Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Report - Analysis of quantitative and qualitative indicators in A3.9

September 2025

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

jamk

Universidad de Jaén

iSR www.isr.es

Valmet

BOSCH Invented for life

WP3.9	Report - Analysis of quantitative and qualitative indicators in A3.9
Authors	Ciprian Rad
Short Description	This report synthetizes in a structured way the quantitative and qualitative results of Activity A3.9, using the outcomes from Reports R3.9a–g.
Status	Final
Distribution level	Public
Date of delivery	30/09/2025
Contributions by:	Ciprian Lapusan, Rubén Dorado Vicente
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	25.09.2025	Ciprian Rad	First Draft
0.2	26.09.2025	Ciprian Lapusan	Draft amendments
0.3	30.09.2025	Rubén Dorado Vicente	Draft amendments
Final	30.09.2025	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

Activity A3.9 supports the implementation of the second WP3 specific objective: *implementation and evaluation of the international team-teaching process*. The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are selected in the international team-teaching pilot program. There were 6 selected joint courses in the pilot program: **C1 – Strength of Materials**, **C2 – Industrial Automation**, **C3 – Design Projects**, **C4 – Quality Assurance and Applied Methods**, **C5 – Computer Aided Design** and **C6 – Manufacturing Technology**. The joint courses were taught to students from the second, third and fourth years from the following specializations: **Mechatronics** (TUCN), **Mechanical Engineering** (TUCN, JAMK and UJA), **Electrical and Automation Engineering** (UJA), **Industrial Economic Engineering** (UTCN), **Electrical Engineering**, **Electronic and Automation Engineering** (UJA). The selected teachers are experts in their field of activity and have taught the selected courses for several years in their university. Every company nominated the experts based on their qualifications and activity carried out in the company, which is related to the selected courses. An international blended learning environment was created where the teachers, company experts and students participated in face-to-face and online learning activities.

In the first year of project implementation, before implementing the Team-Teaching Pilot Program (TTPP), feedback was collected from the target groups (students and teachers) to obtain the *control results*. This data was used as a baseline for comparing the results obtained after the first and second implementation rounds of the TTPP. Control results were collected in the academic year 2022-2023 during the two exam sessions - autumn semester 2022 and spring semester 2023 - in each partner HEIs. The data obtained is documented in reports **R3.9b** and **R3.9c**.

In the second implementation phase (second and third year of project implementation), feedback was collected from the target groups participating in the 1st and 2nd TTPP rounds:

- The **first implementation round of TTPP** covered the academic year 2023-2024 in all HEIs. The activities associated with the first round were **A3.2** (UTCN – as host university), **A3.3** (JAMK – as host university) and **A3.4** (UJA – as host university). In these activities, the HEI partners and company experts worked together to deliver the new joint courses' content (C1…C4) in the framework of the TTPP to the students. The results are documented in reports **R3.9d** and **R3.9e**.
- The **second implementation round of TTPP** covered the academic year 2024-2025 in all HEIs. The activities associated with the second round are **A3.6** (UTCN – as host university), **A3.7** (JAMK – as host university) and **A3.8** (UJA – as host university). In these activities, the HEI partners and company experts worked together to deliver the new joint courses' content (C1…C6) in the framework of the TTPP to the students. The results are documented in reports **R3.9f** and **R3.9g**.

The same questionnaires used for the *control group* were also used during the two rounds of the TTPP. The feedback was gathered from teachers and students involved in the above-mentioned activities. The questions used in the questionnaire are documented in *Report **R3.9a** - Plan for analyzing the quality of pilot program*.

The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used on the course
- interaction with industry

This report aims to synthesize in a structured way the quantitative and qualitative results of Activity A3.9, using the outcomes from Reports R3.9a, R3.9b, R3.9c, R3.9d, R3.9e, R3.9f, and R3.9g.

2. Quantitative indicators

The quantitative results of **Activity A3.9** refer to the **number of survey rounds** conducted to assess the implementation of cooperative teaching, as well as the **number of participating students and teachers** in the survey rounds.

Target values

- ***Quantitative indicator Q9:* 6 survey rounds**

During the implementation of TTPP, **6 survey rounds** were conducted as follows:

Round 1 and 2 – *Control results* (academic year 2022-2023)

Data collection was performed in **academic year 2022-2023** during the two exam sessions (**autumn semester 2022 and spring semester 2023**) in each partner HEIs.

The links to surveys for the **autumn semester 2022** can be found at:

- survey for the students: https://forms.office.com/e/uTLRsBuQuN
- survey for the teachers: https://forms.office.com/e/Q8iy6Q86Qf

The links to surveys for **spring semester 2023** can be found at:

- survey for the students: https://forms.office.com/e/S7n6EWXutL
- survey for the teachers: https://forms.office.com/e/pzvUUsyxKz

Round 3 and 4 – TTPP first round implementation results (academic year 2023-2024)

Data collection was performed in **academic year 2023-2024** during the two exam sessions (**autumn semester 2023 and spring semester 2024**) in each partner HEIs.

The links to surveys for the **autumn semester 2023** can be found at:

- survey for the students: https://forms.office.com/e/rLSXU180eT
- survey for the teachers: https://forms.office.com/e/ZSbw5zgxEC

The links to surveys for **spring semester 2024** can be found at:

- survey for students – laboratory activities: https://forms.office.com/e/WwPHwQCUpx
- survey for students – tailored lectures activities: https://forms.office.com/e/JK8MUeR1A6
- survey for teachers: https://forms.office.com/e/WbArkrVAAP

Round 5 and 6 – TTPP second round implementation results (academic year 2024-2025)

Data collection was performed in **academic year 2024-2025** during the two exam sessions (**autumn semester 2024 and spring semester 2025**) in each partner HEIs.

The links to surveys for the **autumn semester 2024** can be found at:

- survey for students – laboratory activities: https://forms.office.com/e/cKhG1Nf95e
- survey for students – tailored lectures activities: https://forms.office.com/e/fTVgN7QunV
- survey for teachers: https://forms.office.com/e/FUQUh3XiPg

The links to surveys for the **spring semester 2025** can be found at:

- survey for students – laboratory activities: https://forms.office.com/e/nbVziSrvGP
- survey for students – tailored lectures activities: https://forms.office.com/e/CN9p3PshWC
- survey for teachers: https://forms.office.com/e/aVhHc69nzV

Note

Starting from the spring semester of 2024, the student questionnaire was divided into two parts: one focused on laboratory activities and the other on tailored lecture activities. Feedback was collected after each learning session (tailored lecture or laboratory) in order to increase the response rate. This approach was considered more suitable, as during the autumn semester of 2023, some students attended only the tailored lectures while others participated only in the laboratory activities, due to scheduling differences across HEIs. By separating the questionnaires, it became easier to obtain relevant feedback from each participating student.

- ***Quantitative indicator Q10: at least 50% of students participating in the courses of the pilot program take part in the survey***

The data in Table 1 shows the evolution of student participation in questionnaires across six courses (C1–C6) and six survey rounds conducted from Autumn 2022 to Spring 2025.

Survey rounds 1 and 2 (Autumn 2022 and Spring 2023) served as *control groups*, providing baseline results against which later survey data could be compared. A total of **102 student responses** were collected in this phase, with course-level participation varying significantly. These results, though limited in number, are valuable because they reflect the initial state of student feedback collection before TTPP program was implemented in the HEI partners.

In survey rounds 3 and 4 (Autumn 2023 and Spring 2024), the questionnaire structure was refined by separating laboratory and lecture activities. This improved the precision of feedback and addressed the issue of students attending only one type of activity. A total of **158 responses** were collected, already showing an increase compared to the control rounds. Notably, C2 – Industrial Automation and C4 – Quality Assurance and Applied Methods recorded the highest participation, highlighting the impact of targeted feedback collection. It should be noted that the responses recorded in rounds 3 and 4 for C5 (Computer Aided Design) and C6 (Manufacturing Technology) represent unintended data entries, as these courses were not scheduled to provide feedback during that period.

The most significant improvement appeared in survey rounds 5 and 6 (Autumn 2024 and Spring 2025), where **522 responses** were collected, representing **five times increase** compared to the control rounds. Participation was particularly strong in C1 – Strength of Materials and C6 – Manufacturing Technology. This

rise suggests that both the methodological adjustments and the growing integration of cooperative teaching activities contributed to higher student involvement.

The control rounds (1 and 2) are highly relevant in this context because they provide a baseline reference point. Without these early, lower response numbers, it would be difficult to assess the effectiveness of the changes introduced in later rounds. The contrast highlights how the refined survey approach successfully improved student participation and ensured that the feedback better captured the diversity of learning experiences. Moreover, by comparing later results with the control rounds, it is possible to evaluate not only the growth in participation but also students' perception of TTPP.

Table 1. Evolution of student participation in questionnaires across six survey rounds

	Survey rounds 1 and 2		Survey rounds 3 and 4			Survey rounds 5 and 6			
Course	Autumn 2022	Spring 2023	Autumn 2023	Spring 2024	Spring 2024	Autumn 2024	Autumn 2024	Spring 2025	Spring 2025
Survey type	Lab.+Lect.	Lab.+Lect.	Lab.+Lect.	Laboratory	Lecture	Laboratory	Lecture	Laboratory	Lecture
C1 – Strength of Materials	11	1	12	2	0	1	15	88	29
C2 – Industrial Automation	0	26	2	58	19	0	0	117	48
C3 – Design Projects	21	0	17	1	0	14	11	3	5
C4 – Quality Assurance and Applied Methods	4	12	1	26	17	5	9	9	7
C5 - Computer Aided Design	17	2	1	0	2	37	6	2	11
C6 - Manufacturing Technology	0	8	0	0	0	22	30	27	26
Total=	53	49	33	87	38	79	71	246	126
Total=	102		158			522			
Total=	102		680						

TTPP students	1st round*	2nd round**	Total
CO-TUCN	115	133	248
P1-JAMK	134	111	245
P2-UJA	345	254	599
		Total=	1092

*see Reports R3.2, R3.3, R3.4

**see Reports R3.6, R3.7, R3.8

Indicator	Target %	Done %
Q10	50%	62%

➢ ***Quantitative indicator Q11: at least 18 teachers from selected courses participated in the survey***

This target was achieved during the second implementation round (Autumn 2024 and Spring 2025) of TTPP when all six courses were simultaneously delivered. In first implementation round (Autumn 2023 and Spring 2024), only four courses (**C1–C4**) were active, which explains why the total number of teacher responses remained at 17 during this phase. The number of responses increased in rounds 5 and 6 (Autumn 2024 and Spring 2025), where all six courses were active, resulting in 19 teacher responses. This confirms that the level of teacher participation in the survey was accomplished.

Table 2. Evolution of teacher participation in questionnaires across six survey rounds

	Survey rounds 1 and 2		Survey rounds 3 and 4		Survey rounds 5 and 6	
Course	Autumn 2022	Spring 2023	Autumn 2023	Spring 2024	Autumn 2024	Spring 2025
Survey type	Teachers	Teachers	Teachers	Teachers	Teachers	Teachers
C1 – Strength of Materials	2	4	2	3	2	2
C2 – Industrial Automation	0	3	0	4	1	2
C3 – Design Projects	2	1	4	0	2	1
C4 – Quality Assurance and Applied Methods	2	1	1	3	2	1
C5 - Computer Aided Design	2	0	0	0	2	2
C6 - Manufacturing Technology	0	0	0	0	1	1
Total=	8	9	7	10	10	9
Total=	17		17		19	
Total=	17		19			

Indicator	Target	Done	Done %
Q11	18	19	106%

Note

As can be seen in Table 1, a total of **680 responses were collected** in the first and second round implementation of the TTPP, representing **62%** of all **1092** students who participated in the six joint courses during the implementation of pilot program. In accordance with Table 2, a total of **19 teachers** from the selected courses (**C1–C6**) participated in the survey across the six rounds.

Based on the total number of surveys rounds and data presented in Tables 1 and 2, the level of achievement for all the quantitative indicators is **100%**.

3. Qualitative indicators

The qualitative results of Activity A3.9 focus on:

- **Satisfaction of participants** (students and teachers) with the developed teaching materials and the implementation of cooperative teaching.
- **Compatibility of the new course content** with digital LMS platforms.
- Integration **of eco-friendly concepts** and **student-centered learning** approaches within the new content.
- **Development of laboratory work and tailored seminar content** in collaboration with companies.
- **Evaluation of student learning outcomes** in relation to:
  - eco-friendly concepts,
  - industrial implementation of theoretical knowledge,
  - the extent of student interaction in an international teaching process.

Target values

***Qualitative indicator Q1* - 50 % of the participating students gave positive feedback related to the course content materials**
***Qualitative indicator Q2* - at least 75% of the course content produced is compatible with digital LMS**
***Qualitative indicator Q3* - at least 75% of new course content integrates new ecofriendly concepts and student-centered learning approaches**
***Qualitative indicator Q4* - at least 75% of newly developed laboratory work/tailored seminars are developed in collaboration with companies**
***Qualitative indicator Q5* - at least 50 % of the participating students gave positive feedback related to the cooperative teaching implementation**
***Qualitative indicator Q6* - 50 % increase in students learning outcomes related to Eco-friendly competences, industry practical applications of presented theoretical concepts**
***Qualitative indicator Q7* - 70 % of the participating students in the program interact in an international teaching environment**
***Qualitative indicator Q8* - at least 70 % of the participating teachers gave positive feedback related to the cooperative teaching implementation**

Report **R3.9a** provides a detailed description of the methods and criteria applied to evaluate the quality of the pilot program in activity **A.3.9**. In this context, eight indicator codes (**Q1–Q8**) were established, each corresponding to specific qualitative indicators. The survey questions were mapped to these indicators to ensure consistency between the evaluation framework and the collected feedback. Table 3 presents the analysis of the eight indicators, which was conducted based on the data obtained during the six survey rounds (**R3.9b…R3.9g**). The following procedure was used:

- First, the feedback associated with the selected survey questions was analyzed separately for the first and second rounds of TTPP. For each round, a mean value was calculated to represent the overall response trend.
- Second, the mean values of TTPP rounds 1 and 2 were compared against the predefined target values for each indicator **Q1**…**Q8**. The degree of achievement of these targets was then synthesized and presented in Tables 3 and 4, allowing for a structured overview of the outcomes.
- For indicator Q6, which measures the increase of student learning outcomes related to eco-friendly competences and the industrial application of theoretical knowledge, the calculated

values were compared with the ones from control results. This made it possible to identify and quantify the improvement in student performance in relation to these outcomes.

- This structured procedure ensured that the evaluation captured both the baseline performance and the progress achieved throughout the implementation of the pilot program.

Table 3. The level of achievement of qualitative indicators – extended version

Indicator defined in R3.9a	Qualitative indicator	Result
Q1	- **50%** of the participating students gave positive feedback related to the course content materials	**<u>TTPP first round</u>** ***R3.9d*** *– survey for students - tailored lectures and laboratory activities:* - **85%** of the students agreed that the content of the course was appropriately challenging (*not too hard but not too easy*). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students - **87%** of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter ***R3.9e*** *– survey for students - tailored lectures activities:* - **88%** of the students agreed that the content of the course was appropriately challenging (*not too hard but not too easy*). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students - **91%** of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter ***R3.9e*** *– survey for students - laboratory activities:* - **81%** of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter --- **<u>TTPP second round</u>** ***R3.9f*** *– survey for students - tailored lectures activities:* - **74%** of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students - **76%** of the students appreciated positively that the instruction materials provided by their teachers at the

		team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter ***R3.9f*** *– survey for students - laboratory activities:* - **78%** of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter ***R3.9g*** *– survey for students - tailored lectures activities:* - **82%** of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students - **80%** of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter ***R3.9g*** *– survey for students - laboratory activities:* - **86%** of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter --- **Mean values** - **86%** - mean value after TTPP first round - **79%** - mean value after TTPP second round **- 83% - mean value after TTPP both rounds** --- **Overall results** **Target: 50%** positive feedback **Done: 83%** positive feedback
Q2	- at least **75%** of the course content produced is compatible with digital LMS	**TTPP first round** ***R3.9d*** *- survey for students - tailored lectures and laboratory activities:* - **94%** of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS - **100%** of the teaching materials are compatible with digital learning technologies according to the teachers, which validate the responses provided by students *R3.9e – survey for students - tailored lectures activities:* - **97%** of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS

		R3.9e *– survey for teachers:* - **100%** of the teaching materials are compatible with digital learning technologies according to the teachers, which agrees with the responses provided by students --- **TTPP second round** ***R3.9f*** *– survey for students - tailored lectures activities:* - **81%** of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS ***R3.9f*** *– survey for teachers:* - **100%** of the teaching materials are compatible with digital learning technologies according to the teachers, which agrees with the responses provided by students ***R3.9g*** *– survey for students (tailored lectures activities):* - **91%** of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS ***R3.9g*** *– survey for teachers:* - **100%** of the teaching materials are compatible with digital learning technologies according to the teachers, which agrees with the responses provided by students --- **Mean values** - **98%** - mean value after TTPP first round - **93%** - mean value after TTPP second round **- 96% - mean value after TTPP both rounds** --- **Overall results** **Target: 75%** compatible with digital LMS **Done: 96%** compatible with digital LMS
Q3	- at least **75%** of new course content integrates new ecofriendly concepts and student-centered learning approaches	**TTPP first round** ***R3.9d*** *- survey for teachers:* - **100%** of the teachers agree that the course promotes soft skills - **86%** of the teachers consider that the course they teach promotes eco-friendly concepts (green skills) ***R3.9e*** *– survey for teachers:* - **100%** of the teachers agree that the course promotes soft skills

		- **90%** of the teachers consider that the course they teach promotes eco-friendly concepts (green skills) --- **TTPP second round** ***R3.9f*** *– survey for teachers:* - **100%** of the teachers agree that the course promotes soft skills - **100%** of the teachers consider that the course they teach promotes eco-friendly concepts (green skills) ***R3.9g*** *– survey for teachers:* - **100%** of the teachers agree that the course promotes soft skills - **100%** of the teachers consider that the course they teach promotes eco-friendly concepts (green skills) --- **Mean values** - **94%** - mean value after TTPP first round - **100%** - mean value after TTPP second round **- 97% - mean value after TTPP both rounds** --- **Overall results** **Target: 75%** integrates eco-friendly concepts **Done: 97%** integrates eco-friendly concepts
Q4	- at least **75%** of newly developed laboratory work/tailored seminars are developed in collaboration with companies	**TTPP first round** ***R3.9d*** *– survey for students - tailored lectures and laboratory activities:* - ***53%*** *of the students answered that they had activities in collaboration with industry companies* ***R3.9d*** *- survey for teachers:* - ***100%*** *of the teachers answered that they had activities in collaboration with industry companies* ***R3.9e*** *– survey for students - laboratory activities:* - ***78%*** *of the students answered that they had activities in collaboration with industry companies* ***R3.9e*** *– survey for teachers:* - ***100%*** *of the teachers answered that they had activities in collaboration with industry companies* --- **TTPP second round** ***R3.9f*** *– survey for students - laboratory activities:*

		- ***52%*** *of the students answered that they had activities in collaboration with industry companies* ***R3.9f*** *– survey for teachers:* - ***100%*** *of the teachers answered that they had activities in collaboration with industry companies* ***R3.9g*** *– survey for students - laboratory activities:* - ***51%*** *of the students answered that they had activities in collaboration with industry companies* *R3.9g – survey for teachers:* - ***100%*** *of the teachers answered that they had activities in collaboration with industry companies* --- **Mean values** - **83%** - mean value after TTPP first round - **76%** - mean value after TTPP second round **- 80% - mean value after TTPP both rounds** --- **Overall results** **Target: 75%** collaboration with companies **Done: 80%** collaboration with companies
Q5	- at least **50%** of the participating students gave positive feedback related to the cooperative teaching implementation	**TTPP first round** ***R3.9d*** *– survey for students - tailored lectures and laboratory activities:* - ***72%*** *of the students consider that student-centered approaches are promoted at the course* - ***82%*** *of the participants agreed that the course promotes soft skills* - ***81%*** *of students consider that interaction with experts from companies and/or foreign teachers provides added value to their educational process and professional development* - ***88%*** *of students confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process* ***R3.9e*** *– survey for students - lectures and laboratories:* - ***88%*** *of the students consider that student-centered approaches are promoted at the course* - ***89%*** *of the participants agreed that the course promotes soft skills* - ***90%*** *of students consider that interaction with experts from companies and/or foreign teachers provides added*

		value to their educational process and professional development *- **90%** of students confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process* --- **<u>TTPP second round</u>** ***R3.9f** - survey for students - lectures and laboratories:* *- **61%** of the students consider that student-centered approaches are promoted on the course* *- **65%** of the participants agreed that the course promotes soft skills* *- **73%** of students consider that interaction with experts from companies and/or foreign teachers provides added value to their educational process and professional development* *- **72%** of students confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process* ***R3.9g** – survey for students - lectures and laboratories:* *- **69%** of the students consider that student-centered approaches are promoted at the course* *- **81%** of the participants agreed that the course promotes soft skills* *- **85%** of students consider that interaction with experts from companies and/or foreign teachers provides added value to their educational process and professional development* *- **88%** of students confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process* --- **<u>Mean values</u>** - **85%** - mean value after TTPP first round - **74%** - mean value after TTPP second round **<u>- 80% - mean value after TTPP both rounds</u>** --- **<u>Overall results</u>** **Target: 50%** positive feedback **<u>Done: 80%</u>** <u>positive feedback</u>

Q6	- **50%** increase in students learning outcomes related to Eco-friendly competences, industry practical applications of presented theoretical concepts	**Control results** ***R3.9b*** *– survey for students - tailored lectures and laboratory activities:* - **85%** of the students know the learning outcomes of the course - **47%** of the students agreed that green skills are present in the course - **65%** of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications ***R3.9c*** *– survey for students - tailored lectures and laboratory activities:* - **90%** of the students know the learning outcomes of the course - **41%** of the students agreed that green skills are present in the course - **92%** of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications --- **TTPP first round** ***R3.9d*** *– survey for students - tailored lectures and laboratory activities:* - **82%** of the students know the learning outcomes of the course - **75%** of the students agreed that green skills are present in the course - **92%** of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications ***R3.9e*** *– survey for students - lectures and laboratories:* - **74%** of the students know the learning outcomes of the course - **91%** of the students agreed that green skills are present in the course - **93%** of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications --- **TTPP second round** ***R3.9f*** *– survey for students - lectures and laboratories:* - **75%** of the students know the learning outcomes of the course

		- **86%** of the students agreed that green skills are present in the course - **90%** of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications ***R3.9g*** *– survey for students - lectures and laboratories:* - **76%** of the students know the learning outcomes of the course - **86%** of the students agreed that green skills are present in the course - **95%** of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications --- **Mean values** - **70%** - mean value after Control results - **85%** - mean value after TTPP first round - **85%** - mean value after TTPP second round **- 85% - mean value after TTPP both rounds** --- **50% increase** Initial value (control results) = 70% Gap to maximum = 100 – 70 = 30% 50% of that gap = 30 × 0.5 = 15% Add to current value: 70 + 15 = 85% Target value for TTPP = 85% --- **Overall results** **Target: 50%** increase (from 70% to 85%) **Done: 50%** increase (from 70% to 85%)
Q7	- **70%** of the participating students in the program interact in an international teaching environment	**TTPP first round** ***R3.9d*** *– survey for students - tailored lectures and laboratory activities:* - ***79%*** *of the students agreed that they had international teachers attending their courses* - **97%** of students agreed that the learning materials were given both in domestic and foreign languages ***R3.9e*** *– survey for students - lectures and laboratories:* - ***81%*** *of the students agreed that they had international teachers attending their courses*

		- **80%** of students agreed that the learning materials were given both in domestic and foreign languages --- **TTPP second round** ***R3.9f*** *– survey for students - laboratory activities:* - ***72%*** *of the students agreed that they had international teachers attending their courses* - **71%** of students agreed that the learning materials were given both in domestic and foreign languages ***R3.9g*** *– survey for students - laboratory activities:* - ***65%*** *of the students agreed that they had international teachers attending their courses* - **82%** of students agreed that the learning materials were given both in domestic and foreign languages --- **Mean values** - **84%** - mean value after TTPP first round - **73%** - mean value after TTPP second round **- 79% - mean value after TTPP both rounds** --- **Overall results** **Target: 70%** of students interact internationally **Done: 79%** of students interact internationally
Q8	- at least **70%** of the participating teachers gave positive feedback related to the cooperative teaching implementation	**TTPP first round** ***R3.9d*** *- survey for teachers:* - **100%** of the teachers have collaborations with other teachers or experts from companies - **86%** of the teachers consider that they can manage such types of activities ***R3.9e*** *– survey for teachers:* - **100%** of the teachers have collaborations with other teachers or experts from companies - **93%** of the teachers consider that they can manage such types of activities --- **TTPP second round** ***R3.9f*** *– survey for teachers:* - **100%** of the teachers have collaborations with other teachers or experts from companies

		- **93%** of the teachers consider that they can manage such types of activities ***R3.9g*** *– survey for teachers:* - **100%** of the teachers have collaborations with other teachers or experts from companies - **89%** of the teachers consider that they can manage such types of activities --- **Mean values** - **95%** - mean value after TTPP first round - **96%** - mean value after TTPP second round **- 96% - mean value after TTPP both rounds** --- **Overall results** **Target: 70%** positive feedback **Done: 96%** positive feedback

Table 4. The level of achievement of qualitative indicators – summary version

Indicator (R3.9a)	Qualitative indicator	Target group	Level of achievement
Q1	- 50% of the participating students gave positive feedback related to the course content materials	Students	**Target: 50%** positive feedback **Done: 83%** positive feedback **Level of achievement: 166%**
Q2	- at least 75% of the course content produced is compatible with digital LMS	Teachers Students	**Target: 75%** compatible with digital LMS **Done: 96%** compatible with digital LMS **Level of achievement: 128%**
Q3	- at least 75% of new course content integrates new ecofriendly concepts and student-centered learning approaches	Teachers	**Target: 75%** integrates eco-friendly concepts **Done: 97%** integrates eco-friendly concepts **Level of achievement: 129%**
Q4	- at least 75% of newly developed laboratory work/tailored seminars are developed in collaboration with companies	Teachers Students	**Target: 75%** collaboration with companies **Done: 80%** collaboration with companies **Level of achievement: 106%**
Q5	- at least 50% of the participating students gave positive feedback related to the cooperative teaching implementation	Students	**Target: 50%** positive feedback **Done: 80%** positive feedback **Level of achievement: 160%**
Q6	- 50% increase in students learning outcomes related to Eco-friendly competences, industry practical	Students	**Target: 50%** increase (from 70% to 85%)

	applications of presented theoretical concepts		**Done: 50%** increase (from 70% to 85%) **Level of achievement: 100%**
Q7	- 70% of the participating students in the program interact in an international teaching environment	Students	**Target: 70%** of students interact internationally **Done: 79%** of students interact internationally **Level of achievement: 112%**
Q8	- at least 70% of the participating teachers gave positive feedback related to the cooperative teaching implementation	Teachers	**Target: 70%** positive feedback **Done: 96%** positive feedback **Level of achievement: 137%**

Note

Based on the data in Tables 3 and 4, the level of achievement for all the qualitative indicators is **100%** with some of them scoring as high as **166%** (e.g. Indicator **Q1**).

