NextGEng

1st Workshop of the NextGEng Project at TUCN

NextGEng CEL Project 1st Round

6 December 2023

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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.



www.nextgeng.eu

















Iniversidad de Jaér

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)





















What is a CEL project?

• CEL projects focuses 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.



What is a CEL project?

- Two rounds of CEL projects \rightarrow 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) |
| 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)



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|----------|--|
|----------|--|



| 0 | ne CEL Projec | t → At | least 2 . | 5 participants |
|-----------------|----------------------------------------------------|------------|---------------------------|---------------------------------------|
| At or sup | least one Con research group pervisor | npany D | 6 supe HEIs (2 JAMK | rvisors from 2 UJA + 2 + 2TUCN) |
| | INTERNATION | AL & MU | LTIDISCIP | LINARY TEAMS |
| | | | | |
| NTS | Group-A | Gro | up-B | Group-C |
| NDE | | UJA | UJA | UJA UJA |
| 18 ST | | А | Р ЈАМК | јамк јамк |
| | | | | |









1R of CEL projects. Topics

CEL1. Design of an olive quality control system

www.isr.es

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

| napshot | 1 | 2 | 3 | 4 | |
|---------|----|----|----|----|--|
| | 6 | 7 | 8 | 9 | |
| | 11 | 12 | 13 | 14 | |
| | 16 | 17 | 18 | 19 | |
| | 21 | 22 | 23 | 24 | |

- 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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10 15

20

25

www.isr.es





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





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UNIVERSITY

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

Universidad de Jaén

 Simulate the proposed solutions in an integrated environment (Matlab) to validate the concept and to identify the best solution.

www.isr.es

• Comparative analyses of different conceptual solutions of 3GR.







- 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



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3D models and/or concept-level solutions

Low- to medium-fidelity physical prototype solutions











OF CULL-NAPOC

How to apply

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CEL projects. Participation form

| Name and Surnam | e | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------|----------------------------------------------|------------------------------------------------|
| Identity card | | | E-mail | | | | | |
| Bachelor or Mast | er | | | | Phone | | | |
| specialization | | | | | | | | |
| Estimated date of | comple | etion of stud | dies | | | | | |
| CEL Project prefer | ence | CEL 1 | 1. ISR | CEL | 2. TUCN | | CEL 3. | VALMET |
| Prefer | ences | 1 | | | 1 | | | ш |
| Motivation (Write in 200 wor | is maxi | imum why y | you want ti | o participat | e in this pro | ject) | | |
| | | | | | | | | |
| | | | | | | | | |
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| Contribution (Write in 200 work) Highlights (Write in 100 work the team that will you consider shou | is maxi ds maxi develo Id be ti | imum what | you think | you can con lat you wou ; related to yell as your | Id like to co your skills, | his proje mmunic your trai | ct) ate to the ning in oth nd commi | people select her aspects thi itment). |
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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

















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



































