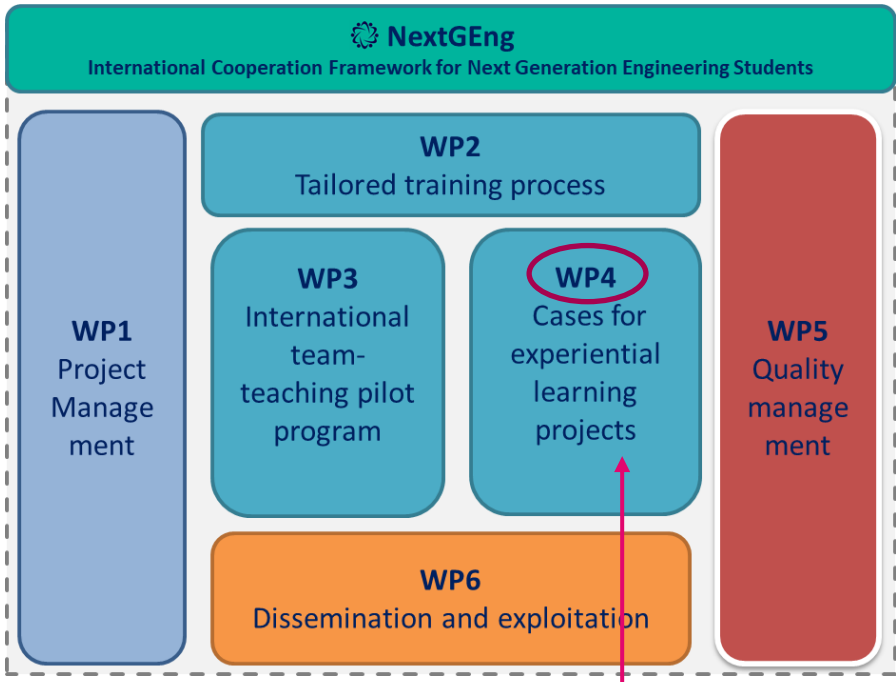
Context

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

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Background

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

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What is a CEL project?