4. Overall experience of students and teachers

The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). The overall experience in TTPP considered the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course
- interaction with industry

Students

The results from Table 5 present student evaluations of TTPP across the two implementation rounds, comparing **control data** (Autumn 2022, Spring 2023) with **feedback data** (Autumn 2023, Spring 2024 for the first round; Autumn 2024, Spring 2025 for the second round).

- **First round of TTPP**
  - Control results: Autumn 2022 (3.96) and Spring 2023 (4.41), with a mean value of **4.18**.
  - Feedback results: Autumn 2023 (4.24) and Spring 2024 (4.45–4.61), with a mean value of **4.43**.
  - These findings indicate a **clear improvement** in student satisfaction compared to the control period, especially in Spring 2024, where scores exceeded 4.6.

- **Second round of TTPP**
  - Control results: Autumn 2022 (3.96) and Spring 2023 (4.41), with a mean value of **4.18**.
  - Feedback results: Autumn 2024 (4.00–4.10) and Spring 2025 (4.26–4.43), with a mean value of **4.20**.
  - Here, satisfaction remained positive but showed a **more modest increase** compared to the control values.

Teachers

The evaluation from teachers is presented in Table 6. The positive trend shows clear improvements from the control rounds to the feedback rounds across both TTPP implementation rounds.

- **First round of TTPP**
  - Control results: Autumn 2022 (3.88) and Spring 2023 (3.67), with a mean value of **3.77**.
  - Feedback results: Autumn 2023 (4.43) and Spring 2024 (4.80), with a mean value of **4.61**.
  - This represents a **substantial increase in satisfaction**, with the mean value rising from below 4.0 in the control period to above 4.6 in the feedback phase. The Spring 2024 evaluation reached nearly the maximum score, showing very strong teacher approval.

- **Second round of TTPP**
  - Control results again produced a mean value of **3.77** (Autumn 2022 and Spring 2023).
  - Feedback results: Autumn 2024 (4.80) and Spring 2025 (4.44), with a mean value of **4.62**.
  - The improvement here was also notable, with the mean value increasing by nearly one full point compared to the control phase. Teacher satisfaction remained consistently high, especially in Autumn 2024, where scores reached 4.80.

Overall interpretation

Student evaluations of TTPP were consistently favorable, with all mean values above 4.0. The **first round** demonstrated a stronger upward trend, suggesting that the initial implementation generated greater impact and enthusiasm among students. The **second round** confirmed stable satisfaction, reflecting consolidation of the teaching practices. It is important to note that the number of student responses increased substantially across the survey rounds—102 in the control phase, 158 in the first round, and 522 in the second round—which directly influenced the stability and reliability of the reported ratings. This indicates that the degree of satisfaction has clearly improved.

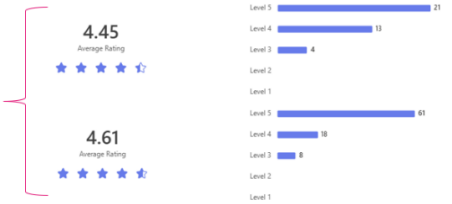
Teacher evaluation of TTPP shifted from moderately positive in the control period (mean 3.77) to strongly positive in the feedback periods (mean values above 4.6). The results highlight that teachers not only observed but also valued the improvements introduced through the program. These outcomes suggest that TTPP was effective not only in increasing student engagement (as shown in Table 5) but also in gaining strong support from teachers, who recognized the benefits of cooperative teaching methods, improved course materials, and enhanced alignment with modern learning approaches. Compared to the student evaluations, which showed a stronger improvement during the first round, teacher feedback demonstrated consistently high satisfaction across both rounds.

Table 5. Overall experience of TTPP evaluated by the students

<table>
<tr><td>TTPP first round</td></tr>
<tr><td>
Control results: autumn semester 2022


Mean value:
4.18
Control results: spring semester 2023

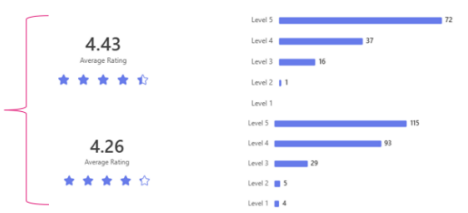

Feedback results: autumn semester 2023


Mean value:
4.43
Feedback results: spring semester 2024


</td></tr>
<tr><td>TTPP second round</td></tr>
<tr><td>
Control results: autumn semester 2022

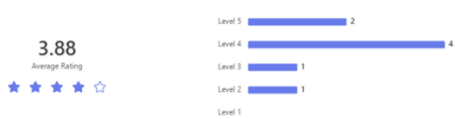

Mean value:
4.18
Control results: spring semester 2023


Feedback results: autumn semester 2024


Mean value:
4.20
Feedback results: spring semester 2025


</td></tr>
</table>

Table 6. Overall experience of TTPP evaluated by the teachers

TTPP first round
Control results: autumn semester 2022  **Mean value: 3.77** **Control results: spring semester 2023** 
Feedback results: autumn semester 2023  **Mean value: 4.61** **Feedback results: spring semester 2024** 
TTPP second round
Control results: autumn semester 2022  **Mean value: 3.77** **Control results: spring semester 2023** 
Feedback results: autumn semester 2024  **Mean value: 4.62** **Feedback results: spring semester 2025** 

Comments/suggestions

The following comments are from TTPP participants (students and teachers) and highlight the program's success. Student feedback confirms that the effort and new content were greatly appreciated. Additionally, teachers provided positive evaluations of the co-teaching experience and the adoption of new modern teaching methodologies.

*"It has been **one of the best laboratories I have ever taken**. The fact that we could apply the theoretical knowledge on industrial PLCs was absolutely great. **I wish there were more practical activities that are industry related**"*

*"It was a **great experience**. I look forward to another one"*

*"It was an **educational experience in which I learned new things and new aspects**"*

*"It was great but hopefully we can do **laboratory live** all together next time"*

*"**Very nicely done**. Thank you for the lecture!"*

*"It was a **great activity**, and I am looking forward to **more** such learning courses"*

*"Very **interesting lecture** where we learn a lot about production of MEMS"*

*"I just want more of this. It was **amazing**."*

*"**I really appreciated the team-teaching activity**. It was **engaging** and helpful to hear different perspectives from the experts. One suggestion for improvement could be to include more interactive elements, like Q&A sessions or small group discussions, to keep the audience more involved and make the session even more dynamic. Overall, it was a **valuable experience**."*

*"It was useful to understand how we can **solve problems of real life at the industry.**"*

*"It is a **new and great way of learning**."*

*"It was **very educational and helped us getting more knowledge** on quality and metrology"*

*"Nothing to add, it was a **great experience**"*

*"The course **was very engaging, and the material was interesting**. The visiting professors did a very good job keeping us (students) engaged through the whole course and the fact that they showed us what a typical exam problem in Jaen looks like was a huge bonus. I don't think any improvement is necessary.*

*"To develop teaching activities in collaboration with foreign teachers and experts from companies, **has been a very productive task.**"*

*"**Great opportunity to create new course** content in close collaboration **with industry and international teachers**."*

*"It has been **strongly good** to teach with professors from other countries."*

5. Conclusions and future directions

The analysis confirms the TTPP implementation was highly successful, delivering significant improvements and establishing a path for long-term sustainability:

Key Achievements

- *Effective content delivery*: The practice of clearly stating learning outcomes at the beginning of co-taught lectures and labs proved highly effective and was validated by positive student feedback.
- *Bridging the Green Skills Gap*: The project successfully addressed a major gap where 80% of teachers believed they taught eco-friendly concepts, but nearly 50% of students didn't recognize them. New TTPP materials, which integrated concepts on environmental impact over an engineering product's lifecycle, have significantly improved student awareness and understanding.
- *Increased internationalization*: Student exposure to international visiting teachers soared from just 6% to over 80%. This success demonstrates that the NextGEng project has created a valuable European learning environment, offered diverse methods and promoted essential soft skills.
- *Full Industry Engagement*: 100% of teachers now incorporate laboratory activities and projects in collaboration with industry partners, a major increase from the initial one-third and a boost for practical relevance.
- *Increased Satisfaction*: The overall satisfaction rating for the course, evaluated by both students and teachers, has clearly improved.

Long-Term Sustainability

- *Curricular Integration*: The newly developed modules (lectures and labs) were integrated into the curricula of the six joint courses at each partner HEI, ensuring the long-term sustainability of the project's output.
- *Program Growth*: The success of the pilot program has allowed co-teaching teams to expand their membership with new teachers (e.g., in course C5).
- *Best practice:* A best practice guide was developed that is used to promote the pilot program within partner HEIs, to Associated Partners, and to new HEIs and companies.

Future directions

These findings confirm TTPP's success in enhancing both pedagogical practices and student outcomes. The pilot program has established a strong foundation that will ensure the project's long-term impact and sustainability across all partner institutions. In summary, the substantial improvements across all key indicators confirm the NextGEng project's innovative effect on modern engineering education.

Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9a

Plan for analyzing the quality of pilot program

January 2023

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

jamk

Universidad de Jaén

iSR www.isr.es

Valmet

BOSCH Invented for life

WP3.9	R3.9a Plan for analyzing the quality of pilot program
Authors	Ciprian Rad
Short Description	The plan outlines the methods and criteria for evaluating the quality of the pilot program, focusing on collecting feedback, measuring outcomes against predefined objectives, and comparing results with baseline data to assess effectiveness and areas for improvement.
Status	Final
Distribution level	Public
Date of delivery	10/02/2023
Contributions by:	Ciprian Lapusan, Luosma Petri, Silvia Satorres
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	16.01.2023	Ciprian Rad/Ciprian Lapusan	First Draft
0.2	23.01.2023	Ciprian Rad/Ciprian Lapusan	Version 0.2
0.3	07.02.2023	Ciprian Rad/Luosma Petri/Ciprian Lapusan/ Silvia Satorres	Version 0.3
Final	10.02.2023	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The activities of WP3 help to improve the quality of the education process in the participating HEIs by implementing new teaching methods with improved learning materials and at the same time increase the student's learning outcomes, motivation, and their soft & green skills.

Feedback from participating students and co-teaching teams is collected before the first implementation round (control results).

- The information should include learning outcomes, teaching methods, interaction with industry, quality of the teaching materials, internationalization etc.
- Due to the differences of semester timetable in each HEI, it is vital to collect this information in accordance with these constraints.

Link to the survey for the students (template): https://forms.office.com/e/rmSYBRPBjq

Link to the survey for the teachers (template): https://forms.office.com/e/75c5RkK50F

The survey addresses the following qualitative indicators associated with the WP3 activities:

Table 1. Indicators associated with the WP3 activities.

No.	Qualitative indicator	Activity	Target group	Indicator Code
1	- 50% of the participating students gave positive feedbacks related the course content materials	A3.1 A3.5 A3.9	Students	Q1
2	- at least 75% of produced course content is compatible with digital LMS	A3.1 A3.5 A3.9	Teachers Students	Q2
3	- at least 75% of new course content integrates new ecofriendly concepts and student-centered learning approaches	A3.1 A3.5 A3.9	Teachers	Q3
4	- at least 75% of new developed laboratory work/tailored seminars is developed in collaboration with companies	A3.1 A3.5 A3.9	Teachers Students	Q4
5	- at least 50% of the participating students gave positive feedbacks related the cooperative teaching implementation	A3.2 A3.3 A3.4 A3.6 A3.7	Students	Q5

		A3.8 A3.9		
6	- 50% increase in students learning outcomes related to Eco-friendly competences, industry practical applications of presented theoretical concepts	A3.2 A3.3 A3.4 A3.6 A3.7 A3.8 A3.9	Students	Q6
7	- 70% of the participating students in the program interact in an international teaching environment	A3.2 A3.3 A3.4 A3.6 A3.7 A3.8 A3.9	Students	Q7
8	- at least 70% of the participating teachers gave positive feedbacks related the cooperative teaching implementation	A3.2 A3.3 A3.4 A3.6 A3.7 A3.8 A3.9	Teachers	Q8

2. Questionnaire

The questionnaire addressed to students is presented next.

Table 2. Student questionnaire.

Questions	Indicator Code
0. Logos, introduction text, etc.	none
1. For what course do you take the survey? <u>Selection list*</u> C1 - Strength of Materials C2 - Industrial Automation C3 - Design Projects C4 - Quality Assurance and Applied Methods C5 - Computer Aided Design C6 - Manufacturing Technology **The selection list will be particularized to include the specific names of the courses taught at each HEI*	none
2. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter. <u>Likert scale</u> (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q1
3. The course content was appropriately challenging (not too hard but not too easy). <u>Likert scale</u> (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q1
4. Did you used digital teaching tools to communicate with the teacher and colleagues, to download didactic materials, to upload assignments, etc.? - *e.g., tools in your Learning Management Systems (LMS) such as Moodle, Zoom, M365 tools (Microsoft Teams, Office apps, OneDrive), Google tools, Miro etc.*	Q2

Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	
5. Did you have laboratory activities/tasks (projects) in collaboration with industry companies? Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q4
6. To what extent do you agree with the following statements? Matrix questions with Likert scale (1) This course was challenging but was organized in a way that helped me learn. (2) I worked with other students on group assignments. (3) The teacher encouraged student dialogue in class or virtual platform. Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q5
7. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.? Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q5
8. How would you appreciate the teaching activity in collaboration with foreign teachers and company experts? Matrix questions with Likert scale (1) It helped me understood concepts more clearly. (2) It allowed me to get in contact with company representatives and/or teachers from other universities. (3) It presented examples on how to apply theory to practice (industry cases). (4) It allowed me to learn in an international environment and increased my communication skills.	Q5

Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	
9. Did you find useful to be exposed to different teaching styles and strategies? Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q5
10. Do you know the learning outcomes of the course? - *learning outcomes of a course are student-centered measurable skills, abilities, knowledge, or values that describes what the students can do after completing the course.* YES/NO	Q6
11. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product? Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q6
12. The theoretical aspects of the course were closely related to industry practical applications thus increasing my abilities to solve real-life problems. Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q6
13. Have you had international visiting lecturers on the course? YES/NO	Q7
14. Was the learning material in a domestic or foreign language or both?	Q7

Selection list Domestic Foreign Both **The materials elaborated in the project must be in English*	
15. Do you have any comments/suggestions to further improve the team-teaching activity? Suggestions and comments	

The questionnaire addressed to teachers is presented next:

Table 3. Teacher questionnaire.

Questions	**Indicator Code**
0. Logos, introduction text, etc.	none
1. For what course do you take the survey? Selection list* C1 - Strength of Materials C2 - Industrial Automation C3 - Design Projects C4 - Quality Assurance and Applied Methods C5 - Computer Aided Design C6 - Manufacturing Technology **The selection list will be particularized to include the specific names of the courses taught at each HEI*	none
2. To what extent the course materials are compatible with digital tools from your Learning Management System (LMS)? - *e.g., tools in your Learning Management Systems (LMS) such as Moodle, Zoom, M365 tools (Microsoft Teams, Office apps, OneDrive), Google tools, Miro etc.* Rating scale 0% to 100%	Q2
3. My course integrates ecofriendly concepts. - *e.g., eco-friendly concepts (green skills) aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product.* Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree	Q3

(4) Agree (5) Strongly agree	
4. My course integrates student-centered learning approaches. - *e.g., course content that put students at the center of learning process and promotes soft skills such as teamwork, understand problems, think critically, decision-making etc. through study cases and experiments developed in collaboration with industry.* <u>Likert scale</u> (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q3
5. Do you have laboratory activities/tasks (projects) in collaboration with industry companies? <u>Likert scale</u> (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	Q4
6. Have you taught with a colleague together at different time in the same course? YES/NO	Q8
7. Have you implemented teaching using one or more of the following methods (multiple choices can be made)? <u>Selection list (multiple choice)</u> Problem-based learning Flipped Classroom Project-based learning Inquiry-based learning Cooperative learning Game-based learning Other I never heard about these methods	Q8
8. To what extent do you agree with the following statements? <u>Matrix questions with Likert scale</u> (1) Cooperative learning is inappropriate for the subject I teach. (2) I understand cooperative learning well enough to implement it successfully. (3) The amount of cooperative learning training I have received has prepared me to implement it successfully.	Q8

Likert scale (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly agree	
9. Do you have any comments/suggestions to further improve the team-teaching activity? Suggestions and comments	

3. Plan for questionnaire implementation and analysis

The questionnaire is delivered to all students and teachers from all three HEI partners that implement the selected courses in the international team-teaching pilot program. The schedule of the implemented courses is presented in Table 3.

Table 3. NextGEng courses schedule.

Course schedule in partner universities			
Course	**Partner**	**Semester 1 – Autumn/year of study**	**Semester 2 – Spring/year of study**
C1 - Strength of materials	TUCN	2nd year	2nd year
	JAMK	3rd year	
	UJA		2nd year
C2 - Industrial automation	TUCN		4th year
	JAMK	3rd year	3rd year
	UJA		2nd year
C3 - Design projects	TUCN	4th year	
	JAMK	4th year	
	UJA	4th year	
C4 - Quality assurance	TUCN		3rd year
	JAMK	3rd year	
	UJA	4th year (Metrology)	4th year (Computer Vision)
C5 - Computer aided design	TUCN	4th year	
	JAMK		2nd year
	UJA	3rd/4th year	
C6 - Production Technology	TUCN		3rd year
	JAMK	3rd year	
	UJA		4th year

Each course responsible teacher from all HEI partners delivers the questionnaire to the target group after implementing the co-teaching activities in the project. WP3 leader will provide the link to the online questionnaire.

Table 4. NextGEng HEI partners semester schedule.

Partner university	**Semester**	**Start month**	**End month**
TUCN	Semester 1/autumn	October	January
	Semester 2/spring	February	May
JAMK	Semester 1/autumn	August	December
	Semester 2/spring	January	May
UJA	Semester 1/autumn	September	January
	Semester 2/spring	February	May

The results are analyzed by WP3 Leader and WP3 responsible persons from each NextGEng partners after implementation of the first (C1…C4) and second round (C1…C6). The obtained results after the first round are presented and discussed with all participant teachers and further improvements are proposed.

Co-funded by
the European Union

R3.9a - Survey for students (template)

- Purpose: to collect feedback about the current status of the targeted courses
- Collecting period: no late than September 2023

NextGEng - International Cooperation Framework for Next Generation Engineering Students

NextGEng, is an international project/consortium with the aim of creating new international teaching models in close collaboration with companies to improve the quality of the education process in the participating higher education institutions (HEIs) by implementing new teaching methods with improved learning materials and at the same time increase the student's learning outcomes, motivation, and their soft & green skills.

The survey aims to collect feedback from students of each HEI partners that are participating in the targeted courses of NextGEng project before the start of first implementation round of International team-teaching pilot program. It includes questions about the following topics:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course
- interaction with industry

* Required

1

Please select your HEI. *

- ◯ Technical University of Cluj-Napoca
- ◯ Jyväskylä University of Applied Sciences
- ◯ Universidad de Jaén

2

For what course do you take the survey? *

- C1 - Rezistența Materialelor
- C2 - Automate de Control și Servire
- C3 - Design și Ergonomie
- C4 - Metrologie
- C5 - Proiectare Asistată de Calculator
- C6 - Tehnologii de Fabricație și Micro / Nanotehnologii

3

For what course do you take the survey? *

- C1 - Strength of Materials
- C2 - DCS Systems 1
- C3 - Laboratory Service (Project)
- C4 - Development Technique
- C5 - 3D-Modeling
- C6 - Develop your 3D-printing skills

4

For what course do you take the survey? *

- C1 - Elasticity and Strength of Materials
- C2 - Industrial Automation
- C3 - Engineering Project
- C4 - Metrology
- C5 - Graphics Engineering
- C6 - Applied Technologies to Production

Learning outcomes of the course

*- **learning outcomes** of a course are student-centered measurable skills, abilities, knowledge, or values that describes what the students can do after completing the course.*

5

Do you know the learning outcomes of the course?
*

- ◯ Yes
- ◯ No
- ◯ Maybe

6

Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?
*

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

7

Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?
*

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Course content and quality of the teaching materials

8

The course content was appropriately challenging (not too hard but not too easy). *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

9

The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter. *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

10

The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?
*

- e.g., tools in your Learning Management Systems (LMS) such as Moodle, Zoom, M365 tools (Microsoft Teams, Office apps, OneDrive), Google tools, Miro etc.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Course internationalization

11

Have you had international visiting professors at the course?
*

- ◯ Yes
- ◯ No

12

Was the learning material in a domestic or foreign language or both?
*

- ◯ Domestic
- ◯ Foreign
- ◯ Both

Teaching methods used at the course

13

To what extent do you agree with the following statements? *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
This course was challenging but was organized in a way that helped me learn	◯	◯	◯	◯	◯
I worked with other students on group assignments	◯	◯	◯	◯	◯
The teacher encouraged student dialogue in class or virtual platform	◯	◯	◯	◯	◯

14

Did you had teaching activities in collaboration with foreign teachers and/or experts from companies? *

◯ Yes

◯ No

15

How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts? *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
It helped me understood concepts more clearly	◯	◯	◯	◯	◯
It allowed me to get in contact with company representatives and/or teachers from other universities	◯	◯	◯	◯	◯
It presented examples on how to apply theory to practice (industry cases)	◯	◯	◯	◯	◯
It allowed me to learn in an international environment and increased my communication skills	◯	◯	◯	◯	◯

16

Did you find useful to participate in learning activities with different teaching styles and strategies? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Interaction with industry at laboratory activities

17

Did you had laboratory activities/tasks (projects) in collaboration with industry companies?
*

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

18

The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.
*

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Overall rating and suggestions

19

Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course
- interaction with industry

*

Poor ☆ ☆ ☆ ☆ ☆ Excellent

20

Do you have any comments/suggestions to further improve the team-teaching activity? *

Thank you for your feedback!

NextGEng

Co-funded by
the European Union

R3.9a - Survey for teachers (template)

- Purpose: to collect feedback about the current status of the targeted courses
- Collecting period: no late than September 2023

NextGEng - International Cooperation Framework for Next Generation Engineering Students

NextGEng, is an international project/consortium with the aim of creating new international teaching models in close collaboration with companies to improve the quality of the education process in the participating higher education institutions (HEIs) by implementing new teaching methods with improved learning materials and at the same time increase the student's learning outcomes, motivation, and their soft & green skills.

The survey aims to collect feedback from teachers of each HEI partners that are participating in the targeted courses of NextGEng project before the start of first implementation round of International team-teaching pilot program. It includes questions about the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

* Required

1

Please select your HEI. *

- ◯ Technical University of Cluj-Napoca
- ◯ Jyväskylä University of Applied Sciences
- ◯ Universidad de Jaén

2

For what course do you take the survey? *

- C1 - Rezistența Materialelor
- C2 - Automate de Control și Servire
- C3 - Design și Ergonomie
- C4 - Metrologie
- C5 - Proiectare Asistată de Calculator
- C6 - Tehnologii de Fabricație și Micro / Nanotehnologii

3

For what course do you take the survey? *

- C1 - Strength of Materials
- C2 - DCS Systems 1
- C3 - Laboratory Service (Project)
- C4 - Development Technique
- C5 - 3D-Modeling
- C6 - Develop your 3D-printing skills

4

For what course do you take the survey? *

- C1 - Elasticity and Strength of Materials
- C2 - Industrial Automation
- C3 - Engineering Project
- C4 - Metrology
- C5 - Graphics Engineering
- C6 - Applied Technologies to Production

Learning outcomes of the course

*- **learning outcomes** of a course are student-centered measurable skills, abilities, knowledge, or values that describes what the students can do after completing the course.*

5

The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

6

The course content integrates eco-friendly concepts (green skills)?
*

- e.g., eco-friendly concepts (green skills) aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Course content and quality of the teaching materials

7

To what extent the course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)? *

- e.g., tools in your Learning Management Systems (LMS) such as Moodle, Zoom, M365 tools (Microsoft Teams, Office apps, OneDrive), Google tools, Miro etc.

0	1	2	3	4	5	6	7	8	9	10

Not at all Fully compatible

Teaching methods used at the course

8

Had you thought the course using one or more of the following teaching methods (multiple choices can be made)? *

- [ ] Problem-based learning
- [ ] Flipped classroom
- [ ] Project-based learning
- [ ] Inquiry-based learning
- [ ] Cooperative learning
- [ ] Game-based learning
- [ ] I never heard about these methods

9

Did you had teaching activities in collaboration with foreign teachers and/or experts from companies? *

- ◯ Yes
- ◯ No

10

Did you find it useful in the context of your course? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

11

To what extent do you agree with the following statements? *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Cooperative teaching is inappropriate for the subject I teach	◯	◯	◯	◯	◯
I understand cooperative teaching well enough to implement it successfully	◯	◯	◯	◯	◯
The amount of cooperative teaching training I have received has prepared me to implement it successfully	◯	◯	◯	◯	◯

Interaction with industry at laboratory activities

12

Did you had laboratory activities/tasks (projects) in collaboration with industry companies? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

13

The theoretical aspects of the course are closely related to industry practical applications? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Overall rating and suggestions

14

Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

*

Poor ☆ ☆ ☆ ☆ ☆ Excellent

15

Do you have any comments/suggestions to further improve the team-teaching activity? *

Thank you for your feedback!

Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9b

Analysis of the current teaching situation for the selected courses autumn semester 2022

June 2023

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

jamk

Universidad de Jaén

iSR www.isr.es

Valmet

BOSCH Invented for life

WP3.9	R3.9b Report - Analysis of the current teaching situation for the selected courses autumn semester 2022
Authors	Ciprian Rad
Short Description	The report analyzes feedback from teachers and students collected prior to the implementation of the team-teaching pilot program for the targeted courses (C1…C6) of the NextGEng project during the autumn semester of 2022.
Status	Final
Distribution level	Public
Date of delivery	26/06/2023
Contributions by:	Ciprian Lapusan, Silvia Satorres
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	05.06.2023	Ciprian Rad	First Draft
0.2	06.06.2023	Ciprian Rad	Draft amendments
0.3	07.06.2023	Ciprian Rad	Draft amendments
0.4	12.06.2023	Silvia Satorres	Draft amendments
0.5	13.06.2023	Ciprian Rad	Draft amendments
Final	26.06.2023	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The qualitative evaluation of the implementation of the WP3 team-teaching pilot program is performed in Activity A3.9. In this process information on the learning process and feedback is collected from target groups in three project implementation phases.

The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are used in the international team-teaching pilot program for the selected 6 joint courses: C1 – Strength of Materials, C2 – Industrial Automation, C3 – Design Projects, C4 – Quality Assurance and Applied Methods, C5 – Computer Aided Design and C6 – Manufacturing Technology.

The joint courses are taught to students from the second, third and fourth year from the following specializations: Mechatronics (TUCN), Mechanical Engineering (TUCN, JAMK and UJA), Electrical and Automation Engineering (UJA), Industrial Economic Engineering (UTCN), Electrical Engineering, Electronic and Automation Engineering (UJA). Teachers are experts in their field of activity and have taught the selected courses for several years in their university. Each of the company partners nominated the experts based on their qualification and activity carried out in the company which is related to the selected courses.

In the first implementation phase, feedback is collected from the participants (students and teachers) before implementing the pilot program to obtain the *control results*. These findings will serve as control results for comparison with the feedback gathered after the pilot program is implemented. The data collection is performed during the two exam sessions in each HEIs (**autumn semester 2022** and **spring semester 2023**).

This report aims to analyze the feedback collected from the courses held in autumn semester 2022.

Questionnaires for gathering feedback from teachers and students involved in targeted courses held in autumn semester 2022 were previously developed and documented in *Report R3.9a - Plan for analyzing the quality of pilot program*. The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

The links to surveys can be found at:

- survey for the students: https://forms.office.com/e/uTLRsBuQuN
- survey for the teachers: https://forms.office.com/e/Q8iy6Q86Qf

The two questionnaires were delivered to the targeted groups that are part of the selected joint courses in the international team-teaching pilot program (teachers and students) in all partner HEIs.

The results were analyzed and discussed by WP3 Leader and people in charge of each HEI and further improvements were proposed.

2. Questionnaire feedback analysis

Next are presented the results obtained for the two questionnaires. Student's responses are presented first and teacher's responses afterwards.

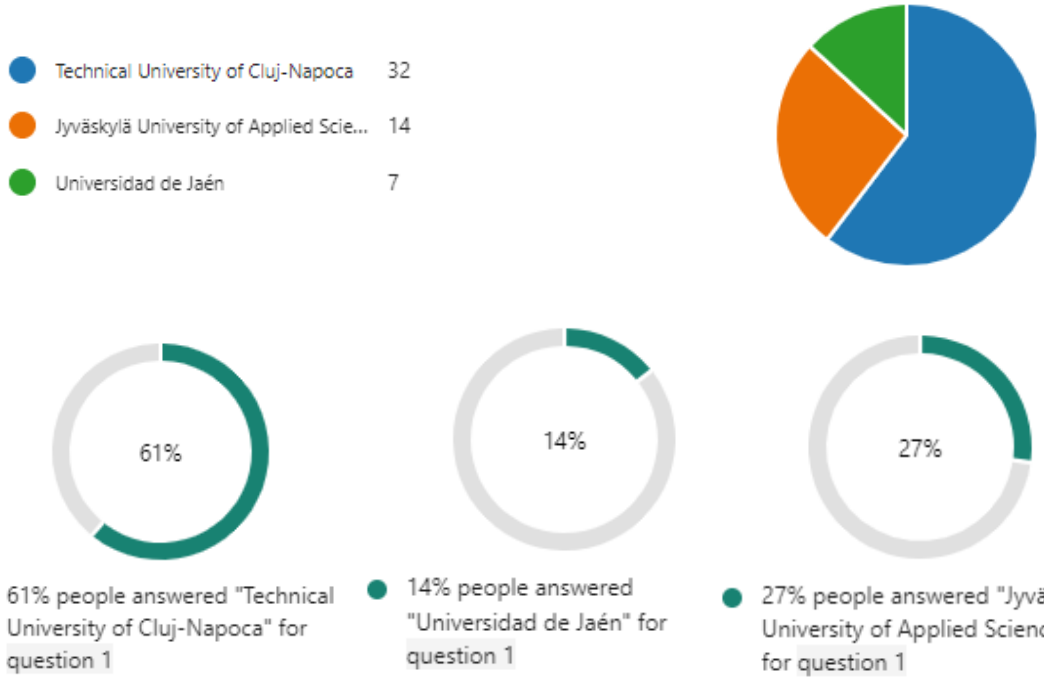
2.1 Survey for students (autumn semester 2022)

A total of 53 students responded to this survey with an average time to complete of 35:52 minutes. The responses represent an overview about the current teaching situation at the selected joint courses held in autumn semester 2022 in each partner HEIs from the perspective of the students.

53	35:52	Active
Responses	Average time to complete	Status

Question 1: Please select your HEI.

Of the total number of students, 61% answered Technical University of Cluj-Napoca (TUCN), 26% answered Jyväskylä University of Applied Sciences (JAMK) and 13% answered Universidad de Jaén (UJA).



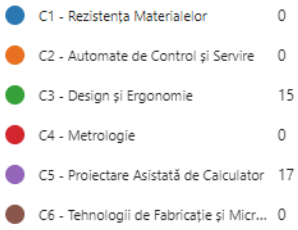
Question 2: For what course do you take the survey?

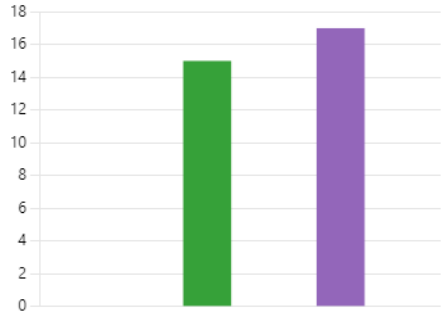
The figures below present the amount of feedback gathered for every joint course in each HEI (TUCN, JAMK UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 0
C2 – 0
C3 – 15
C4 – 0
C5 – 17
C6 – 0

Total = 32

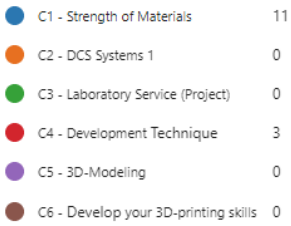


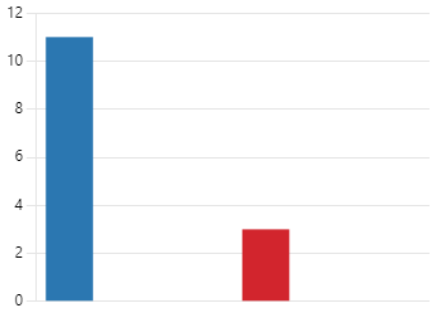


JAMK

C1 – 11
C2 – 0
C3 – 0
C4 – 3
C5 – 0
C6 – 0

Total = 14

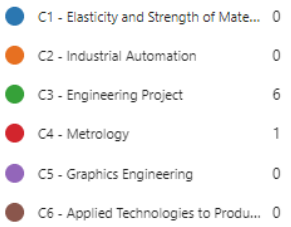


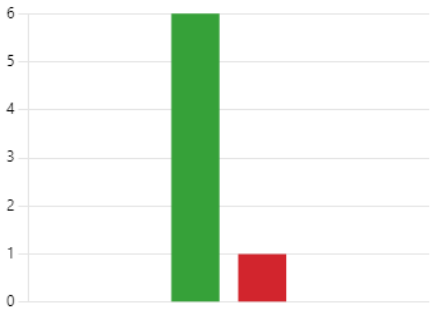


UJA

C1 – 0
C2 – 0
C3 – 6
C4 – 1
C5 – 0
C6 – 0

Total = 7

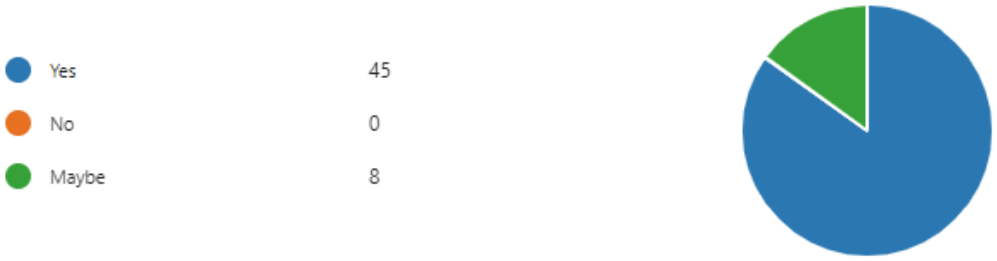




Question 3: Do you know the learning outcomes of the course?

For this question, 85% of students answered “Yes”, 0% answered “No” and 15% answered “Maybe”. Although 85% of the students know the learning outcomes of the course, some of them are not sure what these are.

Learning outcomes of the course/lecture are very important because are student-centered measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course/lecture.



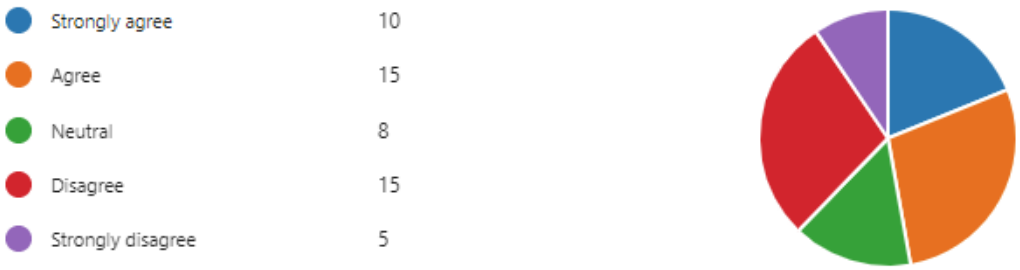
Question 4: Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

As can be seen from the chart below, 79% of the participants agreed that the course promotes soft skills. However, 21% have a different opinion and their answer suggests that improvements can be made in this direction.

Question 5: Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Only 47% of the students agreed that green skills are present in the course while 53% disagree with this fact. These numbers show that is a lack of information among the students regarding the impact on the environment based on their decisions in the development and life span of a certain engineering product.

Improvements in this area are necessary for sure. The approaches proposed in NextGEng project aim to increase student's green skills.



Question 6: The course content was appropriately challenging (not too hard but not too easy).

Almost 80% of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that usually the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students.

Strongly agree	16
Agree	26
Neutral	9
Disagree	2
Strongly disagree	0

Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 80% of the students appreciated positively that the instruction materials provided by their teachers increased their knowledge and skills in the subject matter. However, 20% of the responses suggest that these materials can be improved.

Strongly agree	18
Agree	25
Neutral	8
Disagree	2
Strongly disagree	0

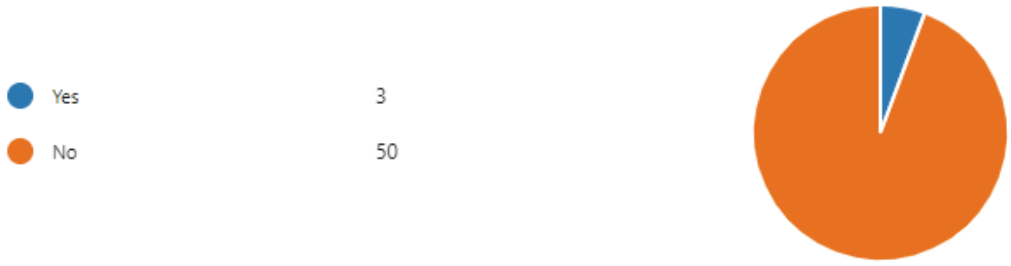
Question 8: The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Almost 95% of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS provided by HEI. This means that most of the materials are compatible with digital teaching and learning technologies.

Strongly agree	30
Agree	20
Neutral	2
Disagree	1
Strongly disagree	0

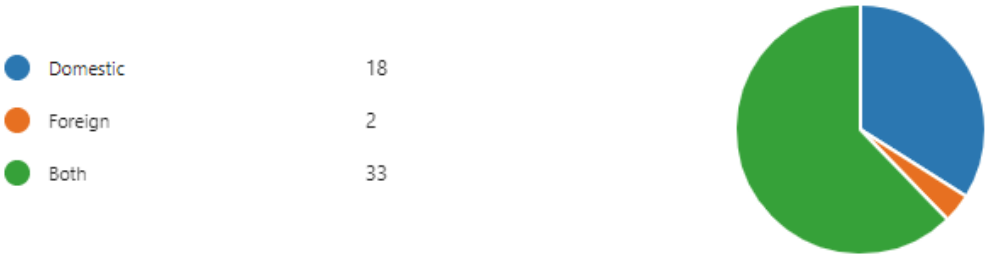
Question 9: Have you had international visiting professors at the course?

Only 6% of the students answered “Yes” to this question. This is a clear indicator that international visiting teachers on the courses are exceptions rather than the rule. These types of interactions between students and international teachers are beneficial and important because in this way, the students can see different approaches that are used in other HEIs.



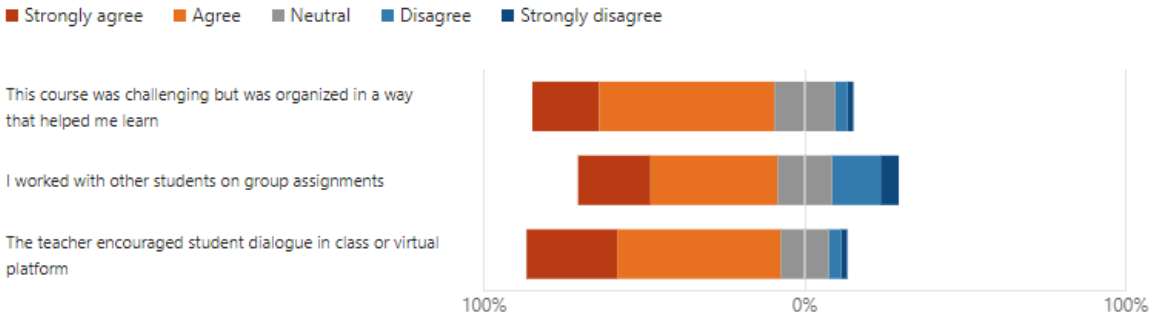
Question 10: Was the learning material in a domestic or foreign language or both?

In this case, 62% percent of students agreed that the learning materials were given both in domestic and foreign language. This suggests that the courses are prepared to be taught also in a foreign language and students can develop/improve their communication skills too.



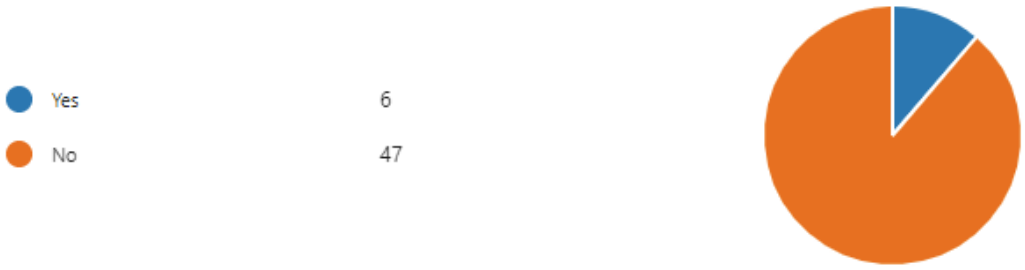
Question 11: To what extent do you agree with the following statements?

Student-Centered Approach in educational process is very important for students. In this way, abilities such as teamwork, understanding problems, thinking critically, and decision-making can be developed. Analyzing the answers to this question, approximately 70% of the students consider that student-centered approaches are promoted at the course. However, 30% of students consider that there is a lack of such things.



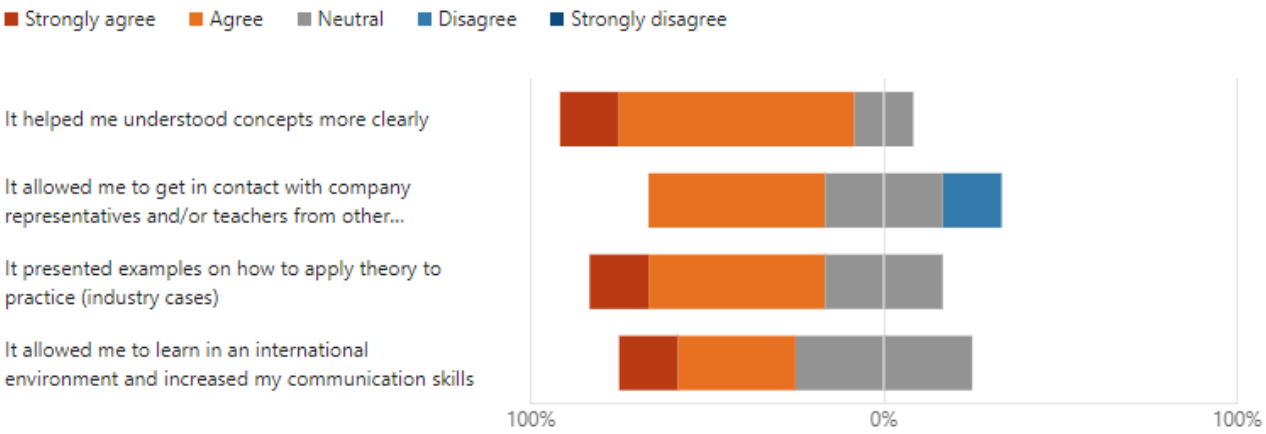
Question 12: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Almost 90% of students answered “No” to this question. This is an area where major improvements can be made and one objective of NextGEng project is to shift educational process to a student centered-learning approach and applying specific teaching methods and develop content that put students at the center of learning process and at the same time stimulate experiential learning through case studies and experiments developed in collaboration with industry.



Question 13: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The other 10% of students that responded with “Yes” at Question 12 were asked to give a degree of satisfaction to the following 4 statements presented below. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



Question 14: Did you find useful to participate in learning activities with different teaching styles and strategies?

The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

Strongly agree	1
Agree	3
Neutral	2
Disagree	0
Strongly disagree	0

Question 15: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Like in Question 12, the ratio of 90% to 10% is preserved here too. That means that the bond between companies and HEIs must be strengthened further to deliver more practical and real-life case scenarios to the students.

Strongly agree	1
Agree	8
Neutral	10
Disagree	18
Strongly disagree	16

Question 16: The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.

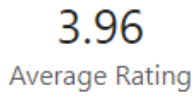
Approximately 65% of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications. Another 35% of them have a neutral position or disagree. Although the percentage is lower compared with the one from Question 12, it accentuates even further the need of experiential learning through study cases and experiments developed in collaboration with industry.

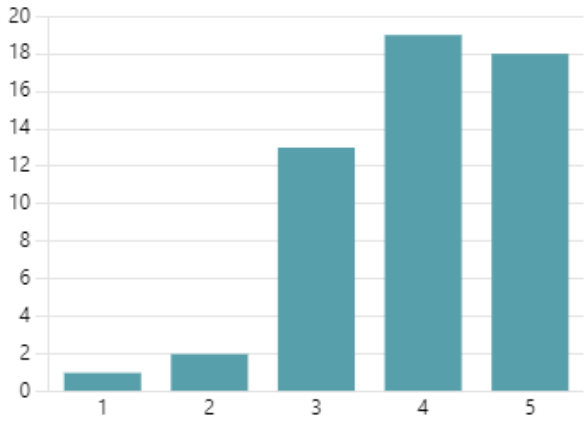
Strongly agree	7
Agree	28
Neutral	12
Disagree	4
Strongly disagree	2

Question 17: Rate your overall experience at the course considering the following aspects:

- ***learning outcomes***
- ***course content and quality of the teaching materials***
- ***internationalization***
- ***teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5. **An average rating of 3.96 was obtained**. This means that the degree of satisfaction is not bad but there is also room for improvement. The directions where these improvements can be made are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.





2.2 Survey for teachers (autumn semester 2022)

A total of 8 teachers responded to this survey with an average time to complete of 05:04 minutes. The responses represent an image of the current teaching situation from the perspective of teachers at the selected joint courses held in autumn semester 2022.

8	05:04	Active
Responses	Average time to complete	Status

Question 1: Please select your HEI.

Of the total number of teachers, 25% answered Technical University of Cluj-Napoca (TUCN), 25% answered Jyväskylä University of Applied Sciences (JAMK) and 50% answered Universidad de Jaén (UJA).

Question 2: For what course do you take the survey?

The figures below present the amount of feedback gathered for every joint course in each HEI (TUCN, JAMK, UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

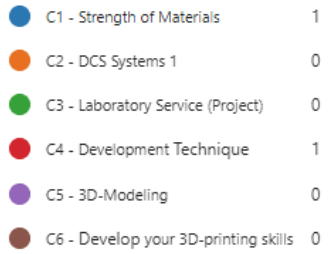
C1 – 1
C2 – 0
C3 – 0
C4 – 0
C5 – 1
C6 – 0

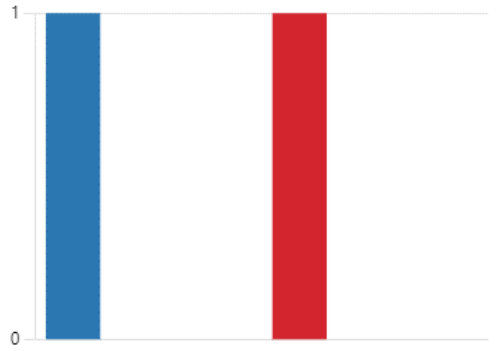
Total = 2

JAMK

C1 – 1
C2 – 0
C3 – 0
C4 – 1
C5 – 0
C6 – 0

Total = 2

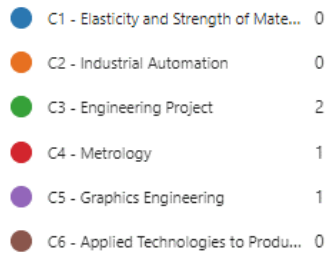


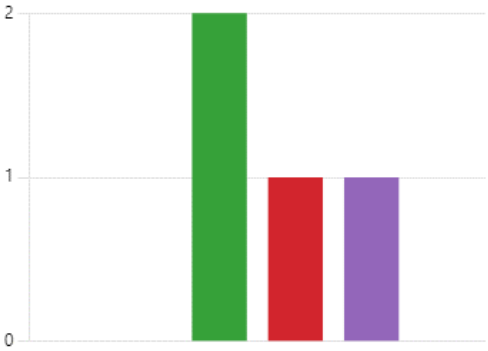


UJA

C1 – 0
C2 – 0
C3 – 2
C4 – 1
C5 – 1
C6 – 0

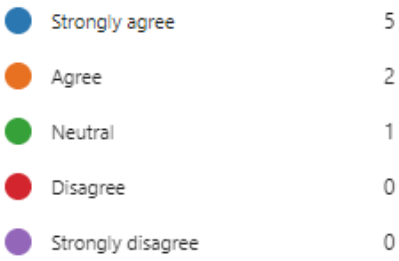
Total = 4





Question 3: The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

According to the responses, 88% of the teachers agree that the course promotes soft skills. The percentage is very similar to the one gathered from the survey that was sent to the students.



Question 4: The course content integrates eco-friendly concepts (green skills)?

Almost 80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). However, only 47% of the students agreed that green skills are present on the courses. This means that although eco-friendly concepts are integrated in the courses the students have problems identifying them.

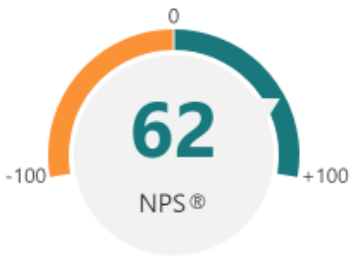
The approaches proposed in NextGEng project aim to increase student's green skills (impact on the environment based on their decisions in the development and life span of a certain engineering product).

Strongly agree	3
Agree	3
Neutral	1
Disagree	1
Strongly disagree	0

Question 5: To what extent the course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

There are few situations where the teaching materials are not compatible with digital learning technologies which is also in agreement with the responses provided by students.

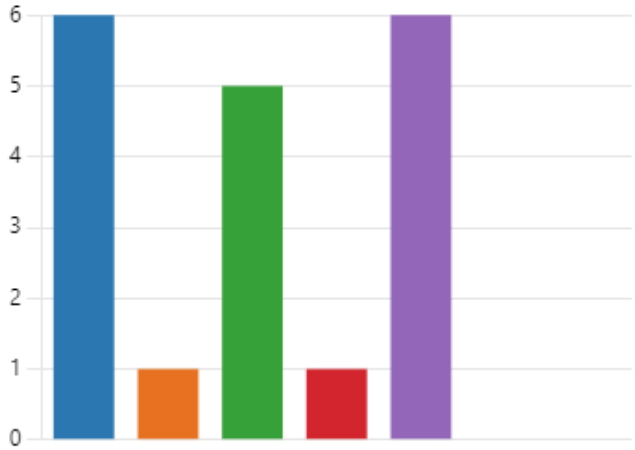
Promoters	6
Passives	1
Detractors	1



Question 6: Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

The responses provided to this question highlight that teachers are familiar with modern teaching methods such as: problems-based learning, project-based learning, and cooperative-learning. NextGEng aims also to improve cooperative teaching/learning between the teachers involved in the project.

Problem-based learning	6
Flipped classroom	1
Project-based learning	5
Inquiry-based learning	1
Cooperative learning	6
Game-based learning	0
I never heard about these methods	0

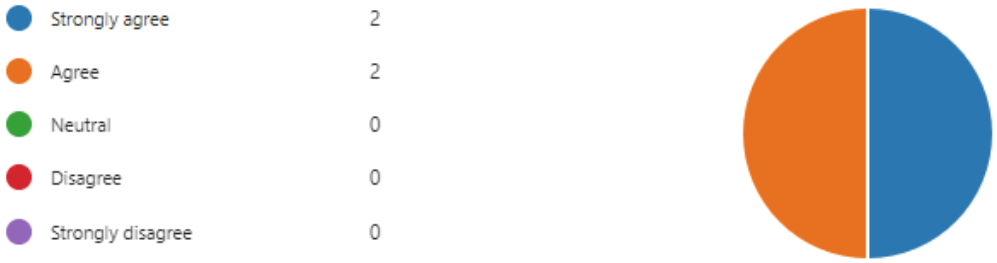


Question 7: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Cooperative teaching/learning is very important to improve the educational process. As can be seen, 50% of the teachers have collaborations with other teachers or experts from companies when doing teaching activities. Through NextGEng project it is expected to improve this percentage.

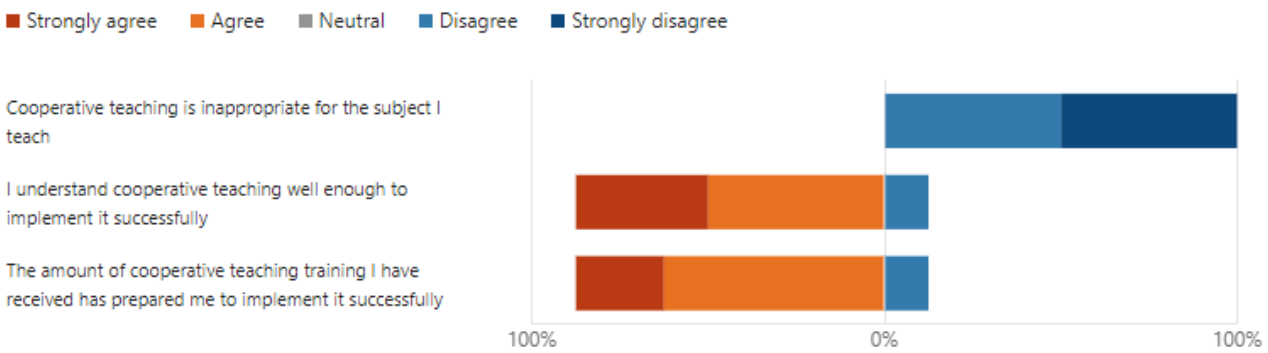
Question 8: Did you find it useful in the context of your course?