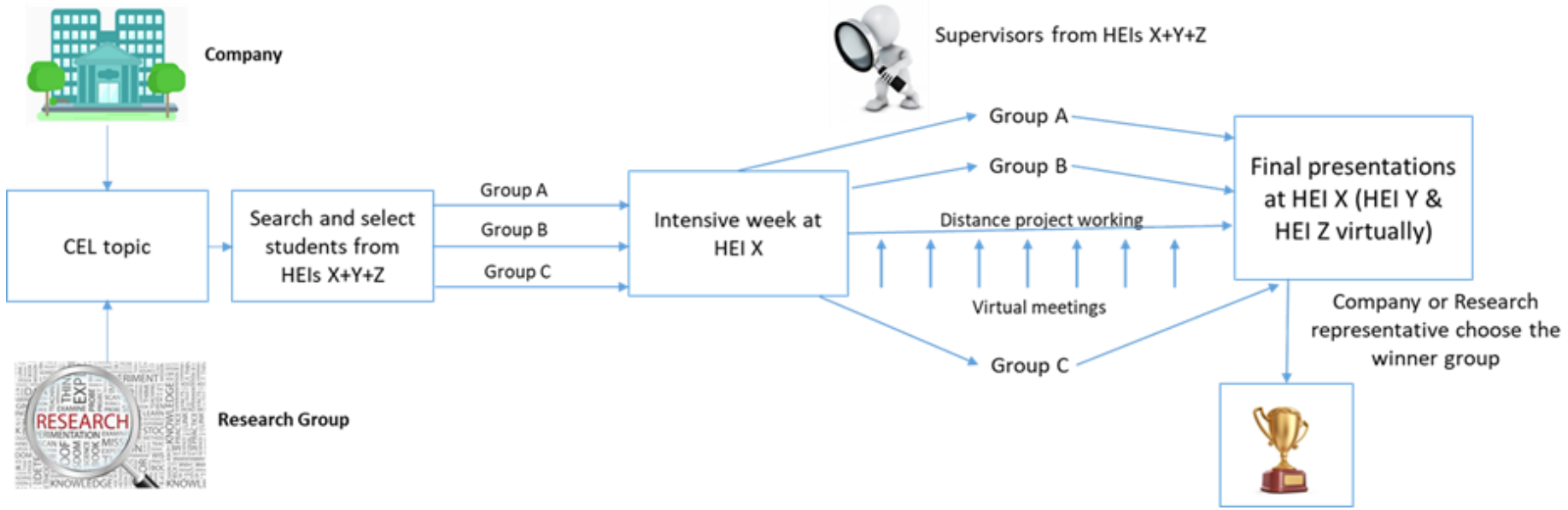
WP4: Cases for experiential learning

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

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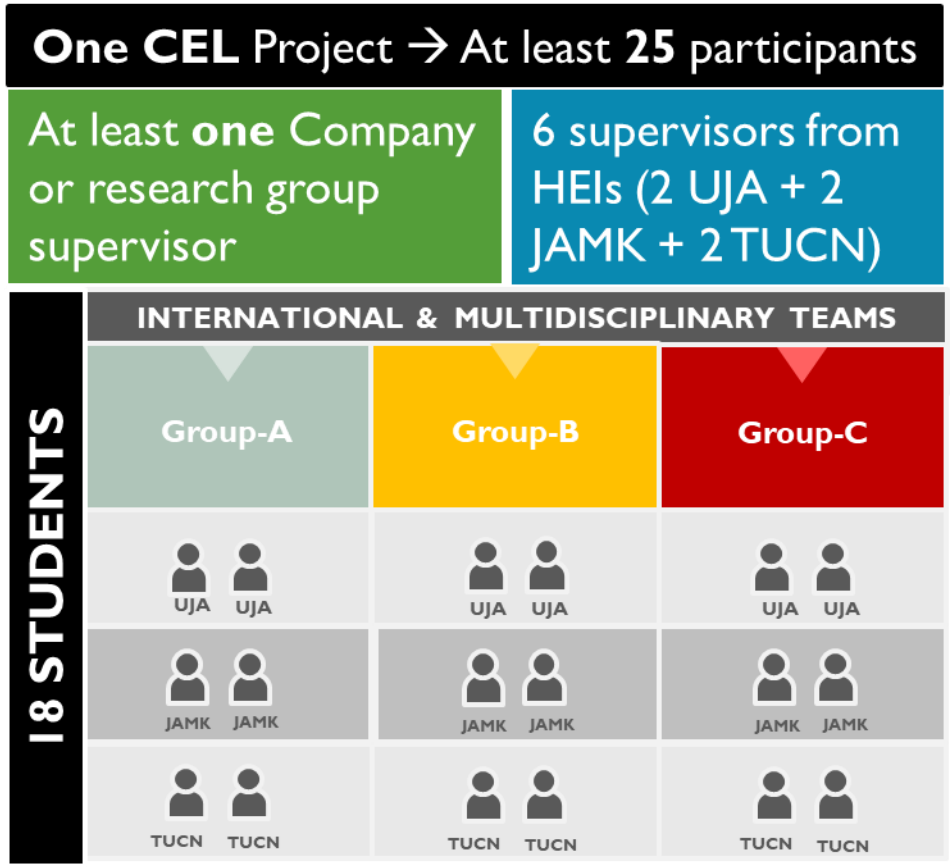
What is a CEL project?

OBJECTIVE

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



- 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)	30/07/2024 (M22)
2	01/08/2024 (M23)	30/07/2025 (M34)