Teachers who responded with "Yes" at Question 7 also agreed that cooperative/teaching learning is useful in the context of their course.



Question 9: To what extent do you agree with the following statements?

Regarding the level of understanding of cooperative teaching through practice or training, 85% of the teachers consider that they can manage such types of activities. However, there's still some of them who are in total disagreement with this and consider that additional training and practice is necessary for them.



Question 10: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Here, 38% of the teachers confirmed that they have activities in collaboration with industry companies. The result is in accordance with the one provided by students, meaning that things can be improved in this area.

Strongly agree	1
Agree	2
Neutral	1
Disagree	3
Strongly disagree	1

Question 11: The theoretical aspects of the course are closely related to industry practical applications?

Although many of the laboratory activities lack collaboration with companies, the examples presented at the course lectures are related to practical applications. This can be seen from the results, as almost 90% of the teachers agreed with this situation.

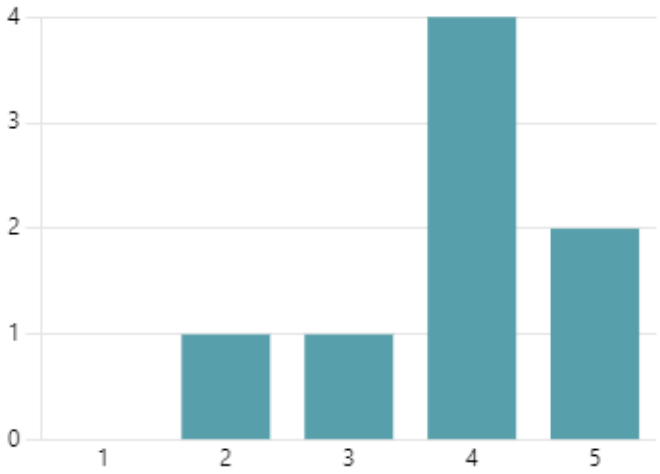
Strongly agree	3
Agree	4
Neutral	0
Disagree	1
Strongly disagree	0

Question 12: Rate your overall experience at the course considering the following aspects:

- ***promotion of eco-friendly concepts and soft skills***
- ***compatibility of course materials with digital teaching and learning***
- ***cooperative teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the teachers based on a rating score from 1 to 5. **An average rating of 3.88 was obtained**. This means that the degree of satisfaction is not bad but there is also room for improvement. The directions where these improvements can be made are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.

3.88
Average Rating



3. Conclusion and further improvements

Based on the analysis performed in Chapter 2, the following conclusion and further improvements directions are presented:

1) There is a group of students (15%) that don't know the learning outcomes of the course they attend. Learning outcomes are very important because are measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course. When developing the moules in NextGEng we will take into consideration this aspect.

2) More than 50% of the students disagree with the fact that green skills are present on the course. The percentage shows that there is a lack of information among the students regarding the impact on the environment based on their decisions in the development and life span of a certain engineering product. On the other hand, 80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). This means that although eco-friendly concepts are integrated in some courses, students have problems identifying them. When developing the modules for the joint courses we will consider the best way to deliver this type of information to increase students' green skills.

3) The answers given by students demonstrate that international visiting teachers or experts from companies at the courses or laboratory activities are exceptions rather than the rule. This is an area where major improvements can be made and one objective of NextGEng project is to shift educational process to a student centered-learning approach and applying specific teaching methods and develop content that put students at the center of learning process and at the same time stimulate experiential learning through case studies and experiments developed in collaboration with industry.

4) The comments provided by students suggest that improvements can be made in the following areas: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.

   Below are presented some of the students and teacher comments/suggestions:

   Students:

   - *"A more practical approach would be nice!"*
   - *"Was an interesting class, where we can learn about project elaboration in real life."*
   - *"Learning this course with foreign professors or making projects with international companies will be a way to work everywhere in the future."*
   - *"Present the final project to promote oral expression and help for the future TFG."*
   - *"More interactive activities / laboratory with foreign students and companies."*
   - *"It would be fine to invite foreign teachers."*
   - *"The professor should use more practical examples, but overall, this was a great course."*
   - *"Per total the course was excellent, with practical examples that applied at laboratory."*
   - *"Use a little more detailed lab guide."*
   - *"I think that everything was explained to the understanding of the students."*

   Teachers:

   - *"The course is a great opportunity to improve our skills."*
   - *"I need extra training to further understand the different team-teaching approaches."*
   - *"I consider the collaborative teaching experience by projects to be very interesting."*

5) The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5. **An average rating of 3.96 was given by students and 3.88 by teachers**. The results agree, which means that the degree of satisfaction is not bad but there is also room for improvement.

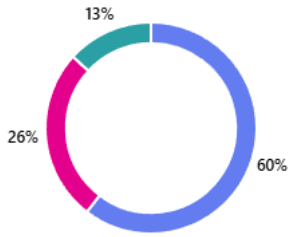
Responses Overview

Active

Responses	Average Time	Duration
53	35:52	952 Days

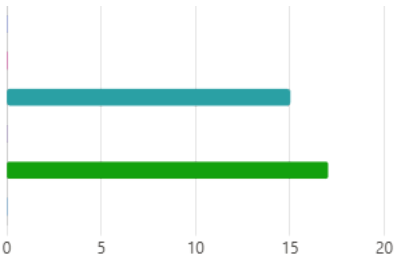
1. Please select your HEI.

Technical University of Cluj-Napoca	32
Jyväskylä University of Applied Sciences	14
Universidad de Jaén	7



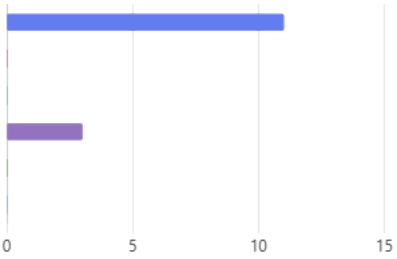
2. For what course do you take the survey?

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	15
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	17
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



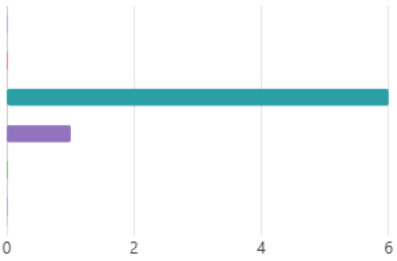
3. For what course do you take the survey?

C1 - Strength of Materials	11
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	3
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0



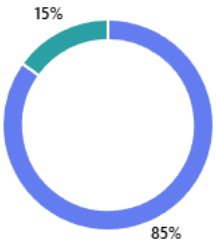
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	0
C3 - Engineering Project	6
C4 - Metrology	1
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0



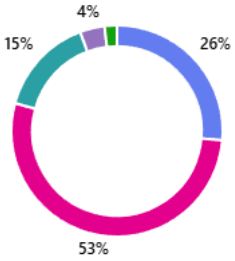
5. Do you know the learning outcomes of the course?

Yes	45
No	0
Maybe	8



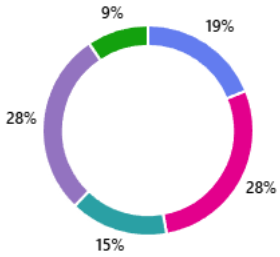
6. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	14
Agree	28
Neutral	8
Disagree	2
Strongly disagree	1



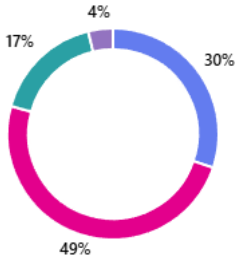
7. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environ ment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	10
Agree	15
Neutral	8
Disagree	15
Strongly disagree	5



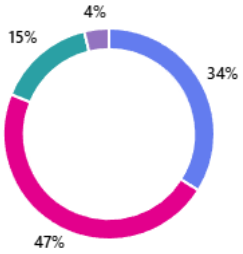
8. The course content was appropriately challenging (not too hard but not too easy).

Strongly agree	16
Agree	26
Neutral	9
Disagree	2
Strongly disagree	0



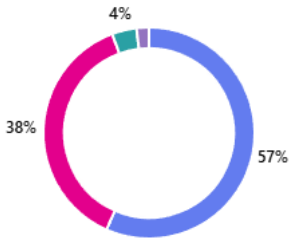
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	18
Agree	25
Neutral	8
Disagree	2
Strongly disagree	0



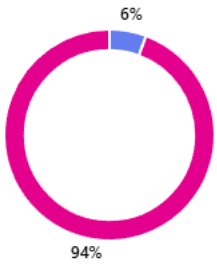
10. The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Strongly agree	30
Agree	20
Neutral	2
Disagree	1
Strongly disagree	0



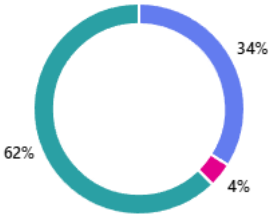
11. Have you had international visiting professors at the course?

Yes	3
No	50



12. Was the learning material in a domestic or foreign language or both?

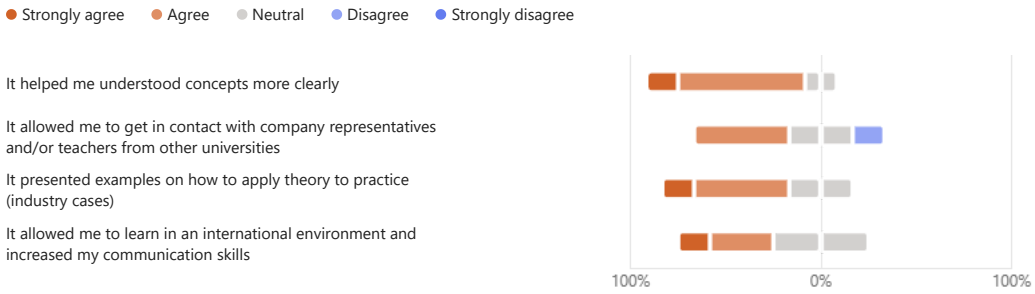
Domestic	18
Foreign	2
Both	33



13. To what extent do you agree with the following statements?

14. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

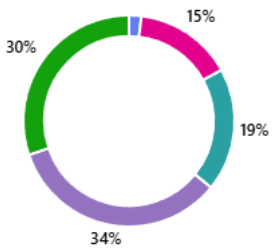
15. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



16. Did you find useful to participate in learning activities with different teaching styles and strategies?

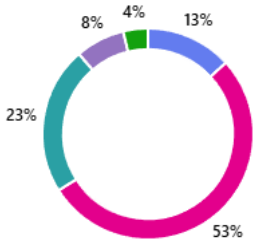
17. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	1
Agree	8
Neutral	10
Disagree	18
Strongly disagree	16



18. The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life pro blems.

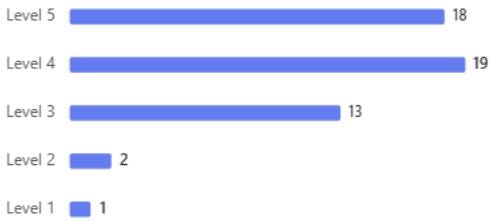
Strongly agree	7
Agree	28
Neutral	12
Disagree	4
Strongly disagree	2



19. Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course
- interaction with industry

3.96
Average Rating



20. Do you have any comments/suggestions to further improve the team-teaching activity?

53
Responses

Latest Responses
"Very good lecturer."
"-"
"Lean technics are very usefull these days worklife."
• • •

8 respondents (15%) answered course for this question.

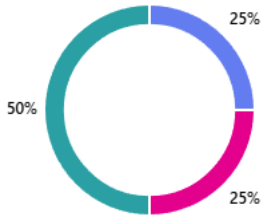
Responses Overview

Active

Responses	Average Time	Duration
8	05:04	952 Days

1. Please select your HEI.

Technical University of Cluj-Napoca	2
Jyväskylä University of Applied Sciences	2
Universidad de Jaén	4



2. For what course do you take the survey?

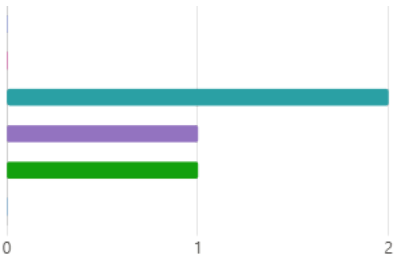
C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	0
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	1
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0

3. For what course do you take the survey?

C1 - Strength of Materials	1
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	1
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0

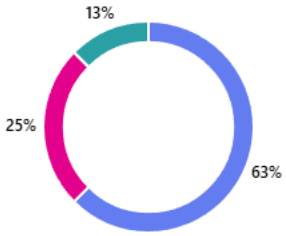
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	0
C3 - Engineering Project	2
C4 - Metrology	1
C5 - Graphics Engineering	1
C6 - Applied Technologies to Production	0



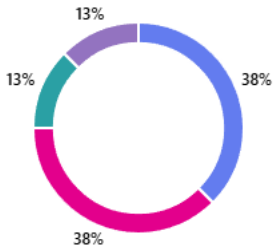
5. The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	5
Agree	2
Neutral	1
Disagree	0
Strongly disagree	0



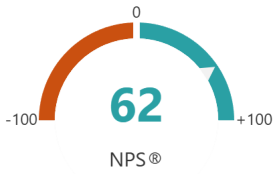
6. The course content integrates eco-friendly concepts (green skills)?

Strongly agree	3
Agree	3
Neutral	1
Disagree	1
Strongly disagree	0



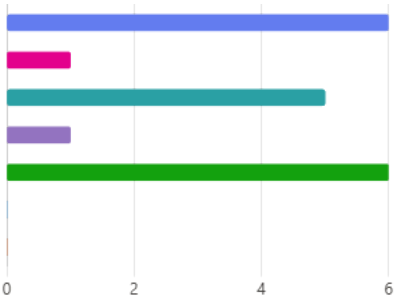
7. To what extent the course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

Promoters	6
Passives	1
Detractors	1



8. Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

Problem-based learning	6
Flipped classroom	1
Project-based learning	5
Inquiry-based learning	1
Cooperative learning	6
Game-based learning	0
I never heard about these methods	0



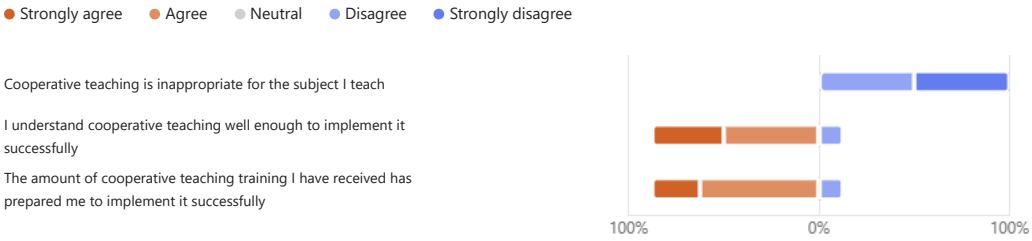
9. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Yes	4
No	4

10. Did you find it useful in the context of your course?

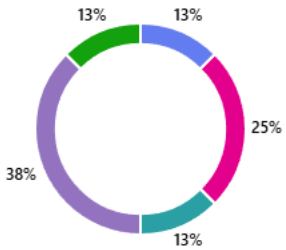
Strongly agree	2
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0

11. To what extent do you agree with the following statements?



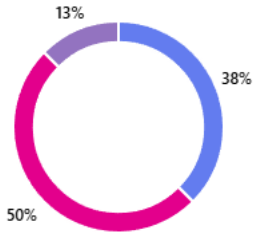
12. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	1
Agree	2
Neutral	1
Disagree	3
Strongly disagree	1



13. The theoretical aspects of the course are closely related to industry practical applications?

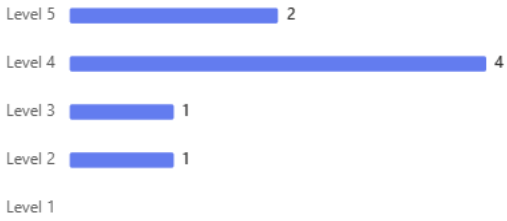
Strongly agree	3
Agree	4
Neutral	0
Disagree	1
Strongly disagree	0



14. Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

3.88
Average Rating



15. Do you have any comments/suggestions to further improve the team-teaching activity?

8
Responses

Latest Responses

"I CONSIDER THE COLLABORATIVE TEACHING EXPERIENCE BY PROJECTS TO BE VE..."

"I need extra training to further understand the different team-teaching approaches"

"-"

• • •

Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9c

Analysis of the current teaching situation for the selected courses spring semester 2023

July 2023

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA
jamk
Universidad de Jaén
iSR www.isr.es
Valmet
BOSCH Invented for life

WP3.9	R3.9c Report - Analysis of the current teaching situation for the selected courses spring semester 2023
Authors	Ciprian Rad
Short Description	The report analyzes feedback from teachers and students collected prior to the implementation of the team-teaching pilot program for the targeted courses (C1…C6) of the NextGEng project during the spring semester of 2023.
Status	Final
Distribution level	Public
Date of delivery	04.10.2023
Contributions by:	Luosma Petri, Ciprian Lapusan
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	14.07.2023	Ciprian Rad	First Draft
0.2	21.07.2023	Ciprian Rad	Draft amendments
0.3	28.07.2023	Ciprian Rad	Draft amendments
0.4	06.09.2023	Luosma Petri, Ciprian Lapusan	Review
Final	04.10.2023	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The qualitative evaluation of the implementation of the WP3 team-teaching pilot program is performed in activity A3.9. In this process information on the learning process and feedback is collected from target groups in three project implementation phases.

The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are used in the international team-teaching pilot program for the selected 6 joint courses: C1 – Strength of Materials, C2 – Industrial Automation, C3 – Design Projects, C4 – Quality Assurance and Applied Methods, C5 – Computer Aided Design and C6 – Manufacturing Technology.

The joint courses are taught to students from the second, third and fourth year from the following specializations: Mechatronics (TUCN), Mechanical Engineering (TUCN, JAMK and UJA), Electrical and Automation Engineering (TUCN, JAMK, UJA), Industrial Economic Engineering (UTCN), Electrical Engineering, Electronic and Automation Engineering (UJA). Teachers are experts in their field of activity and have taught the selected courses for several years in their university. Each of the company partners nominated the experts based on their qualification and activity carried out in the company which is related to the selected courses.

In the first implementation phase feedback is collected from the participants (students and teachers) before implementing the pilot program to obtain the *control results*. These findings will serve as control results for comparison with the feedback gathered after the pilot program is implemented. The data collection is performed during the end of the two semesters or in the two exam sessions in each partner HEIs (**autumn semester 2022** and **spring semester 2023**).

This report aims to analyze the feedback collected from the courses held in spring semester 2023.

Questionnaires for gathering feedback from teachers and students involved in targeted courses held in spring 2023 semester were previously developed and documented in *Report R3.9a - Plan for analyzing the quality of pilot program*. The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

The links to surveys can be found at:

- survey for the students: https://forms.office.com/e/S7n6EWXutL
- survey for the teachers: https://forms.office.com/e/pzvUUsyxKz

The two questionnaires were delivered to the targeted groups that are part of the selected joint courses in the international team-teaching pilot program (teachers and students) in all partner HEIs.

The results were analyzed and discussed by WP3 Leader and people in charge of each HEI and further improvements were proposed (questionnaire content/proposed upgrade method).

2. Questionnaire feedback analysis

Next are presented the results obtained for the two questionnaires. Student's responses are presented first and teacher's responses afterwards.

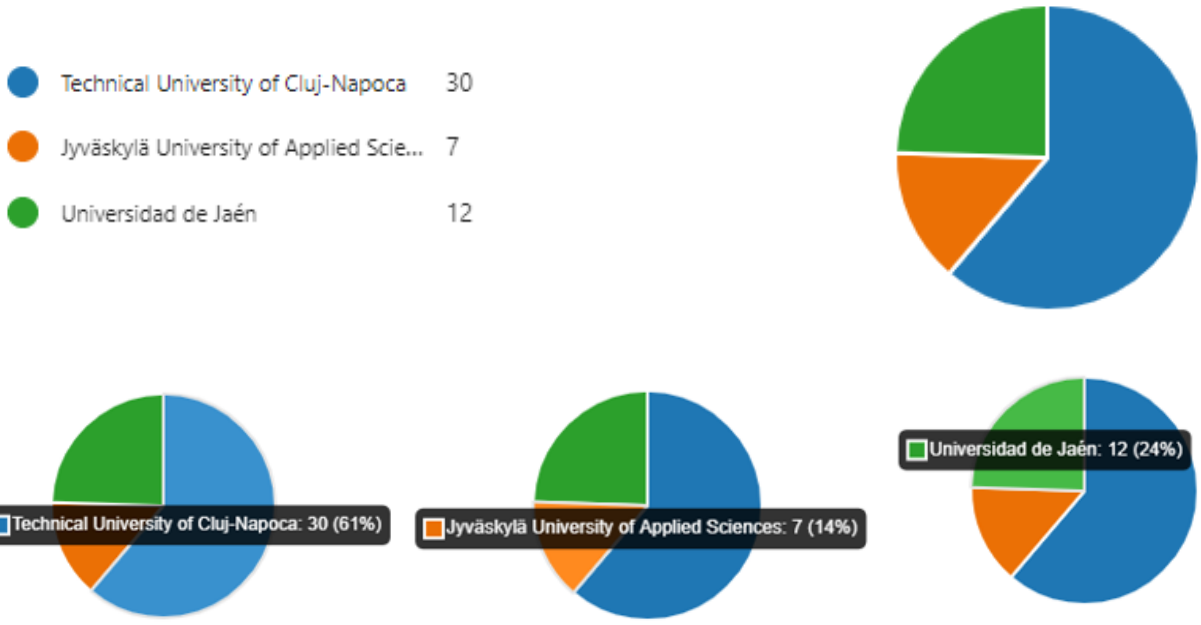
2.1 Survey for students (spring semester 2023)

A total of 49 students responded to this survey with an average time to complete of 08:37 minutes. The responses represent an overview about the current teaching situation at the selected joint courses held in spring semester 2023 in each partner HEIs from the perspective of the students.

49	08:37	Active
Responses	Average time to complete	Status

Question 1: Please select your HEI.

Of the total number of students, 62% answered Technical University of Cluj-Napoca (TUCN), 14% answered Jyväskylä University of Applied Sciences (JAMK) and 24% answered Universidad de Jaén (UJA).



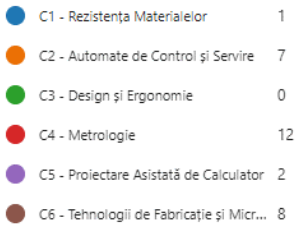
Question 2: For what course do you take the survey?

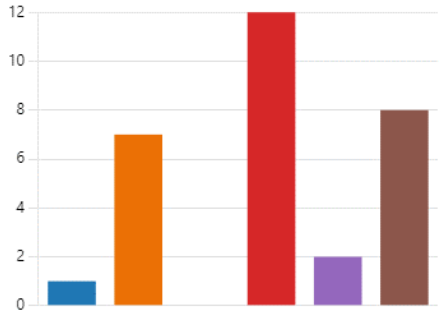
The figures below present the number of feedbacks gathered for every joint course in each HEI (TUCN, JAMK, UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 1
C2 – 7
C3 – 0
C4 – 12
C5 – 2
C6 – 8

Total = 30

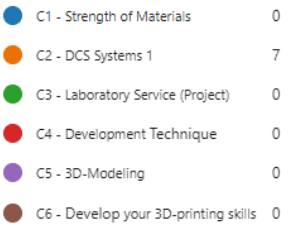


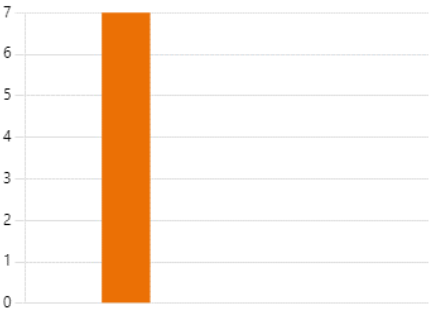


JAMK

C1 – 0
C2 – 7
C3 – 0
C4 – 3
C5 – 0
C6 – 0

Total = 7

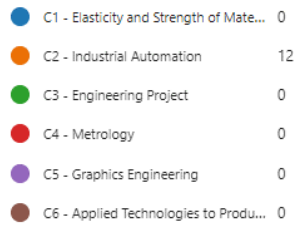


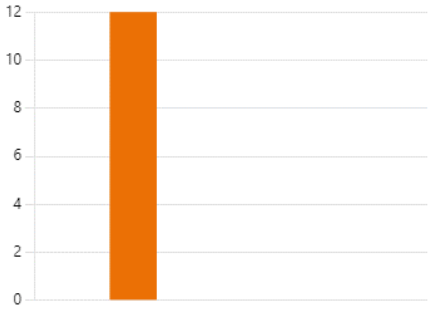


UJA

C1 – 0
C2 – 12
C3 – 0
C4 – 0
C5 – 0
C6 – 0

Total = 12

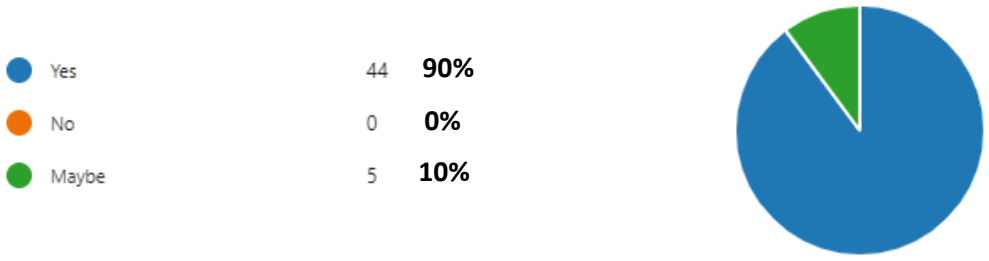




Question 3: Do you know the learning outcomes of the course?

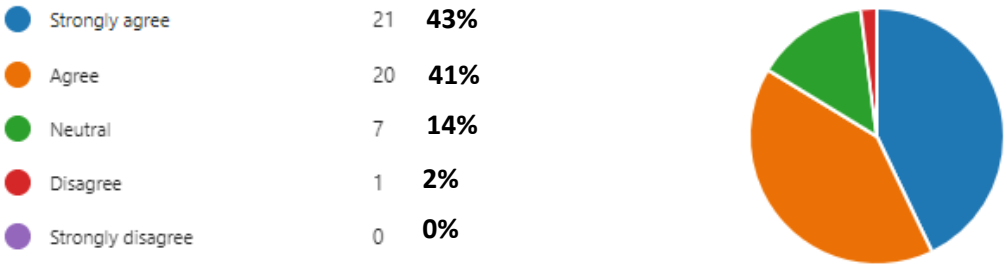
For this question, 90% of students answered “Yes”, 0% answered “No” and 10% answered “Maybe”. Although 90% of the students know the learning outcomes of the course, some of them are not sure what these are.

Learning outcomes of the course/lecture are very important because are student-centered measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course/lecture.



Question 4: Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

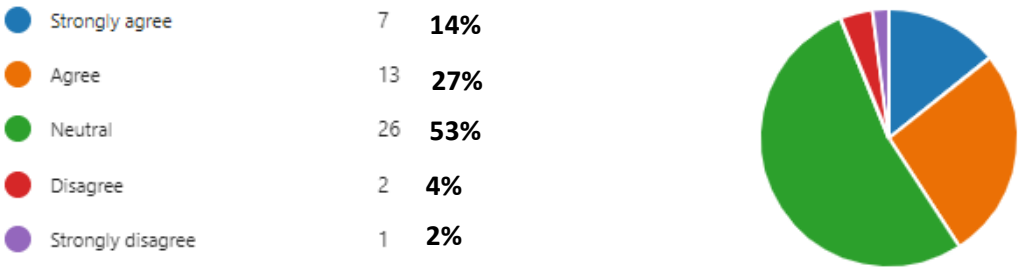
As can be seen from the chart below, 84% of the participants agreed that the course promotes soft skills. However, 16% have a different opinion and their answer suggests that improvements can be made in this direction.



Question 5: Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Only 41% of the students agreed that green skills are present in the course while 59% disagree with this fact. These numbers show that there is a lack of information among the students regarding the impact on the environment based on their decisions in the development and life span of a certain engineering products.

Improvements in this area are necessary for sure. The approaches proposed in NextGEng project aim to increase student's green skills.



Question 6: The course content was appropriately challenging (not too hard but not too easy).

Almost 86% of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that usually the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students.

Strongly agree	25	**51%**
Agree	17	**35%**
Neutral	5	**10%**
Disagree	2	**4%**
Strongly disagree	0	**0%**

Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 90% of the students appreciated positively that the instruction materials provided by their teachers increased their knowledge and skills in the subject matter. Less than 10% of the responses suggest that these materials can be improved.

Strongly agree	26	**53%**
Agree	19	**39%**
Neutral	1	**2%**
Disagree	2	**4%**
Strongly disagree	1	**2%**

Question 8: The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Almost 92% of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS provided by HEI. This means that most of the materials are compatible with digital teaching and learning technologies.

Strongly agree	38	**78%**
Agree	7	**14%**
Neutral	3	**6%**
Disagree	1	**2%**
Strongly disagree	0	**0%**

Question 9: Have you had international visiting professors at the course?

Only 12% of the students answered "Yes" to this question. This is a clear indicator that international visiting teachers on the courses are exceptions rather than the rule. These types of interactions between students and international teachers are beneficial and important because in this way, the students can see different approaches that are used in other HEIs.

Yes	6	**88%**
No	43	**12%**

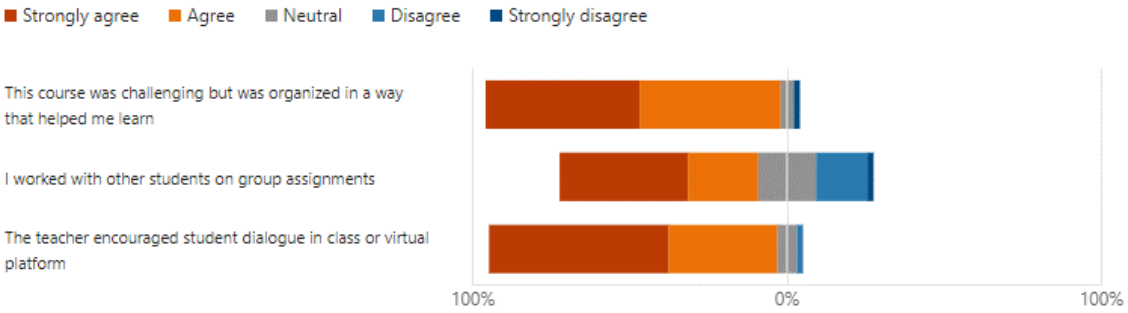
Question 10: Was the learning material in a domestic or foreign language or both?

In this case 53% percent of students agreed that the learning materials were given in domestic language. However, 39% percent of students had their materials both in domestic and foreign language. This suggests that many courses are already prepared to be taught also in a foreign language and students can develop/improve their communication skills too.

Domestic	26	**53%**
Foreign	4	**8%**
Both	19	**39%**

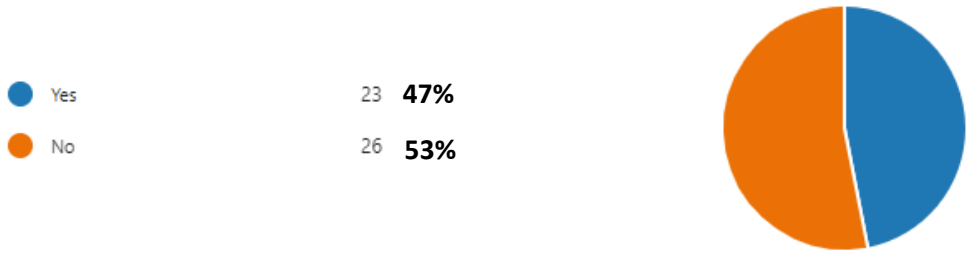
Question 11: To what extent do you agree with the following statements?

Student-Centered Approach in educational process is very important for students. In this way, abilities such as teamwork, understanding problems, thinking critically, and decision-making can be developed. Analyzing the answers to this question, approximately 80% of the students consider that student-centered approaches are promoted at the course. However, 20% of students consider that there is a lack of such things.



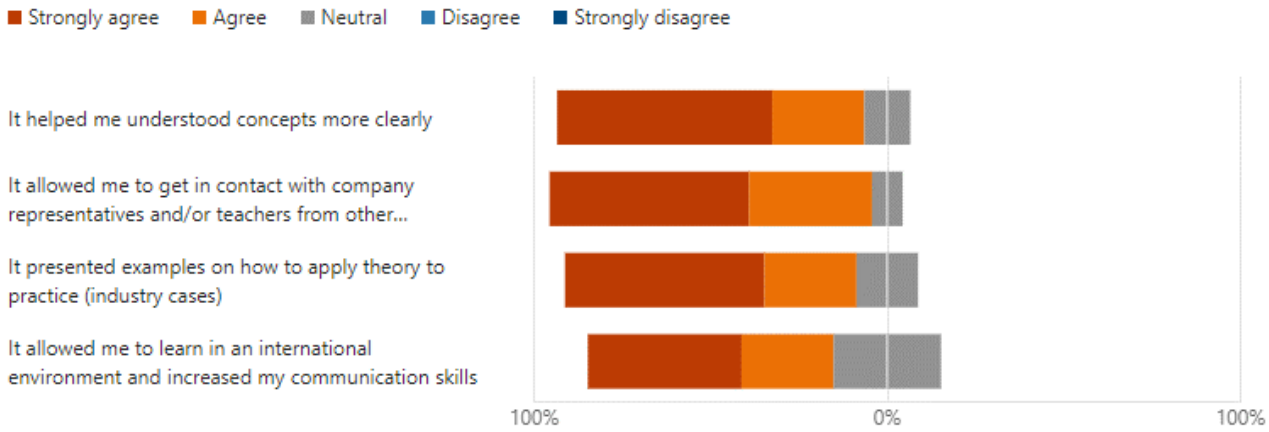
Question 12: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Almost 53% of students answered “No” to this question. This is an area where major improvements can be made and one objective of NextGEng project is to shift educational process to a student centered-learning approach and applying specific teaching methods and develop content that put students at the center of learning process and at the same time stimulate experiential learning through case studies and experiments developed in collaboration with industry.



Question 13: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The other 45% of students that responded with “Yes” at Question 12 were asked to give a degree of satisfaction to the following 4 statements presented below. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



Question 14: Did you find useful to participate in learning activities with different teaching styles and strategies?

The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

Strongly agree	14	78%
Agree	8	14%
Neutral	0	6%
Disagree	1	2%
Strongly disagree	0	0%

Question 15: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Like in Question 12, the ratio of 50% to 50% is preserved here too. That means that the bond between companies and HEIs must be strengthened further to deliver more practical and real-life case scenarios to the students.

Strongly agree	13	27%
Agree	13	27%
Neutral	9	18%
Disagree	11	22%
Strongly disagree	3	6%

Question 16: The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.

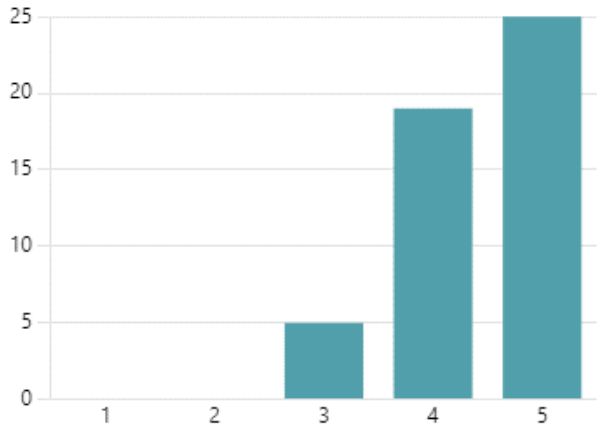
Approximately 90% of the students consider that the theoretical aspects presented by the teachers are closely related to practical applications. Another 10% of them have a neutral position or disagree. Although the percentage is lower compared with the one from Question 12, it accentuates even further the need of experiential learning through study cases and experiments developed in collaboration with industry.

Strongly agree	18	37%
Agree	27	55%
Neutral	2	4%
Disagree	2	4%
Strongly disagree	0	0%

Question 17: Rate your overall experience at the course considering the following aspects:

- ***learning outcomes***
- ***course content and quality of the teaching materials***
- ***internationalization***
- ***teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). **An average rating of 4.41 was obtained**. This means that the degree of satisfaction is quite good but there is also room for improvement. The directions where these improvements can be made are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.



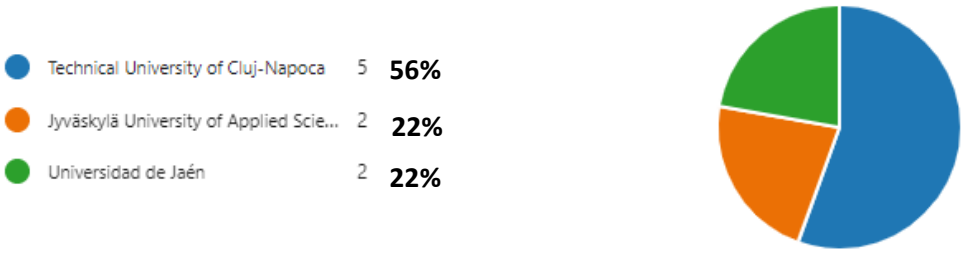
2.2 Survey for teachers (spring semester 2023)

A total of 9 teachers responded to this survey with an average time to complete of 18:31 minutes. The responses represent an image of the current teaching situation from the perspective of teachers at the selected joint courses held in spring semester 2023.

9	18:31	Active
Responses	Average time to complete	Status

Question 1: Please select your HEI.

Of the total number of teachers, 56% answered Technical University of Cluj-Napoca (TUCN), 22% answered Jyväskylä University of Applied Sciences (JAMK) and 22% answered Universidad de Jaén (UJA)



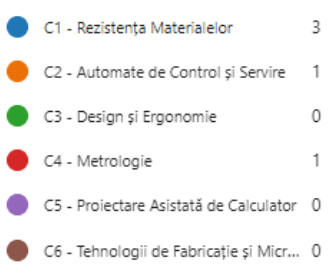
Question 2: For what course do you take the survey?

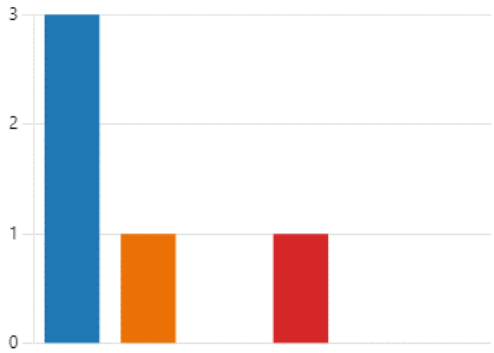
The figures below present the number of feedbacks gathered for every joint course in each HEI (TUCN, JAMK UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 3
C2 – 1
C3 – 0
C4 – 1
C5 – 1
C6 – 0

Total = 5

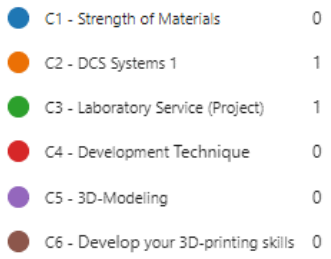




JAMK

C1 – 0
C2 – 1
C3 – 1
C4 – 0
C5 – 0
C6 – 0

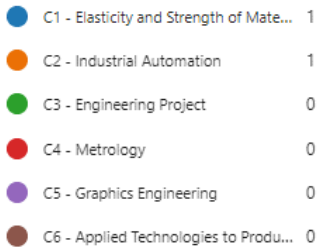
Total = 2



UJA

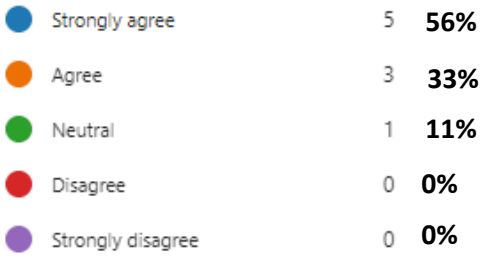
C1 – 1
C2 – 1
C3 – 0
C4 – 0
C5 – 0
C6 – 0

Total = 2



Question 3: The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

According to the responses, 89% of the teachers agree that the course promotes soft skills. The percentage is very similar to the one gathered from the survey that was sent to the students.



Question 4: The course content integrates eco-friendly concepts (green skills)?

Only 44% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). This agrees with the 41% of the students that responded that green skills are present on the courses. Although eco-friendly concepts are integrated in some courses by teachers, the students have problems assimilating them.

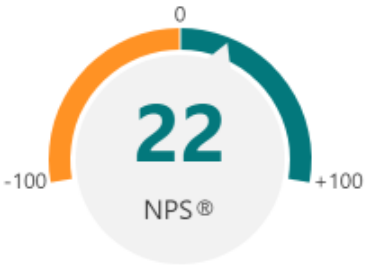
The approaches proposed in NextGEng project aim to increase student's green skills (impact on the environment based on their decisions in the development and life span of a certain engineering product).

Strongly agree	2	22%
Agree	2	22%
Neutral	3	33%
Disagree	1	11%
Strongly disagree	1	11%

Question 5: To what extent the course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

There are few situations where the teaching materials are not compatible with digital learning technologies which is also in agreement with the responses provided by students.

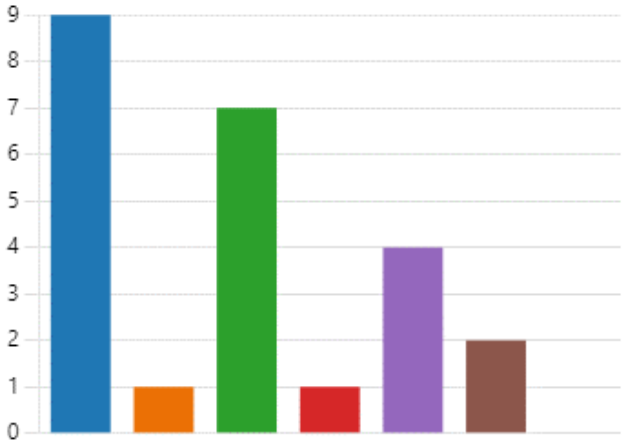
Promoters	4	45%
Passives	3	33%
Detractors	2	22%



Question 6: Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

The responses provided to this question highlight that teachers are familiar with modern teaching methods such as: problems-based learning, project-based learning, and cooperative-learning. NextGEng aims also to improve cooperative teaching/learning between the teachers involved in the project.

Problem-based learning	9
Flipped classroom	1
Project-based learning	7
Inquiry-based learning	1
Cooperative learning	4
Game-based learning	2
I never heard about these methods	0



Question 7: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Cooperative teaching/learning offers the premises to increase/improve the quality of the educational process. As can be seen, only 22% of the teachers have collaborations with other teachers or experts from companies when doing teaching activities. Through NextGEng project it is expected to improve this percentage.

Yes	2	**22%**
No	7	**78%**

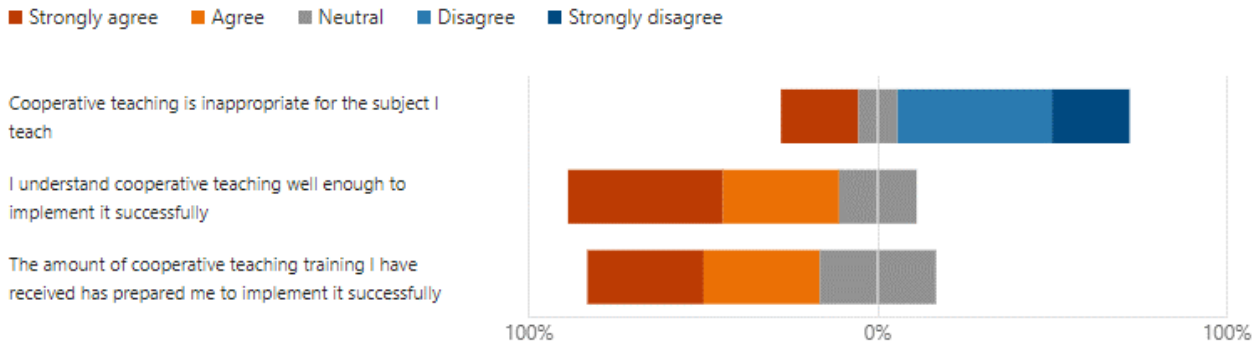
Question 8: Did you find it useful in the context of your course?

Teachers who responded with "Yes" at Question 7 also agreed that cooperative/teaching learning is useful in the context of their course.

Strongly agree	2	**100%**
Agree	0	**0%**
Neutral	0	**0%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 9: To what extent do you agree with the following statements?

Regarding the level of understanding of cooperative teaching through practice or training, 70% of the teachers consider that they can manage such types of activities. However, there's still 30% of them who are in total disagreement with this and consider that additional training and practice is necessary for them.



Question 10: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Here, 33% of the teachers confirmed that they have activities in collaboration with industry companies. The result is in accordance with the one provided by students, meaning that things can be improved in this area.

Strongly agree	2	**22%**
Agree	1	**11%**
Neutral	3	**33%**
Disagree	2	**22%**
Strongly disagree	1	**11%**

Question 11: The theoretical aspects of the course are closely related to industry practical applications?

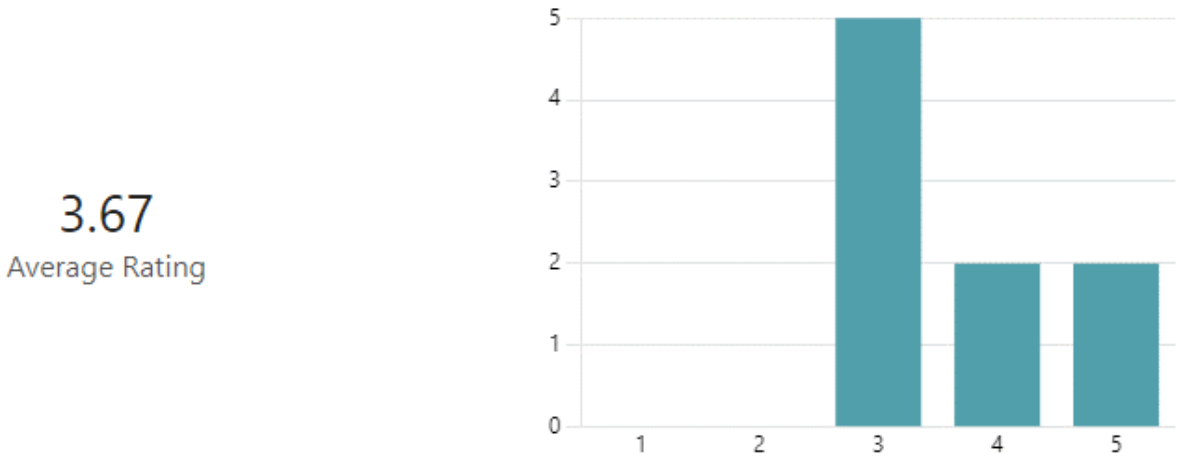
Although many of the laboratory activities lack collaboration with companies, the examples presented at the course lectures are related to practical applications. This can be seen from the results, as almost 90% of the teachers agreed with this affirmation.

Strongly agree	3	**33%**
Agree	5	**56%**
Neutral	1	**11%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 12: Rate your overall experience at the course considering the following aspects:

- ***promotion of eco-friendly concepts and soft skills***
- ***compatibility of course materials with digital teaching and learning***
- ***cooperative teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). **An average rating of 3.67 was obtained**. This means that the degree of satisfaction is not bad but there is also room for improvement. The directions where these improvements can be made are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.



3. Conclusion and further improvements

Based on the analysis performed in Chapter 2, the following conclusion and further improvements directions are presented:

1) There is a small percentage of students that are not sure what are the **learning outcomes** of the course they attend. Learning outcomes are very important because are measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course. When developing the modules in NextGEng, the teachers involved in WP3 activities will take into consideration this aspect.

2) Almost 60% of the students disagree with the fact that **green skills** are present on the course. The percentage shows that there is a lack of information among the students regarding the impact on the environment based on their decisions in the development and life span of a certain engineering product. On the other hand, 44% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). This means that although eco-friendly concepts are integrated in some courses,

students have problems identifying them. When developing the modules for the joint courses we will consider the best way to deliver this type of information to increase students' green skills.

3) The answers given by students demonstrate that **international visiting teachers** or **experts from companies** at the courses or laboratory activities are exceptions rather than the rule. This is an area where major improvements can be made and one objective of NextGEng project is to shift educational process to a student centered-learning approach and applying specific teaching methods and develop content that put students at the center of learning process and at the same time stimulate experiential learning through case studies and experiments developed in collaboration with industry.

4) The comments/suggestions provided by students suggest that improvements can be made in the following areas: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.

   Below are presented some of the students and teacher comments/suggestions:

   Students:

   - *"Would be nice to have someone, maybe from Valmet to come and show some of the projects that they have done."*
   - *"I think, for the next course, a better integration and internationalization will be appreciated, because we don't have any activities with a foreign teacher, for example."*
   - *"Carry out more projects and practices during the course as they help to understand the theoretical content."*
   - *"Foreign teachers can join the classes."*
   - *"Rethinking the structure of the courses we have at our disposal, to be more friendly for students, to understand some notions more easily."*

   Teachers:

   - *"Promotion of the eco-friendly concept in the team-teaching activity."*
   - *"Cooperative teaching, sharing resources and upgrading contents will improve the course. Cooperative teaching in other countries will be an enriching experience."*
   - *"I am looking forward to the first implementation of the co-teaching activity and the feedback from the students. I am also glad companies are contributing with real-life case-studies on the course topics."*

5) The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). **An average rating of 4.41 was given by students and 3.67 by teachers**. The results indicate that the degree of satisfaction is not bad but there is also room for improvement.

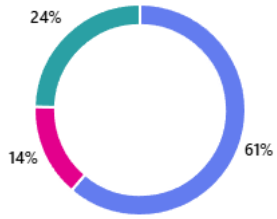
Responses Overview

Active

Responses	Average Time	Duration
49	08:37	885 Days

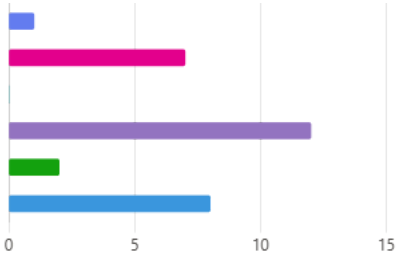
1. Please select your HEI.

Technical University of Cluj-Napoca	30
Jyväskylä University of Applied Sciences	7
Universidad de Jaén	12



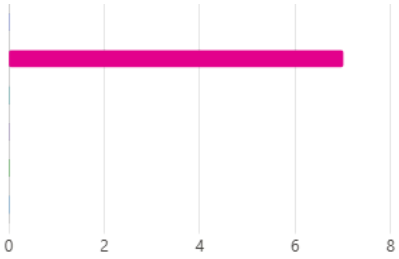
2. For what course do you take the survey?

C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	7
C3 - Design și Ergonomie	0
C4 - Metrologie	12
C5 - Proiectare Asistată de Calculator	2
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	8



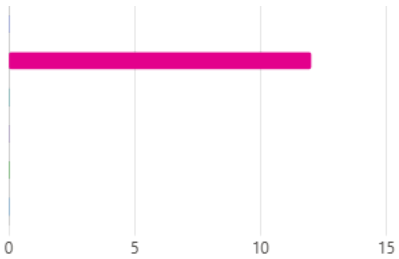
3. For what course do you take the survey?

C1 - Strength of Materials	0
C2 - DCS Systems 1	7
C3 - Laboratory Service (Project)	0
C4 - Development Technique	0
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0



4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	12
C3 - Engineering Project	0
C4 - Metrology	0
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0

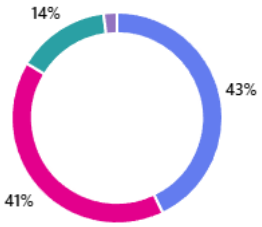


5. Do you know the learning outcomes of the course?

Yes	44
No	0
Maybe	5

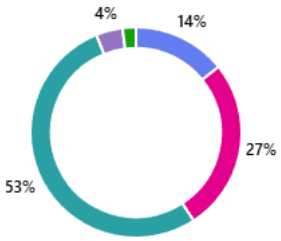
6. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	21
Agree	20
Neutral	7
Disagree	1
Strongly disagree	0



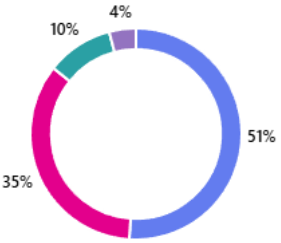
7. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environ ment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	7
Agree	13
Neutral	26
Disagree	2
Strongly disagree	1



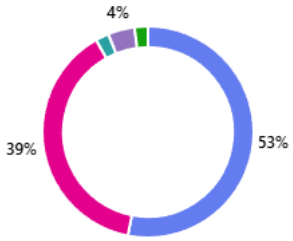
8. The course content was appropriately challenging (not too hard but not too easy).