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

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

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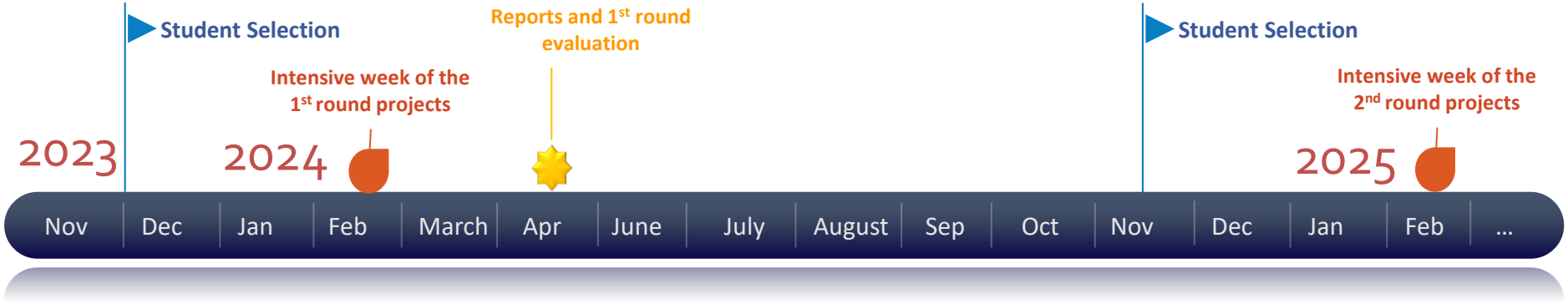
1R of CEL projects. Schedule

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				

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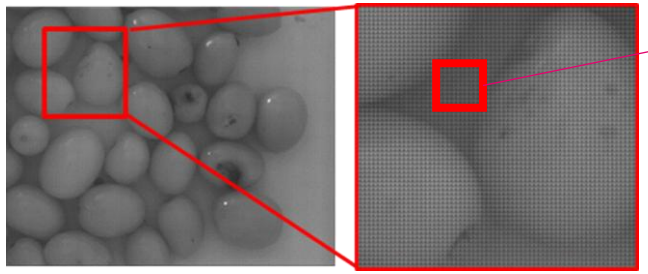
1R of CEL projects. Topics

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

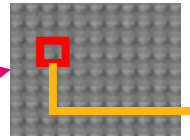
- Project planning
- Acquisition station CAD design
- Development of computer vision algorithms for quality assessment



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

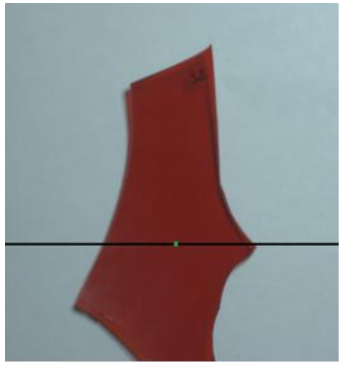


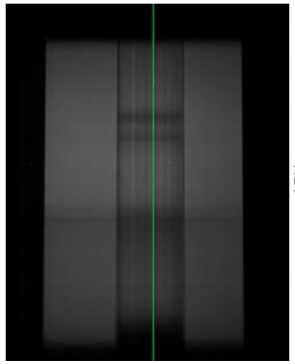
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

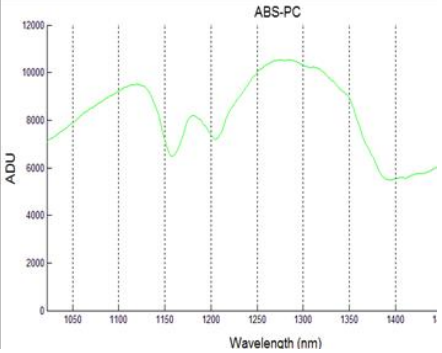
- Spectral range:665 - 975nm
- 25 spectral channels

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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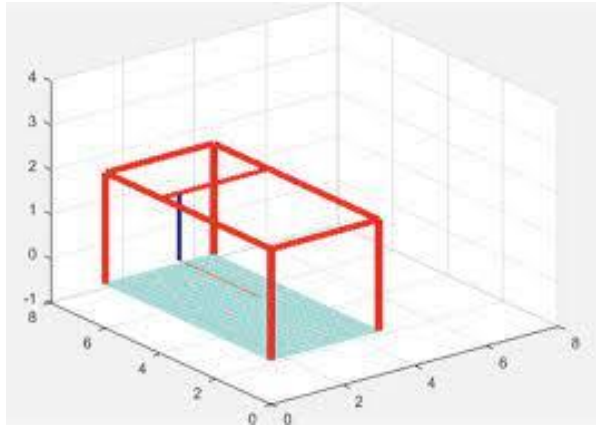
1R of CEL projects. Topics



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)

Profiles

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

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.