Strongly agree	25
Agree	17
Neutral	5
Disagree	2
Strongly disagree	0



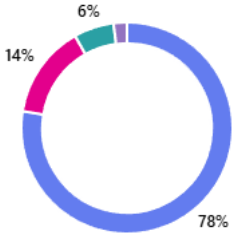
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	26
Agree	19
Neutral	1
Disagree	2
Strongly disagree	1



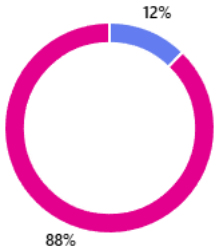
10. The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Strongly agree	38
Agree	7
Neutral	3
Disagree	1
Strongly disagree	0



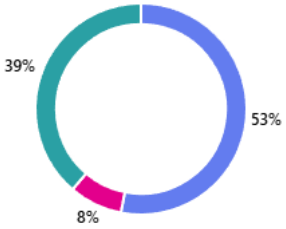
11. Have you had international visiting professors at the course?

Yes	6
No	43



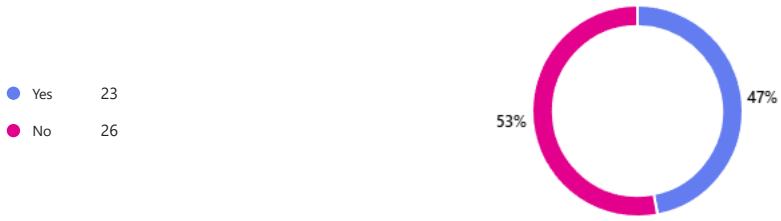
12. Was the learning material in a domestic or foreign language or both?

Domestic	26
Foreign	4
Both	19

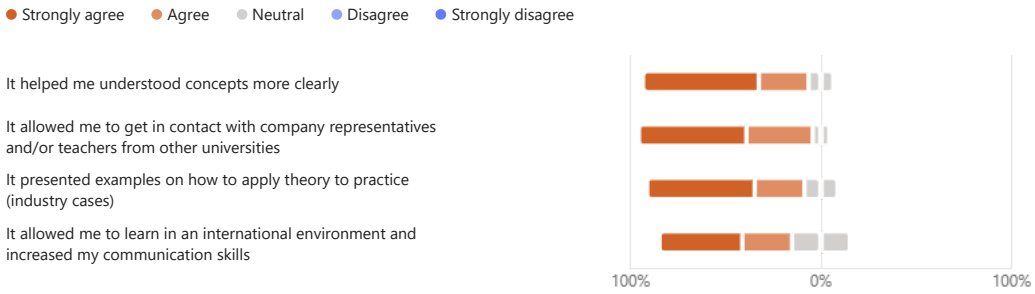


13. To what extent do you agree with the following statements?

14. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?



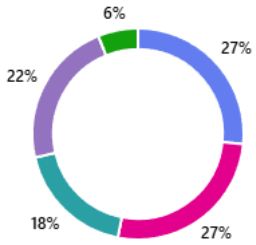
15. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



16. Did you find useful to participate in learning activities with different teaching styles and strategies?

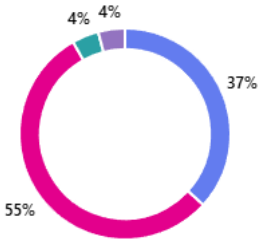
17. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	13
Agree	13
Neutral	9
Disagree	11
Strongly disagree	3



18. The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life pro blems.

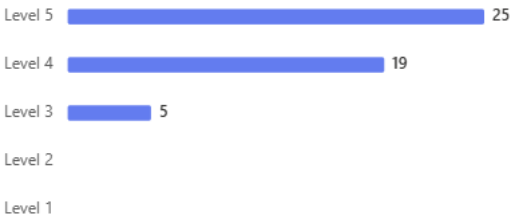
Strongly agree	18
Agree	27
Neutral	2
Disagree	2
Strongly disagree	0



19. Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course
- interaction with industry

4.41
Average Rating



20. Do you have any comments/suggestions to further improve the team-teaching activity?

47
Responses

Latest Responses
"NO"
"No"
"I don't have"
• • •

2 respondents (4%) answered pentru for this question. Update

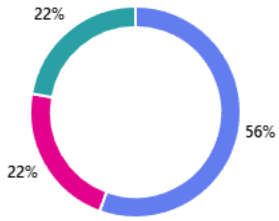
Responses Overview

Active

Responses	Average Time	Duration
9	18:31	885 Days

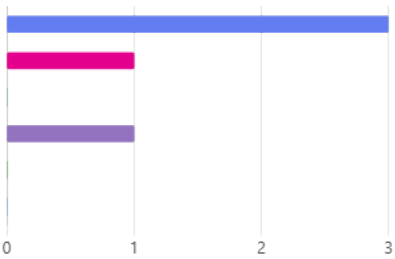
1. Please select your HEI.

Technical University of Cluj-Napoca	5
Jyväskylä University of Applied Sciences	2
Universidad de Jaén	2



2. For what course do you take the survey?

C1 - Rezistența Materialelor	3
C2 - Automate de Control și Servire	1
C3 - Design și Ergonomie	0
C4 - Metrologie	1
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



3. For what course do you take the survey?

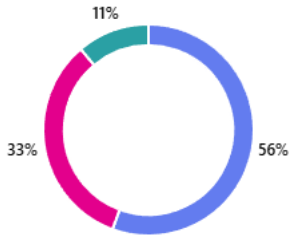
C1 - Strength of Materials	0
C2 - DCS Systems 1	1
C3 - Laboratory Service (Project)	1
C4 - Development Technique	0
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0

4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	1
C2 - Industrial Automation	1
C3 - Engineering Project	0
C4 - Metrology	0
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0

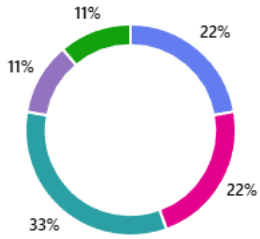
5. The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	5
Agree	3
Neutral	1
Disagree	0
Strongly disagree	0



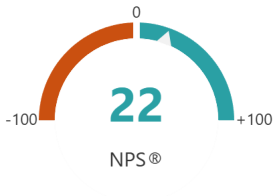
6. The course content integrates eco-friendly concepts (green skills)?

Strongly agree	2
Agree	2
Neutral	3
Disagree	1
Strongly disagree	1



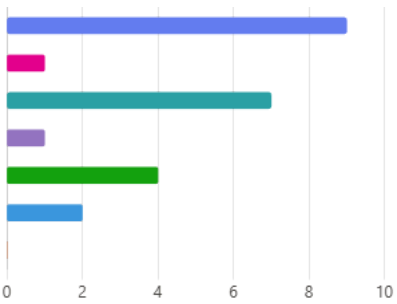
7. To what extent the course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

Promoters	4
Passives	3
Detractors	2



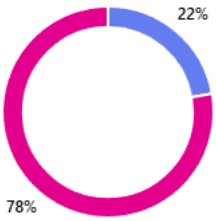
8. Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

Problem-based learning	9
Flipped classroom	1
Project-based learning	7
Inquiry-based learning	1
Cooperative learning	4
Game-based learning	2
I never heard about these methods	0



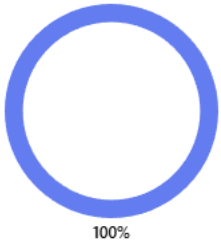
9. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Yes	2
No	7

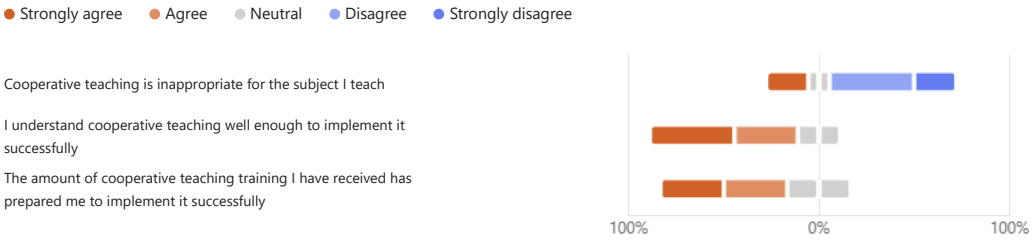


10. Did you find it useful in the context of your course?

Strongly agree	2
Agree	0
Neutral	0
Disagree	0
Strongly disagree	0

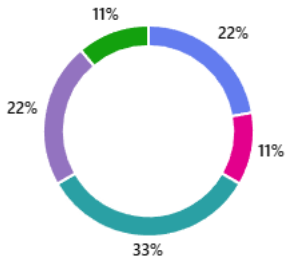


11. To what extent do you agree with the following statements?



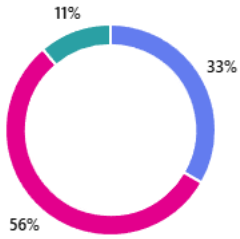
12. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	2
Agree	1
Neutral	3
Disagree	2
Strongly disagree	1



13. The theoretical aspects of the course are closely related to industry practical applications?

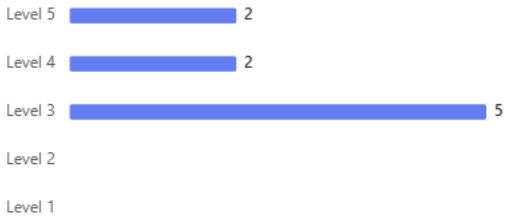
Strongly agree	3
Agree	5
Neutral	1
Disagree	0
Strongly disagree	0



14. Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

3.67
Average Rating



15. Do you have any comments/suggestions to further improve the team-teaching activity?

9
Responses

Latest Responses

"Promotion of the eco-friendly concept in the team-teaching activity"

"No"

"-"

• • •

Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9d

Analysis of the cooperative teaching implementation autumn semester 2023

April 2024

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA
jamk
Universidad de Jaén
iSR www.isr.es
Valmet
BOSCH Invented for life

WP3.9	R3.9d Report - Analysis of the cooperative teaching implementation autumn semester 2023
Authors	Ciprian Rad
Short Description	The report analyzes feedback from teachers and students collected in the first implementation round of the team-teaching pilot program for the targeted courses (C1…C4) of the NextGEng project during the autumn semester of 2023.
Status	Final
Distribution level	Public
Date of delivery	30/04/2024
Contributions by:	Ciprian Lapusan, Rubén Dorado Vicente
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	29.04.2024	Ciprian Rad	First Draft
0.2	30.04.2024	Ciprian Lapusan	Draft amendments
0.3	30.04.2024	Rubén Dorado Vicente	Draft amendments
Final	30.04.2024	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The qualitative evaluation of the implementation of the WP3 team-teaching pilot program is performed in Activity A3.9. In this process information on the learning process and feedback is collected from target groups in three project implementation phases.

The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are used in the international team-teaching pilot program for the selected 6 joint courses: C1 – Strength of Materials, C2 – Industrial Automation, C3 – Design Projects, C4 – Quality Assurance and Applied Methods, C5 – Computer Aided Design and C6 – Manufacturing Technology. The joint courses are taught to students from the second, third and fourth year from the following specializations: Mechatronics (TUCN), Mechanical Engineering (TUCN, JAMK and UJA), Electrical and Automation Engineering (UJA), Industrial Economic Engineering (UTCN), Electrical Engineering, Electronic and Automation Engineering (UJA). Teachers are experts in their field of activity and have taught the selected courses for several years in their university. Each of the company partners nominated the experts based on their qualification and activity carried out in the company which is related to the selected courses.

In the first implementation phase feedback was collected from the target groups (students and teachers) before implementing the team-teaching pilot program (TTPP) to obtain the *control results*. This data is used to compare the results that are collected after the first and second implementation rounds of the team-teaching learning process. The data collection was already performed during the two exam sessions in each HEI (autumn semester 2022 and spring semester 2023) and the results are documented in reports R3.9b and R3.9c. In the second implementation phase, feedback is collected from target groups participating in the first and second round of TTPP. The first implementation round of TTPP covers the academic year 2023-2024 in all HEIs. The activities associated with the first round are A3.2 (UTCN – host university), A3.3 (JAMK – host university) and A3.4 (UJA – host university). In these activities the HEI partners and company experts work together to deliver the new joint courses content (C1…C4) in the framework of the team-teaching pilot program to the students. An international blended learning environment is created where the teachers, company experts and students participate in face-to-face and online learning activities.

This report aims to analyze the feedback collected from the target groups (students, teachers) that participated in the courses held in autumn semester 2023 in the first implementation round of TTPP.

Questionnaires for gathering feedback from teachers and students involved in targeted courses held in autumn 2023 semester were previously developed and documented in *Report R3.9a - Plan for analyzing the quality of pilot program*. The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

The links to surveys can be found at:

- survey for the students: https://forms.office.com/e/rLSXU180eT
- survey for the teachers: https://forms.office.com/e/ZSbw5zgxEC

2. Questionnaire feedback analysis

Next are presented the results obtained for the two questionnaires. Student's responses are presented first and teacher's responses afterwards.

2.1 Survey for students (autumn semester 2023)

A total of 32 students responded to this survey with an average time to complete of 5:26 minutes. The feedback was collected from students that participated in activities (lectures and laboratories) held in autumn semester of academic year 2023-2024 in each partner HEIs. These activities were part of the first implementation round of TTPP where the new joint courses content (C1…C4) were delivered. These are intermediary results and represent just a partial view of the first implementation round of TTPP because team-teaching activities span over the entire academic year 2023-2024. The complete results after the first implementation round of TTPP will be available at the end of spring semester 2024 (Report R3.9e) when all the team-teaching activities will be completed.

32 Responses | 05:26 Average time to complete | Active Status

Question 1: Please select your HEI.

Of the total number of respondents, 28% answered Technical University of Cluj-Napoca (TUCN), 34% answered Jyväskylä University of Applied Sciences (JAMK) and 38% answered Universidad de Jaén (UJA).

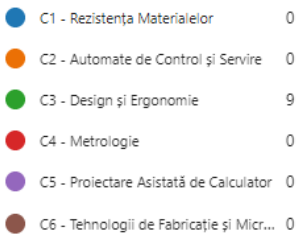
Technical University of Cluj-Napoca	9	**28%**
Jyväskylä University of Applied Scie...	11	**34%**
Universidad de Jaén	12	**38%**

Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

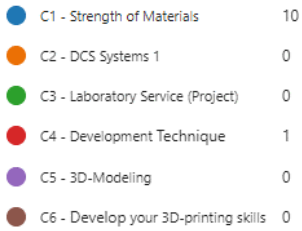
C1 – 0
C2 – 0
C3 – 9
C4 – 0
C5 – 0
C6 – 0

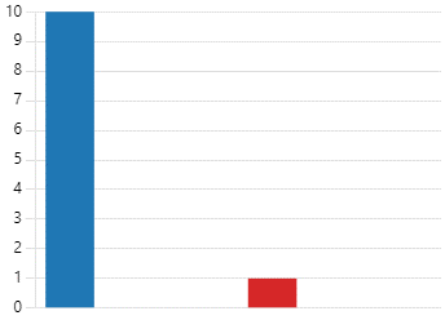


Total = 9

JAMK

C1 – 10
C2 – 0
C3 – 0
C4 – 1
C5 – 0
C6 – 0

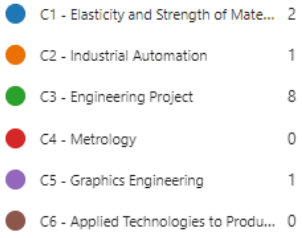


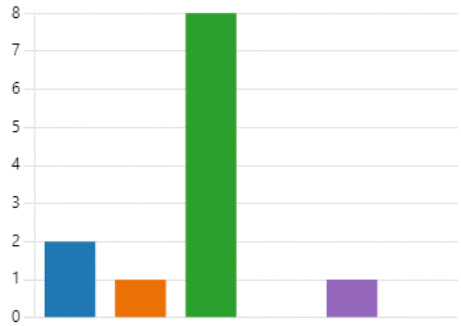


Total = 11

UJA

C1 – 2
C2 – 1
C3 – 8
C4 – 0
C5 – 1
C6 – 0





Total = 12

Question 3: Do you know the learning outcomes of the course?

For this question, 81% of students answered “Yes”, 0% answered “No” and 19% answered “Maybe”. The results indicate that most of the questioned students know the learning outcomes of the course while a few of them are not sure.

Learning outcomes of the course/lecture are very important because are student-centered measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course/lecture.

Question 4: Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

As can be seen from the chart below, 82% of the participants agreed that the course promotes soft skills. However, 18% have a different opinion and their answer suggests that improvements can be made in this direction.

Strongly agree	9	**28%**
Agree	17	**54%**
Neutral	2	**6%**
Disagree	2	**6%**
Strongly disagree	2	**6%**

Question 5: Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 65% of the students agreed that green skills are present in the course/laboratory content while 13% disagree with this fact. Almost a quarter of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 75% of positive feedback. Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.

Strongly agree	7	**21%**
Agree	14	**44%**
Neutral	7	**22%**
Disagree	3	**10%**
Strongly disagree	1	**3%**

Question 6: The course content was appropriately challenging (not too hard but not too easy).

Almost 85% of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that the teachers from each HEIs delivers the information in a balanced/appropriate manner to their students.

Strongly agree	13	40%
Agree	14	45%
Neutral	2	6%
Disagree	1	3%
Strongly disagree	2	6%

Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 85% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures and laboratories) increased their knowledge and skills in the subject matter.

Strongly agree	8	25%
Agree	20	62%
Neutral	3	10%
Disagree	1	3%
Strongly disagree	0	0%

Question 8: The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Almost 95% of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS provided by HEI. This means that most of the new created learning materials are compatible with digital teaching and learning technologies.

Strongly agree	14	44%
Agree	16	50%
Neutral	0	0%
Disagree	1	3%
Strongly disagree	1	3%

Question 9: Have you had international visiting professors at the course?

Almost 80% of the students agreed that they had international visiting teachers on the course. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (only 6% of the students answered "Yes" to this question). This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

Yes	25	**78%**
No	7	**22%**

Question 10: Was the learning material in a domestic or foreign language or both?

In this case, 57% percent of students agreed that the learning materials were given both in domestic and foreign language. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

Domestic	1	**3%**
Foreign	13	**40%**
Both	18	**57%**

Question 11: To what extent do you agree with the following statements?

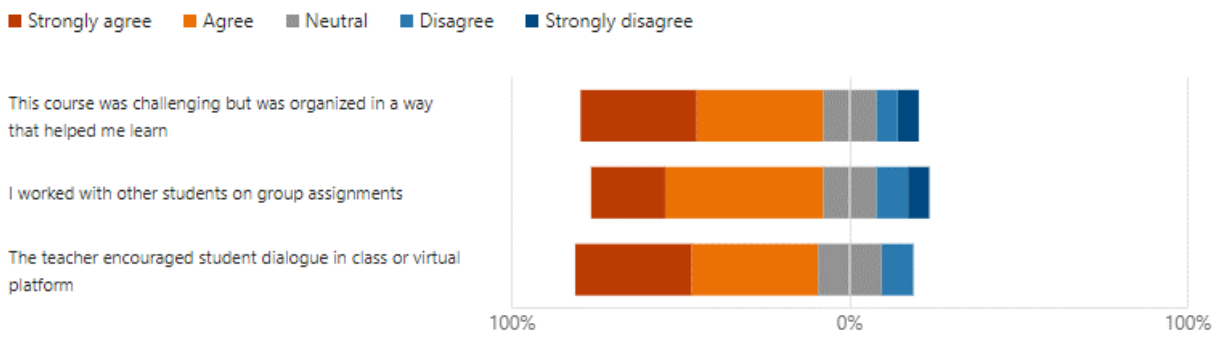
Student-Centered Approach in educational process is very important for students. In this way, abilities such as teamwork, understanding problems, thinking critically, and decision-making can be developed.

Analyzing the answers to these questions, approximately 70% of the students consider that student-centered approaches are promoted at the course. The result is a slight improvement compared with the initial one.

Students highlighted that the educational material was organized in such a way that helped them think critically. The teamwork activities for various assignments were also mentioned as a plus.

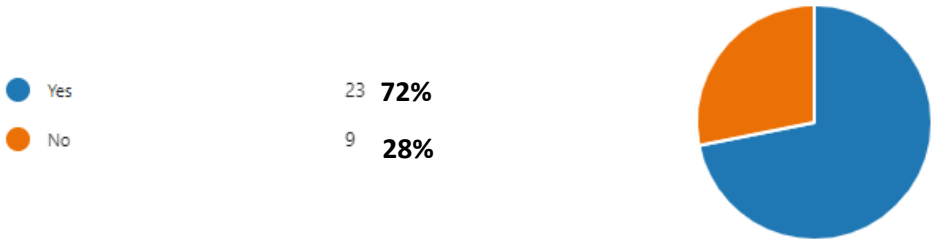
Teachers also provided for their students the necessary virtual tools/platforms to encourage the dialogue face-to-face and/or online to develop decision-making abilities.

However, 30% of students still consider that there is a lack of such things.



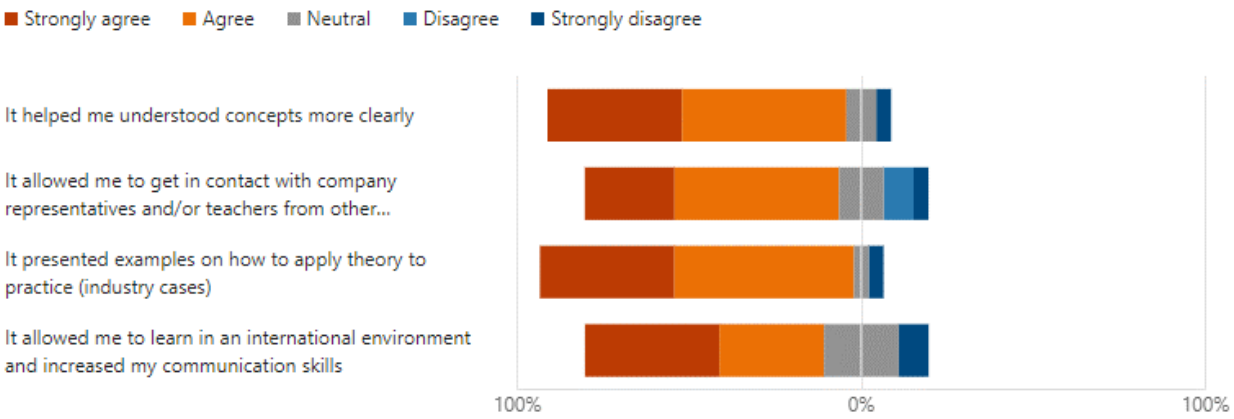
Question 12: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

At this question, 72% answered "Yes". This is a big improvement compared with the initial values obtained in autumn semester 2022 (only 10% of students answered "Yes" to this question). This is an indicator that NextGEng approaches shifts the educational process to a student centered-learning approach and at the same time stimulates experiential learning through case studies and experiments developed in collaboration with industry.



Question 13: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students that responded with "Yes" at Question 12 were asked to give a degree of satisfaction to the following 4 statements presented below. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



Question 14: Did you find useful to participate in learning activities with different teaching styles and strategies?

The same students that responded with "Yes" at Question 12 responded to this question. The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

Strongly agree	10	**43%**
Agree	10	**43%**
Neutral	2	**9%**
Disagree	0	**0%**
Strongly disagree	1	**5%**

Question 15: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

The improvements observed at Question 12 are also present in this case. Approximately 65% of the students answered that they had activities in collaboration with industry companies. This means that the connection between companies and HEIs must be strengthened further to deliver more practical and real-life case scenarios to the students.

Strongly agree	8	**25%**
Agree	9	**28%**
Neutral	9	**28%**
Disagree	2	**7%**
Strongly disagree	4	**12%**

Question 16: The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.

Almost 90% of the students consider that theoretical aspects presented by the teachers are closely related to practical applications. This is a big improvement compared with the previous results where only 65% agreed with this.

These results emphasize even further the need of experiential learning through study cases and experiments developed in collaboration with experts from industry/companies.

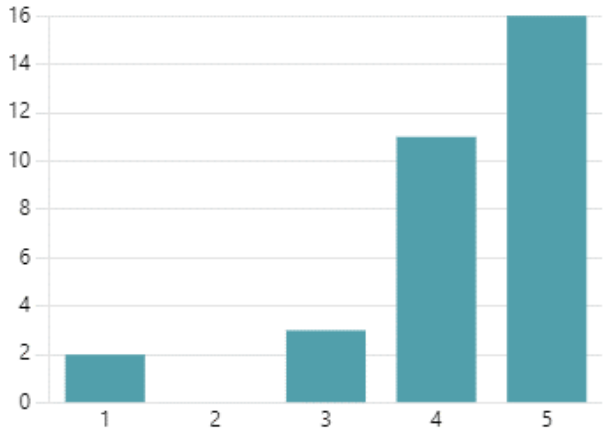
Strongly agree	6	19%
Agree	23	72%
Neutral	1	3%
Disagree	0	0%
Strongly disagree	2	6%

Question 17: Rate your overall experience at the course considering the following aspects:

- ***learning outcomes***
- ***course content and quality of the teaching materials***
- ***internationalization***
- ***teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.22 was obtained which is higher than 3.96 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng project helped the students to increase their knowledge at the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.

4.22
Average Rating



2.2 Survey for teachers (autumn semester 2023)

A total of 7 teachers responded to this survey with an average time to complete of 07:49 minutes. The feedback was collected from teachers that participated in team-teaching activities held in autumn semester of academic year 2023-2024 in each partner HEIs. These activities were part of the first implementation round of TTPP where the new joint courses content (C1…C4) were delivered.

7 Responses	07:49 Average time to complete	Active Status

Question 1: Please select your HEI.

Of the total number of respondents, 29% answered Technical University of Cluj-Napoca (TUCN), 29% answered Jyväskylä University of Applied Sciences (JAMK) and 42% answered Universidad de Jaén (UJA).

Technical University of Cluj-Napoca	2	**29%**
Jyväskylä University of Applied Scie...	2	**29%**
Universidad de Jaén	3	**42%**

Question 2: For what course do you take the survey?

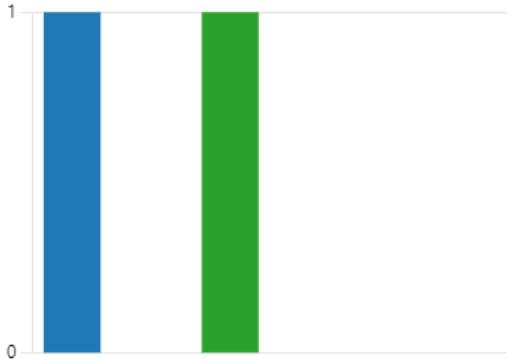
The figures below present the number of responses gathered for every joint course in each HEI (TUCN, JAMK, UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 1
C2 – 0
C3 – 1
C4 – 0
C5 – 0
C6 – 0

Total = 2

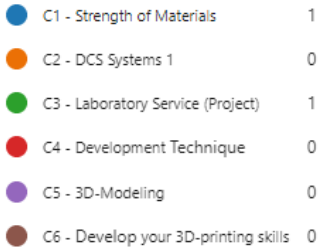
C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	1
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micr...	0

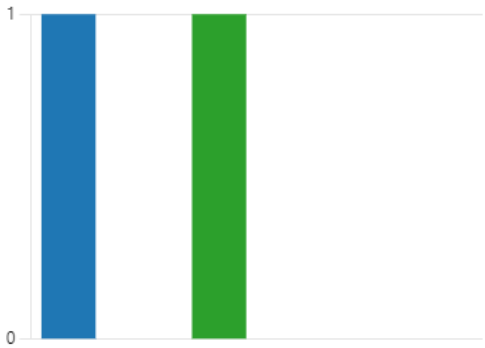


JAMK

C1 – 1
C2 – 0
C3 – 1
C4 – 0
C5 – 0
C6 – 0

Total = 2

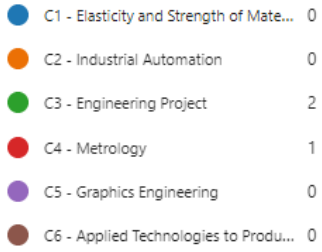


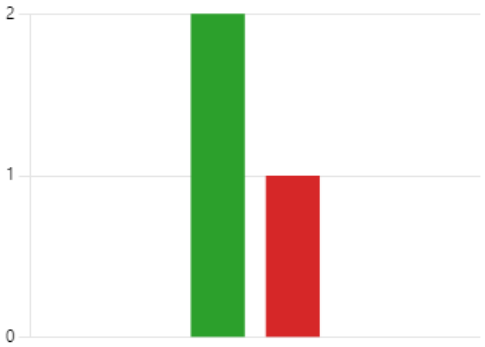


UJA

C1 – 0
C2 – 0
C3 – 2
C4 – 1
C5 – 0
C6 – 0

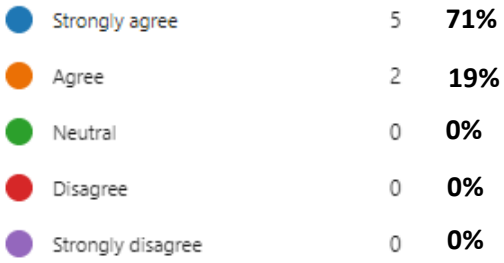
Total = 3





Question 3: The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

According to the responses, 100% of the teachers agree that the course promotes soft skills. The percentage is like the one obtained from the survey addressed to the students.



Question 4: The course content integrates eco-friendly concepts (green skills)?

Almost 80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). In the survey addressed to the students, 75% of the students agreed that green skills are present on the courses. Although eco-friendly concepts are integrated in the courses some students have problems identifying them.

The approaches proposed in NextGEng project aim to increase student's green skills (impact on the environment based on their decisions in the development and life span of a certain engineering product).

Strongly agree	3	43%
Agree	3	43%
Neutral	1	14%
Disagree	0	0%
Strongly disagree	0	0%

Question 5: The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

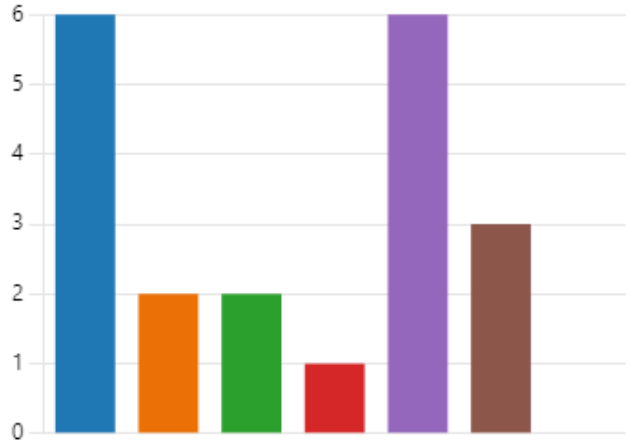
According to the teachers, all the teaching materials are compatible with digital learning technologies which is in agreement with the responses provided by students.

Strongly agree	5	71%
Agree	2	19%
Neutral	0	0%
Disagree	0	0%
Strongly disagree	0	0%

Question 6: Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

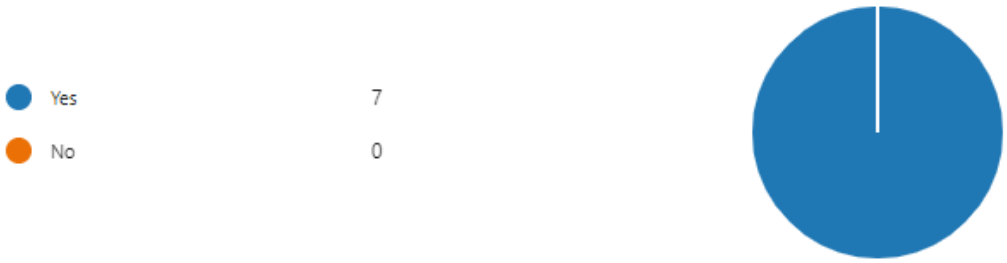
The responses provided to this question highlight that teachers are familiar with modern teaching methods such as: problems-based learning, project/game-based learning, and cooperative-learning. NextGEng aims also to improve cooperative teaching/learning between the teachers involved in the project.

Problem-based learning	6
Flipped classroom	2
Project-based learning	2
Inquiry-based learning	1
Cooperative learning	6
Game-based learning	3
I never heard about these methods	0



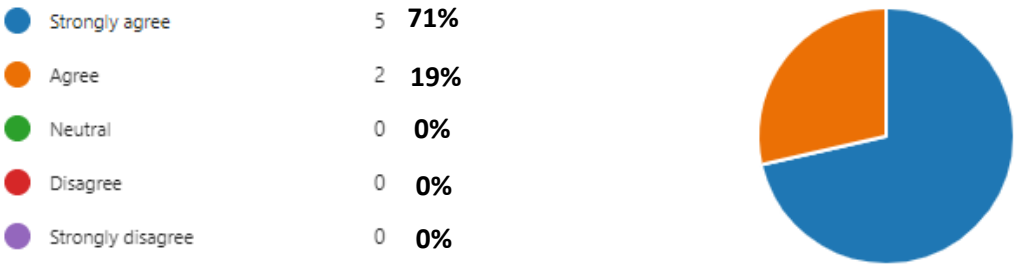
Question 7: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Cooperative teaching/learning is very important to improve the educational process. As can be seen at this level of TTPP implementation, 100% of the teachers have collaborations with other teachers or experts from companies when doing teaching activities. This is a very good result considering that only 50% of the teachers agreed with this question on the first survey (autumn semester 2022).



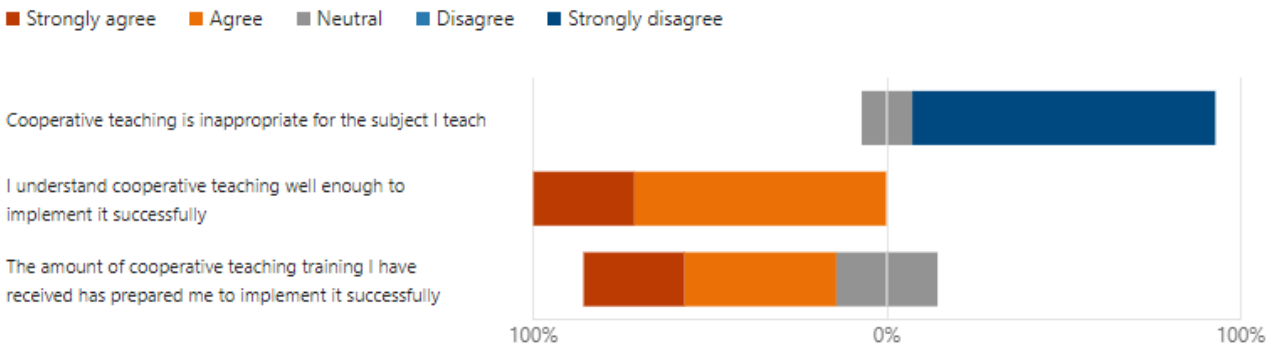
Question 8: Did you find it useful in the context of your course?

Teachers who responded with "Yes" at Question 7 also agreed that cooperative/teaching learning is useful in the context of their course.



Question 9: To what extent do you agree with the following statements?

Regarding the level of understanding of cooperative teaching through practice or training, 90% of the teachers consider that they can manage such types of activities. However, there's still some of them who consider that additional training and practice is necessary for them.



Question 10: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

The initial percentage at this question was 38%. Only a third of the teachers confirmed that they have activities in collaboration with industry companies. Compared with the current results, the situation has clearly improved. Now, we have 86% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies.

Strongly agree	4	**58%**
Agree	2	**28%**
Neutral	1	**14%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 11: The theoretical aspects of the course are closely related to industry practical applications?

The examples presented at the course lectures are related to practical applications. This can be seen from the results, as 100% of the teachers agreed with this situation. Also, here we have a slight improvement compared with the initial results.

Strongly agree	4	**58%**
Agree	3	**42%**
Neutral	0	**0%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

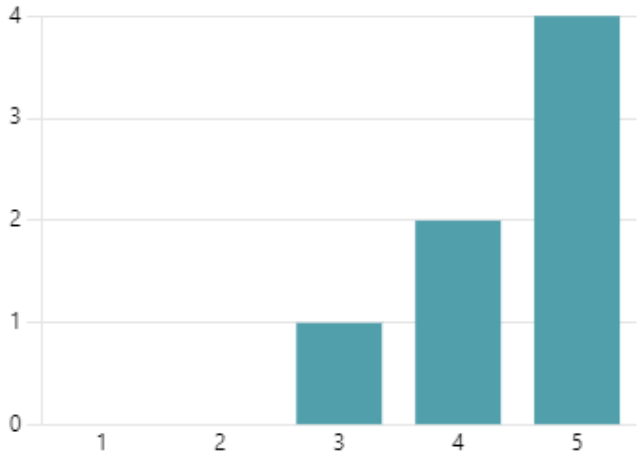
Question 12: Rate your overall experience at the course considering the following aspects:

- ***promotion of eco-friendly concepts and soft skills***
- ***compatibility of course materials with digital teaching and learning***
- ***cooperative teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.43 was obtained which is higher than 3.88 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng project helped the teachers to upgrade their teaching materials, to increase their team-teaching abilities and the collaborations with experts from industry.

4.43

Average Rating



3. Conclusion and further improvements

Based on the analysis performed in Chapter 2, at this level of TTPP implementation the following conclusion and further improvements directions are presented:

1) There is a small percentage of students that are not sure what the **learning outcomes** of the course they attend. Learning outcomes are very important because they are measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course (learning activity). **The modules were designed in such a way that learning outcomes are presented in the beginning of both team-teaching activities (lectures and laboratories). It is expected that these measures will increase the percentage in this case.**

2) The feedback obtained from the survey sent to students in **autumn/spring semester 2022/2023** highlighted the fact that almost **50% of the students considered that green skills are not present on the course**. On the other hand, **80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills).** This means that although eco-friendly concepts are integrated in some courses, students have problems identifying them. **The situation has improved since the start of TTPP and the current value of 75% suggests that the new learning materials created in the project facilitate students to understand these aspects much better.**

3) Almost **80% of the students agreed that they had international visiting teachers on the course**. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (**only 6% of the students answered "Yes" to this question**). This is a clear indicator that **NextGEng project has widened the interactions between students and international teachers**. This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

4) We now have **86% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies**. This indicator is much better after implementing TTPP because in the beginning only a **third of the teachers** confirmed that they have these types of activities.

5) The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average **rating of 4.22 was given by students** and **4.43 by teachers**. The results are higher compared with the initial ones. This indicates that the degree of satisfaction has clearly improved.

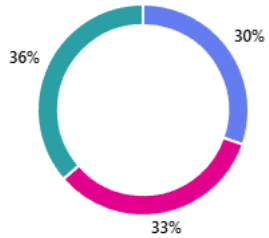
Responses Overview

Active

Responses	Average Time	Duration
33	05:22	673 Days

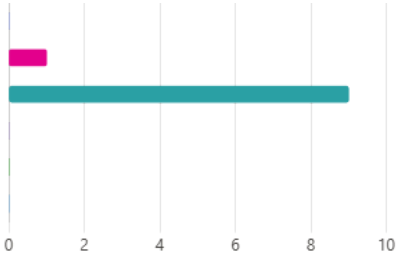
1. Please select your HEI.

Technical University of Cluj-Napoca	10
Jyväskylä University of Applied Sciences	11
Universidad de Jaén	12



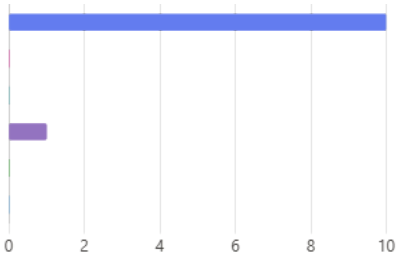
2. For what course do you take the survey?

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	1
C3 - Design și Ergonomie	9
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



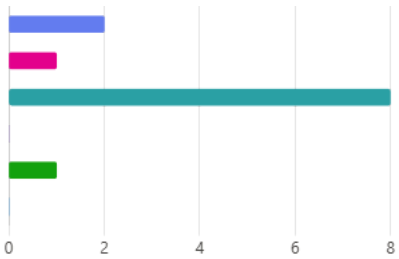
3. For what course do you take the survey?

C1 - Strength of Materials	10
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	1
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0



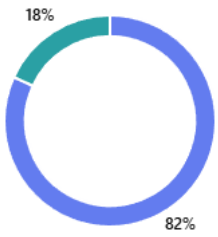
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	2
C2 - Industrial Automation	1
C3 - Engineering Project	8
C4 - Metrology	0
C5 - Graphics Engineering	1
C6 - Applied Technologies to Production	0



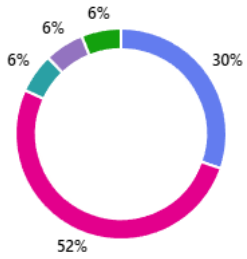
5. Do you know the learning outcomes of the course?

Yes	27
No	0
Maybe	6



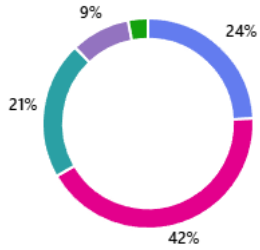
6. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	10
Agree	17
Neutral	2
Disagree	2
Strongly disagree	2



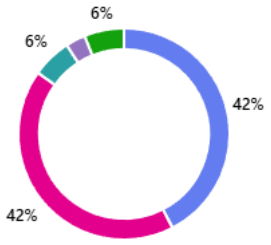
7. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environ ment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	8
Agree	14
Neutral	7
Disagree	3
Strongly disagree	1



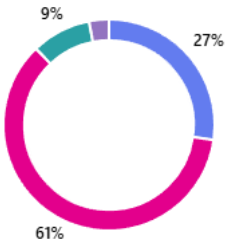
8. The course content was appropriately challenging (not too hard but not too easy).

Strongly agree	14
Agree	14
Neutral	2
Disagree	1
Strongly disagree	2



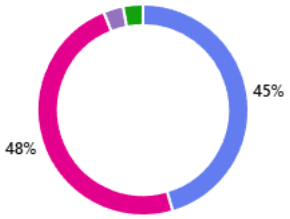
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	9
Agree	20
Neutral	3
Disagree	1
Strongly disagree	0



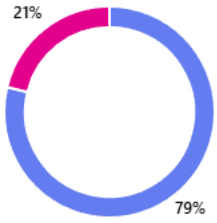
10. The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Strongly agree	15
Agree	16
Neutral	0
Disagree	1
Strongly disagree	1



11. Have you had international visiting professors at the course?

Yes	26
No	7



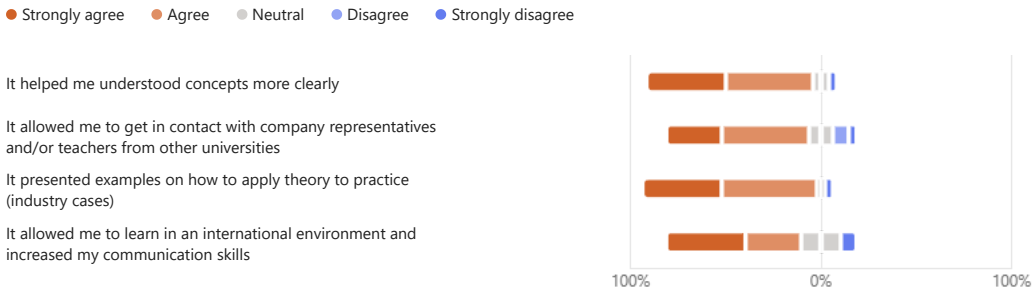
12. Was the learning material in a domestic or foreign language or both?

Domestic	1
Foreign	13
Both	19

13. To what extent do you agree with the following statements?

14. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

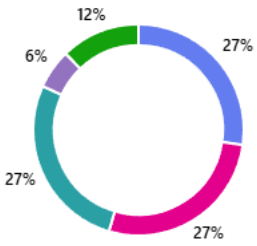
15. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



16. Did you find useful to participate in learning activities with different teaching styles and strategies?

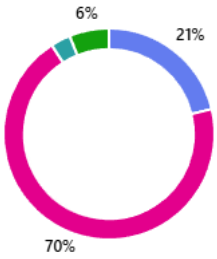
17. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	9
Agree	9
Neutral	9
Disagree	2
Strongly disagree	4



18. The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life pro blems.

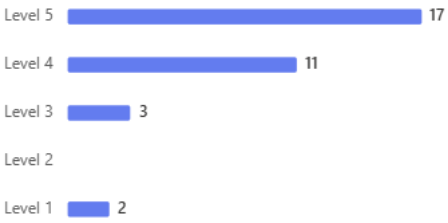
Strongly agree	7
Agree	23
Neutral	1
Disagree	0
Strongly disagree	2



19. Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course
- interaction with industry

4.24
Average Rating



20. Do you have any comments/suggestions to further improve the team-teaching activity?

31
Responses

Latest Responses
"great experience"
""
"-"
...

6 respondents (18%) answered good for this question.

Update

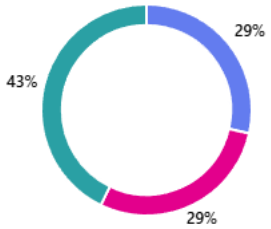
Responses Overview

Active

Responses	Average Time	Duration
7	07:49	673 Days

1. Please select your HEI.

Technical University of Cluj-Napoca	2
Jyväskylä University of Applied Sciences	2
Universidad de Jaén	3



2. For what course do you take the survey?

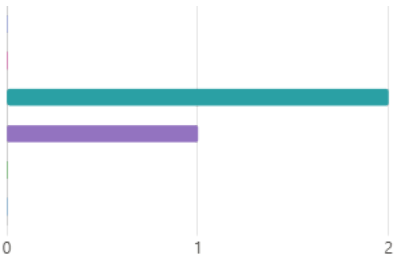
C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	1
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0

3. For what course do you take the survey?

C1 - Strength of Materials	1
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	1
C4 - Development Technique	0
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0

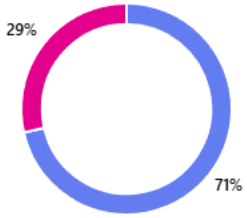
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	0
C3 - Engineering Project	2
C4 - Metrology	1
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0



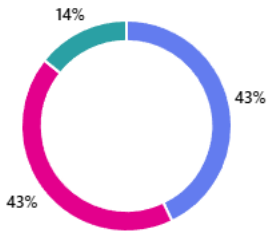
5. The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	5
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0



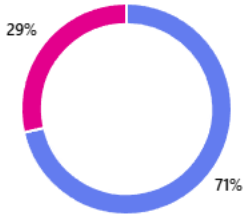
6. The course content integrates eco-friendly concepts (green skills)?

Strongly agree	3
Agree	3
Neutral	1
Disagree	0
Strongly disagree	0



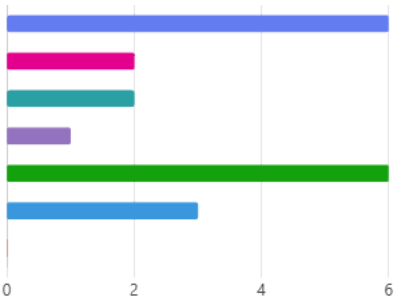
7. The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

Strongly agree	5
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0



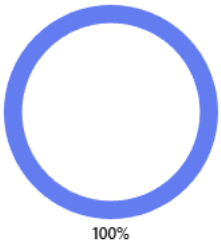
8. Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

Problem-based learning	6
Flipped classroom	2
Project-based learning	2
Inquiry-based learning	1
Cooperative learning	6
Game-based learning	3
I never heard about these methods	0



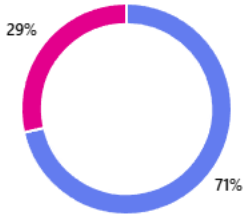
9. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Yes	7
No	0

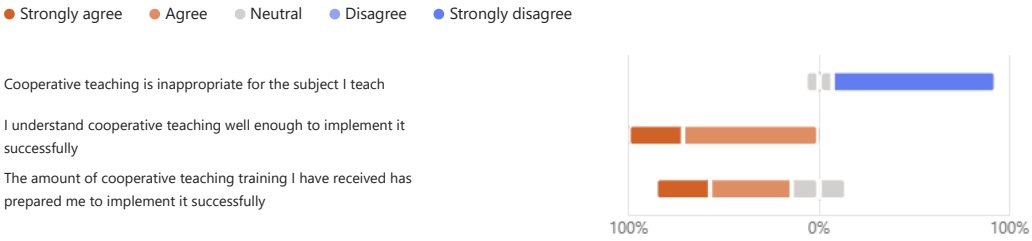


10. Did you find it useful in the context of your course?

Strongly agree	5
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0

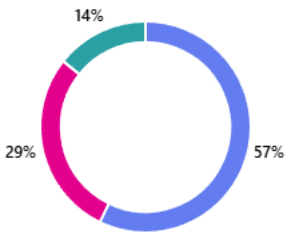


11. To what extent do you agree with the following statements?



12. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	4
Agree	2
Neutral	1
Disagree	0
Strongly disagree	0



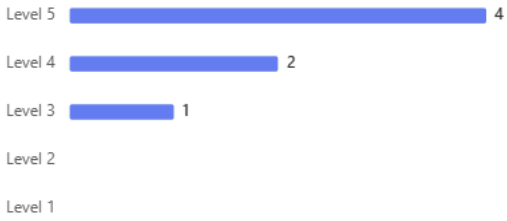
13. The theoretical aspects of the course are closely related to industry practical applications?

Strongly agree	4
Agree	3
Neutral	0
Disagree	0
Strongly disagree	0

14. Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

4.43
Average Rating



15. Do you have any comments/suggestions to further improve the team-teaching activity?

7
Responses

Latest Responses

"A possible recommendation for next year would be to coincide in the same time ... "

"Course content between different partners is not the same and this bring challen... "

"Increase the staff exchange programs and collaboration in the didactical activities"

Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9e

Analysis of the cooperative teaching implementation spring semester 2024

July 2024

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

jamk

Universidad de Jaén

iSR www.isr.es

Valmet

BOSCH Invented for life

WP3.9	R3.9e Report - Analysis of the cooperative teaching implementation spring semester 2024
Authors	Ciprian Rad
Short Description	The report analyzes feedback from teachers and students collected in the first implementation round of the team-teaching pilot program for the targeted courses (C1…C4) of the NextGEng project during the spring semester of 2024.
Status	Final
Distribution level	Public
Date of delivery	31/07/2024
Contributions by:	Ciprian Lapusan, Rubén Dorado Vicente
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	29.07.2024	Ciprian Rad	First Draft
0.2	30.07.2024	Ciprian Lapusan	Draft amendments
0.3	30.07.2024	Rubén Dorado Vicente	Draft amendments
Final	31.07.2024	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The qualitative evaluation of the implementation of the WP3 team-teaching pilot program is performed in Activity A3.9. In this process information on the learning process and feedback is collected from target groups in three project implementation phases.

The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are used in the international team-teaching pilot program for the selected 6 joint courses: C1 – Strength of Materials, C2 – Industrial Automation, C3 – Design Projects, C4 – Quality Assurance and Applied Methods, C5 – Computer Aided Design and C6 – Manufacturing Technology. The joint courses are taught to students from the second, third and fourth year from the following specializations: Mechatronics (TUCN), Mechanical Engineering (TUCN, JAMK and UJA), Electrical and Automation Engineering (UJA), Industrial Economic Engineering (UTCN), Electrical Engineering, Electronic and Automation Engineering (UJA). Teachers are experts in their field of activity and have taught the selected courses for several years in their university. Each of the company partners nominated the experts based on their qualification and activity carried out in the company which is related to the selected courses.

In the first implementation phase feedback was collected from the target groups (students and teachers) before implementing the team-teaching pilot program (TTPP) to obtain the *control results*. This data is used to compare the results that are collected after the first and second implementation rounds of the team-teaching learning process. The data collection was already performed during the two exam sessions in each HEI (autumn semester 2022 and spring semester 2023) and the results are documented in reports R3.9b and R3.9c. In the second implementation phase, feedback is collected from target groups participating in the first and second round of TTPP. The first implementation round of TTPP covers the academic year 2023-2024 in all HEIs. The activities associated with the first round are A3.2 (UTCN – host university), A3.3 (JAMK – host university) and A3.4 (UJA – host university). In these activities the HEI partners and company experts work together to deliver the new joint courses content (C1…C4) in the framework of the team-teaching pilot program to the students. An international blended learning environment is created where the teachers, company experts and students participate in face-to-face and online learning activities.

This report aims to analyze the feedback collected from the target groups (students, teachers) that participated in the courses held in spring semester 2024 in the first implementation round of TTPP.

Questionnaires for gathering feedback from teachers and students involved in targeted courses held in spring 2024 semester were previously developed and documented in *Report R3.9a - Plan for analyzing the quality of pilot program*. The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

The links to surveys can be found at:

- survey for students – laboratory activities: https://forms.office.com/e/WwPHwQCUpx
- survey for students – tailored lectures activities: https://forms.office.com/e/JK8MUeR1A6
- survey for teachers: https://forms.office.com/e/WbArkrVAAP

2. Questionnaire feedback analysis

Next are presented the results obtained for the two questionnaires. Student's responses are presented first and teacher's responses afterwards.

2.1 Survey for students (spring semester 2024)

The feedback was collected from students that participated in activities (lectures and laboratories) held in spring semester of academic year 2023-2024 in each partner HEIs. These activities were part of the first implementation round of TTPP where the new joint courses content (C1…C4) were delivered.

The questionnaire for students was split in two for this evaluation phase: one for the laboratory's activities and another one for the tailored lectured activities. We decided that this approach is more appropriate, because we had situations in autumn semester 2023 where the students that participated in the tailored lectures did not attend the laboratory activities or vice versa because of the schedule of activities implementation in each HEI. In this way, it was much easier to get the appropriate feedback from each participating student.