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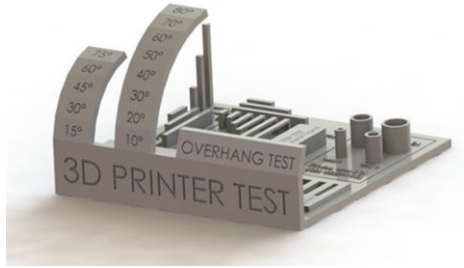
1R of CEL projects. Topics



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

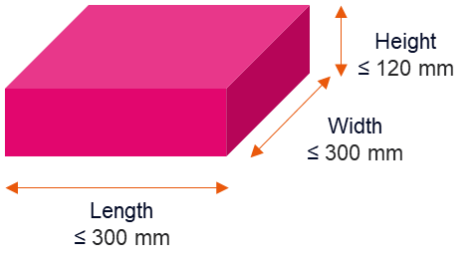
The knowledge from such tests can be used to adjust process parameters

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



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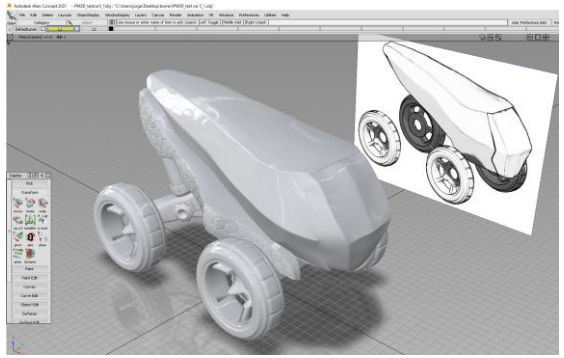
Minimum letter height ~3 mm



Seminars

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

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1R of CEL projects. Student selection

Workshop with students and HEIs responsibles in CEL projects

1. About NextGEng
2. NextGEng Partners
3. What is a CEL project?
4. Description of CELs topics
5. Schedule
6. How to apply

- Application form
- CV
- Transcript of records
- Official English certificate

Contact details			
Name and Surname			
Identity card		E-mail	
Degree or Master & course		Phone	
Estimated date of completion of studies			
CEL Project preference	CEL 1. ISR	CEL 2. TUCN	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 reco and level of English.

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Conclusions

- A pool of CEL projects is available (a total of 13 proposal for 6 CEL projects) which ensures the feasibility of the WP
- The seminars planned for the intensive weeks focus on the knowledge needed to develop the CEL project
- The profiles of students and supervisors for the implementation of the CEL projects correspond to the HEIs participating in the NextGEng project
- Simultaneous implementation of the three CEL projects will facilitate project management
- Promotion and transparency of the student selection process

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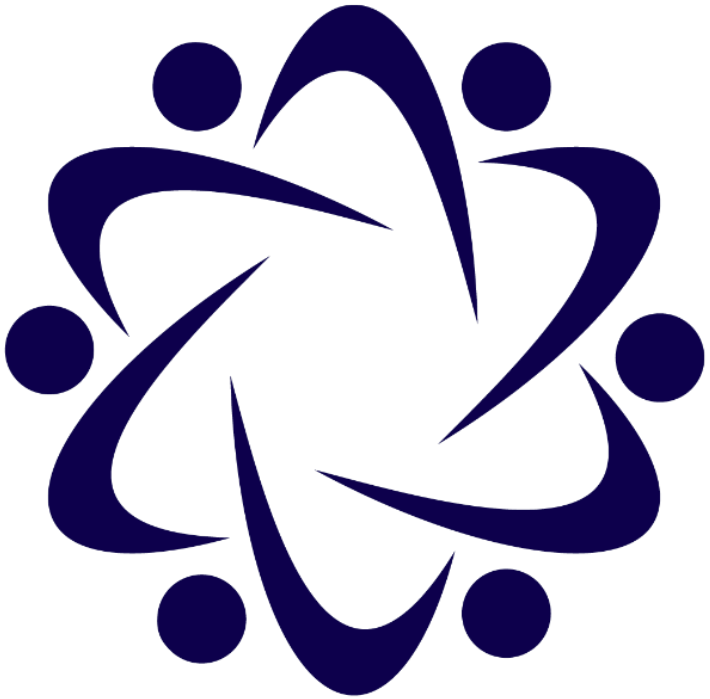

Thank you!