Survey for students – tailored lectures activities

A total of 33 students responded to the survey for tailored lectures activities with an average time to complete of 9:35 minutes.

33 Responses | 09:35 Average time to complete | Active Status

Question 1: Please select your HEI.

Of the total number of respondents, 72% answered Technical University of Cluj-Napoca (TUCN), 0% answered Jyväskylä University of Applied Sciences (JAMK) and 28% answered Universidad de Jaén (UJA).

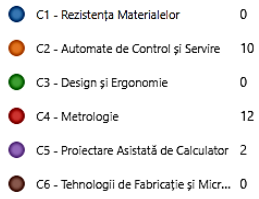
Technical University of Cluj-Napoca	24	**72%**
Jyväskylä University of Applied Scie...	0	**0%**
Universidad de Jaén	9	**28%**

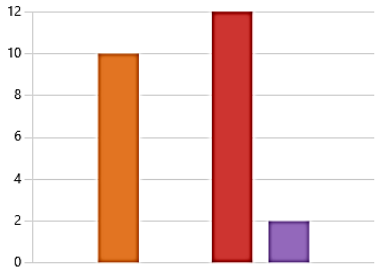
Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 0
C2 – 10
C3 – 0
C4 – 12
C5 – 2
C6 – 0

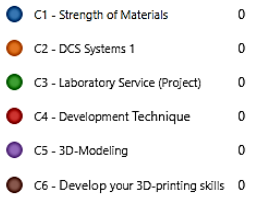




Total = 24

JAMK

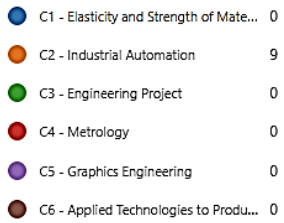
C1 – 0
C2 – 0
C3 – 0
C4 – 0
C5 – 0
C6 – 0

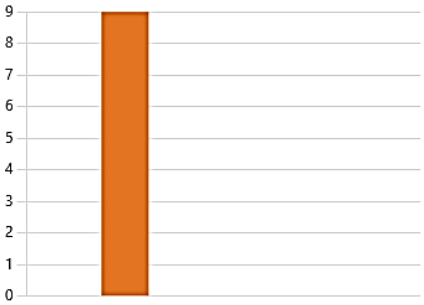


Total = 0

UJA

C1 – 0
C2 – 9
C3 – 0
C4 – 0
C5 – 0
C6 – 0





Total = 9

Question 3: Do you know the learning outcomes of the course?

For this question, 73% of students answered “Yes”, 3% answered “No” and 24% answered “Maybe”. The results indicate that most of the students questioned know the learning outcomes of the course while a few of them are not sure.

Learning outcomes of the course/lecture are very important because are student-centered measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course/lecture.

Yes	24	**73%**
No	1	**3%**
Maybe	8	**24%**

Question 4: Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

As can be seen from the chart below, 88% of the participants agreed that the course promotes soft skills. However, 12% have a different opinion and their answer suggests that improvements can be made in this direction.

Strongly agree	8	**24%**
Agree	21	**64%**
Neutral	4	**12%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 5: Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 76% of the students agreed that green skills are present in the course content. Almost a quarter of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 88% positive feedback.

Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.

Strongly agree	8	**24%**
Agree	17	**52%**
Neutral	8	**24%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 6: The course content was appropriately challenging (not too hard but not too easy).

Almost 90% of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students.

Strongly agree	14	**42%**
Agree	15	**46%**
Neutral	4	**12%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 90% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures) increased their knowledge and skills in the subject matter.

Strongly agree	10	**30%**
Agree	20	**61%**
Neutral	3	**9%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 8: The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Almost 97% of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS provided by HEI. This means that most of the newly created learning materials are compatible with digital teaching and learning technologies.

Strongly agree	18	**55%**
Agree	14	**42%**
Neutral	1	**3%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 9: Have you had international visiting professors at the course?

Almost 90% of the students agreed that they had international visiting teachers on the course. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (only 6% of the students answered “Yes” to this question).

This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

Yes	29	**88%**
No	4	**12%**

Question 10: Was the learning material in a domestic or foreign language or both?

In this case, 73% percent of students agreed that the learning materials were given both in domestic and foreign languages. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

Domestic	5	**15%**
Foreign	19	**58%**
Both	9	**27%**

Question 11: To what extent do you agree with the following statements?

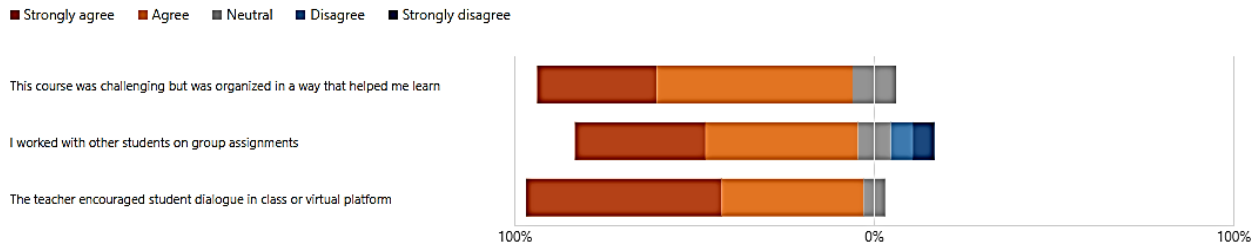
Student-Centered Approach in educational process is very important for students. In this way, abilities such as teamwork, understanding problems, thinking critically, and decision-making can be developed.

Analyzing the answers to these questions, approximately 87% of the students consider that student-centered approaches are promoted at the course. The result is an important improvement compared with the initial one.

Students highlighted that the educational material was organized in such a way that helped them think critically. The teamwork activities for various assignments were also mentioned as a plus.

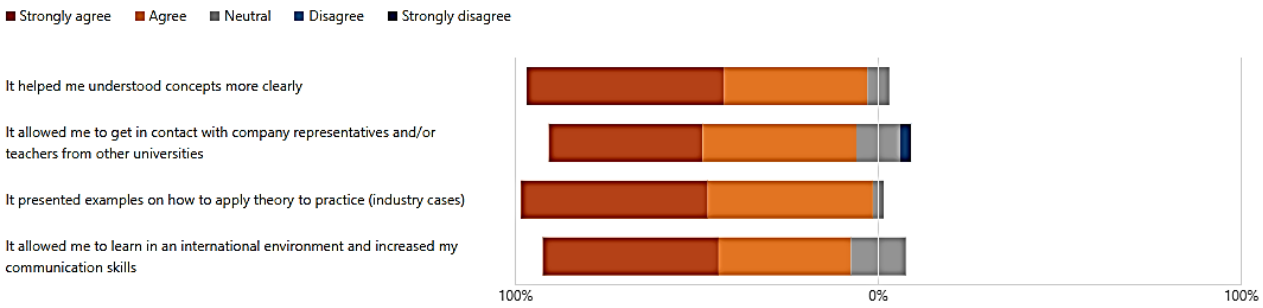
Teachers also provided for their students the necessary virtual tools/platforms to encourage the dialogue face-to-face and/or online to develop decision-making abilities.

Only 8% of students still consider that there is a lack of such things. This is a very good result.



Question 12: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students were asked to give a degree of satisfaction to the following 4 statements presented below. More than 90% of the students gave positive feedback. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



Question 13: Did you find useful to participate in learning activities with different teaching styles and strategies?

The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

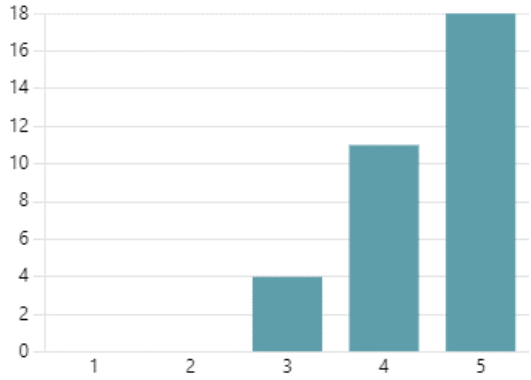
Strongly agree	18	55%
Agree	12	36%
Neutral	3	9%
Disagree	0	0%
Strongly disagree	0	0%

Question 14: Rate your overall experience at the course considering the following aspects:

- ***learning outcomes***
- ***course content and quality of the teaching materials***
- ***internationalization***
- ***teaching methods used at the course***

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.42 was obtained which is higher than 3.96 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng project helped the students to increase their knowledge at the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.

4.42
Average Rating



Survey for students – laboratory activities

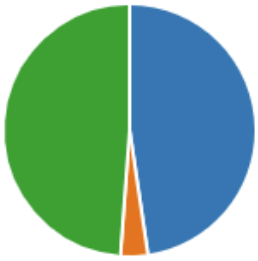
A total of 86 students responded to the survey for laboratory activities with an average time to complete of 2:15 minutes.

86 Responses | 02:15 Average time to complete | Active Status

Question 1: Please select your HEI.

Of the total number of respondents, 72% answered Technical University of Cluj-Napoca (TUCN), 0% answered Jyväskylä University of Applied Sciences (JAMK) and 28% answered Universidad de Jaén (UJA).

Technical University of Cluj-Napoca	41	**48%**
Jyväskylä University of Applied Scie...	3	**3%**
Universidad de Jaén	42	**49%**



Question 2: For what course do you take the survey?

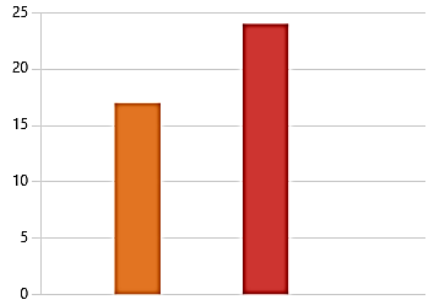
The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9.a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 0
C2 – 17
C3 – 0
C4 – 24
C5 – 0
C6 – 0

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	17
C3 - Design și Ergonomie	0
C4 - Metrologie	24
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micr...	0

Total = 41

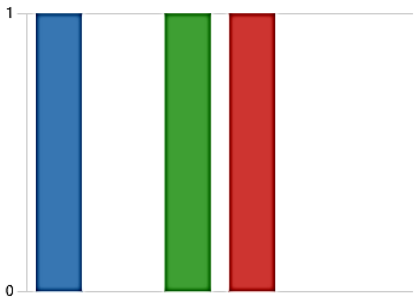


JAMK

C1 – 1
C2 – 0
C3 – 1
C4 – 1
C5 – 0
C6 – 0

C1 - Strength of Materials	1
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	1
C4 - Development Technique	1
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0

Total = 3

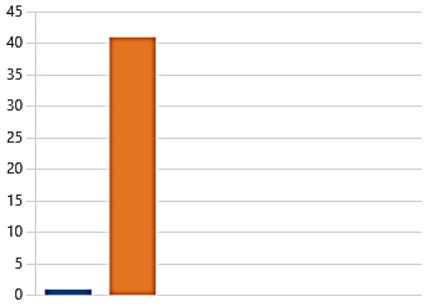


UJA

C1 – 1
C2 – 41
C3 – 0
C4 – 0
C5 – 0
C6 – 0

C1 - Elasticity and Strength of Mate...	1
C2 - Industrial Automation	41
C3 - Engineering Project	0
C4 - Metrology	0
C5 - Graphics Engineering	0
C6 - Applied Technologies to Produ...	0

Total = 42



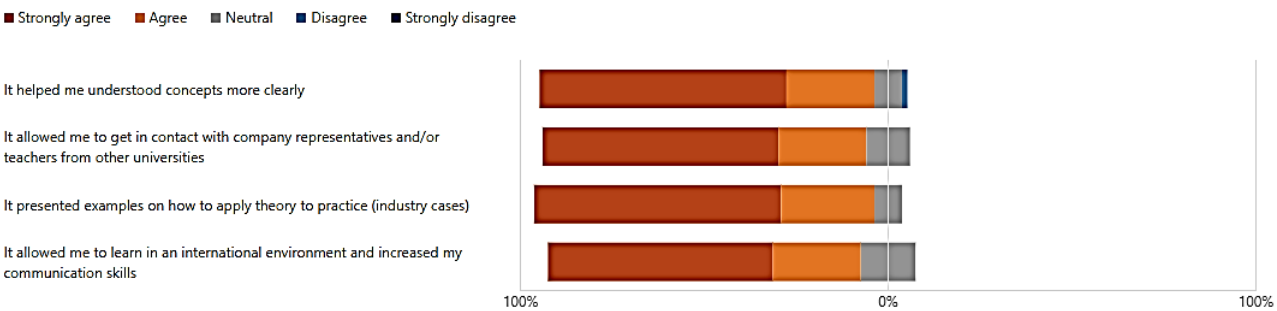
Question 3: Did you had laboratory activities in collaboration with foreign teachers and/or experts from companies?

To this question, 78% answered "Yes". This is a big improvement compared with the initial values obtained in autumn semester 2022 (only 10% of students answered "Yes" to this question). This is an indicator that NextGEng approaches shifts the educational process to a student centered-learning approach and at the same time stimulates experiential learning through case studies and experiments developed in collaboration with industry.

Yes	67	**78%**
No	19	**22%**

Question 4: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students were asked to give a degree of satisfaction to the following 4 statements presented below. More than 90% of the students gave positive feedback. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



Question 5: The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.

Almost 90% of the students consider that theoretical aspects presented by the teachers are closely related to practical applications. This is a big improvement compared with the previous results where only 65% agreed with this.

These results emphasize even further the need of experiential learning through study cases and experiments developed in collaboration with experts from industry/companies.

Strongly agree	41	**61%**
Agree	19	**28%**
Neutral	6	**9%**
Disagree	1	**1%**
Strongly disagree	0	**0%**

Question 6: Do eco-friendly concepts (green skills) were integrated in the laboratory content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 89% of the students agreed that green skills are present in the course content. Almost 10% of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 94% positive feedback.

Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.

Strongly agree	35	**52%**
Agree	25	**37%**
Neutral	7	**10%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 90% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures) increased their knowledge and skills in the subject matter.

Strongly agree	35	**53%**
Agree	19	**28%**
Neutral	12	**18%**
Disagree	1	**1%**
Strongly disagree	0	**0%**

Question 8: Was the laboratory material in a domestic or foreign language or both?

In this case, 76% percent of students agreed that the learning materials were given both in domestic and foreign languages. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

Domestic	16	**24%**
Foreign	23	**34%**
Both	28	**42%**

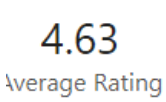
Question 9: Did you find useful to participate in learning activities with different teaching styles and strategies?

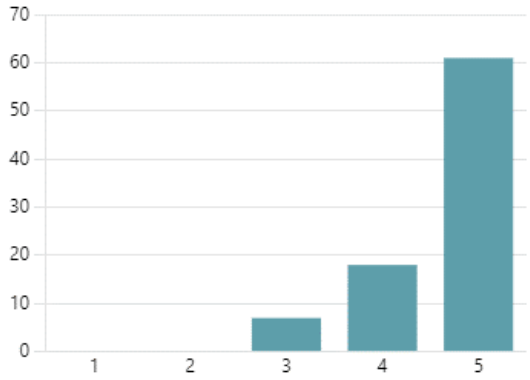
The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

Strongly agree	36	**54%**
Agree	23	**34%**
Neutral	8	**12%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 10: Rate your overall experience after participating at the laboratory.

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.63 was obtained, which is higher than 3.96 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng project helped the students to increase their knowledge on the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.





2.2 Survey for teachers (spring semester 2024)

A total of 10 teachers responded to this survey with an average time to complete of 02:46 minutes. The feedback was collected from teachers that participated in team-teaching activities held in spring semester of academic year 2023-2024 in each partner HEIs. These activities were part of the first implementation round of TTPP where the new joint courses content (C1…C4) were delivered.

10 Responses | 02:46 Average time to complete | Active Status

Question 1: Please select your HEI.

Of the total number of respondents, 30% answered Technical University of Cluj-Napoca (TUCN), 30% answered Jyväskylä University of Applied Sciences (JAMK) and 40% answered Universidad de Jaén (UJA).

Technical University of Cluj-Napoca	3	30%
Jyväskylä University of Applied Scie...	3	30%
Universidad de Jaén	4	40%

Question 2: For what course do you take the survey?

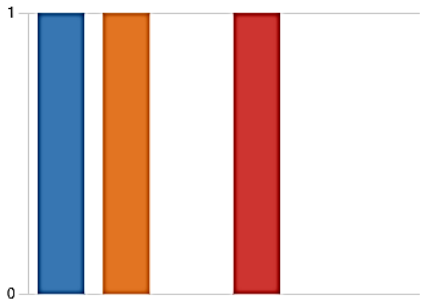
The figures below present the number of responses gathered for every joint course in each HEI (TUCN, JAMK, UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 1
C2 – 1
C3 – 0
C4 – 1
C5 – 0
C6 – 0

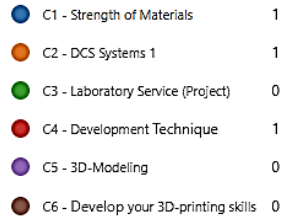
Total = 3

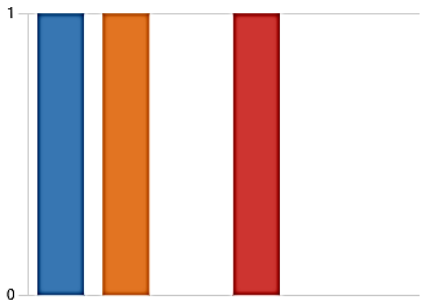
C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	1
C3 - Design și Ergonomie	0
C4 - Metrologie	1
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micr...	0



JAMK

C1 – 1
C2 – 1
C3 – 0
C4 – 1
C5 – 0
C6 – 0

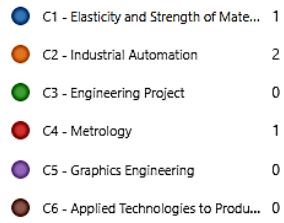


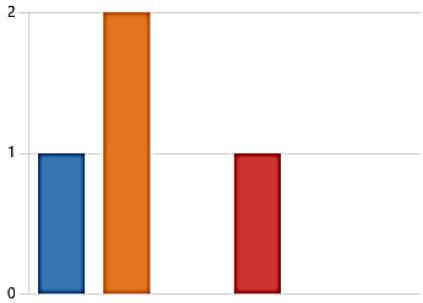


Total = 3

UJA

C1 – 1
C2 – 2
C3 – 0
C4 – 1
C5 – 0
C6 – 0

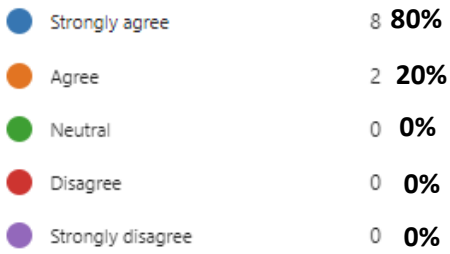




Total = 4

Question 3: The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

According to the responses, 100% of the teachers agree that the course promotes soft skills. The percentage is like the one obtained from the survey addressed to the students.



Question 4: The course content integrates eco-friendly concepts (green skills)?

Almost 90% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). In the survey addressed to the students, 89% of the students agreed that green skills are present on the courses. Although eco-friendly concepts are integrated in the courses some students have problems identifying them.

The approaches proposed in NextGEng project aim to increase student's green skills (impact on the environment based on their decisions in the development and life span of a certain engineering product).

Strongly agree	6	60%
Agree	3	30%
Neutral	1	10%
Disagree	0	0%
Strongly disagree	0	0%

Question 5: The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

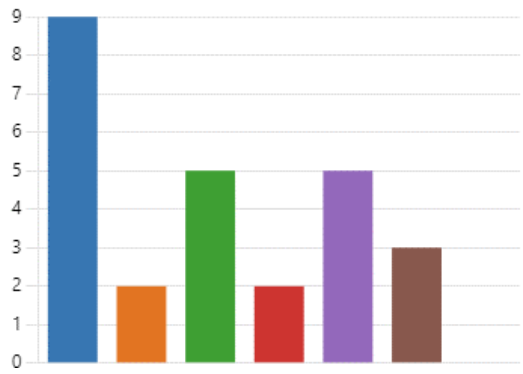
According to the teachers, all the teaching materials are compatible with digital learning technologies which is in agreement with the responses provided by students.

Strongly agree	9	90%
Agree	1	10%
Neutral	0	0%
Disagree	0	0%
Strongly disagree	0	0%

Question 6: Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

The responses provided to this question highlight that teachers are familiar with modern teaching methods such as problems-based learning, project/game-based learning, and cooperative-learning. NextGEng aims also to improve cooperative teaching/learning between the teachers involved in the project.

Problem-based learning	9
Flipped classroom	2
Project-based learning	5
Inquiry-based learning	2
Cooperative learning	5
Game-based learning	3
I never heard about these methods	0



Question 7: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Cooperative teaching/learning is very important to improve the educational process. As can be seen at this level of TTPP implementation, 100% of the teachers have collaborations with other teachers or experts from companies when doing teaching activities. This is a very good result considering that only 50% of the teachers agreed with this question on the first survey (autumn semester 2022).

Yes	10	**100%**
No	0	**0%**

Question 8: Did you find it useful in the context of your course?

Teachers who responded with "Yes" at Question 7 also agreed that cooperative/teaching learning is useful in the context of their course.

Strongly agree	7	**70%**
Agree	3	**30%**
Neutral	0	**0%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 9: To what extent do you agree with the following statements?

Regarding the level of understanding of cooperative teaching through practice or training, 90% of the teachers consider that they can manage such types of activities. However, there's still some of them who consider additional training and practice is necessary for them.

Question 10: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

The initial percentage at this question was 38%. Only a third of the teachers confirmed that they have activities in collaboration with industry companies. Compared with the current results, the situation has clearly improved. Now, we have 100% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies.

Strongly agree	8	**80%**
Agree	2	**20%**
Neutral	0	**0%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

Question 11: The theoretical aspects of the course are closely related to industry practical applications?

The examples presented at the lectures on the course are related to practical applications. This can be seen from the results, as 100% of the teachers agreed with this situation. Also, here we have seen a slight improvement compared with the initial results.

Strongly agree	8	**80%**
Agree	2	**20%**
Neutral	0	**0%**
Disagree	0	**0%**
Strongly disagree	0	**0%**

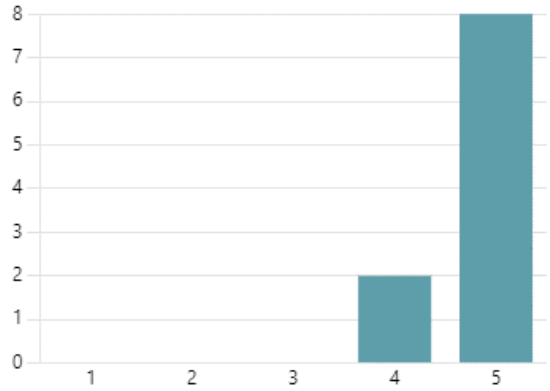
Question 12: Rate your overall experience at the course considering the following aspects:

- ***promotion of eco-friendly concepts and soft skills***
- ***compatibility of course materials with digital teaching and learning***
- ***cooperative teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.80 was obtained which is higher than 3.88 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng project helped the teachers to upgrade their teaching materials, to increase their team-teaching abilities and the collaborations with experts from industry.

4.80

Average Rating



3. Conclusion and further improvements

Based on the analysis performed in Chapter 2, at this level of TTPP implementation the following conclusion and further improvements directions are presented:

1) There is a small percentage of students that are not sure what the **learning outcomes** of the course they attend. Learning outcomes are very important because they are measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course (learning activity). **The modules were designed in such a way that learning outcomes are presented in the beginning of both team-teaching activities (lectures and laboratories). It is expected that these measures will increase the percentage in this case.**

2) The feedback obtained from the survey sent to students in **autumn/spring semester 2022/2023** highlighted the fact that almost **50% of the students considered that green skills are not present on the course**. On the other hand, **80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills).** This means that although eco-friendly concepts are integrated in some courses, students have problems identifying them. **The situation has been improved since the start of TTPP and the current value of 85% suggests that the new learning materials created in the project facilitate students understanding these aspects much better.**

3) Almost **90% of the students agreed that they had international visiting teachers on the course**. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (**only 6% of the students answered "Yes" to this question**). This is a clear indicator that **NextGEng project has widened the interactions between students and international teachers**. This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

4) We now have **100% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies**. This indicator is much better after implementing TTPP because in the beginning only a **third of the teachers** confirmed that they have these types of activities.

5) The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average **rating of 4.53 was given by students** and **4.80 by teachers**. The results are higher compared with the initial ones. This indicates that the degree of satisfaction has clearly improved.

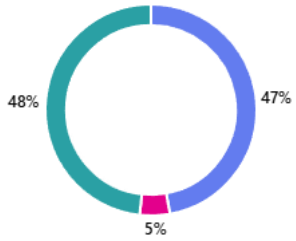
Responses Overview

Active

Responses	Average Time	Duration
87	02:15	554 Days

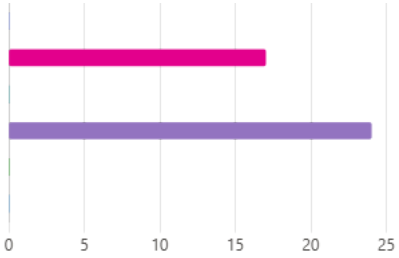
1. Please select your University.

Technical University of Cluj-Napoca	41
Jyväskylä University of Applied Sciences	4
Universidad de Jaén	42



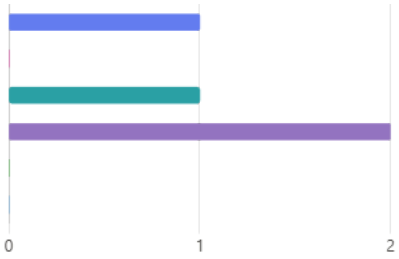
2. For what course do you take the survey?

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	17
C3 - Design și Ergonomie	0
C4 - Metrologie	24
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



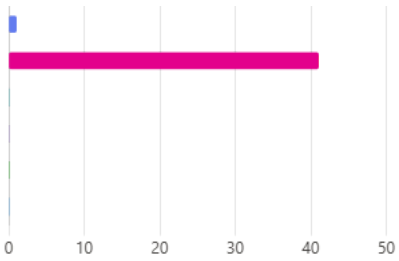
3. For what course do you take the survey?

C1 - Strength of Materials	1
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	1
C4 - Development Technique	2
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0



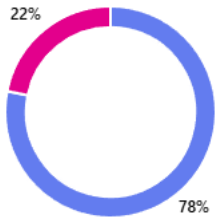
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	1
C2 - Industrial Automation	41
C3 - Engineering Project	0
C4 - Metrology	0
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0

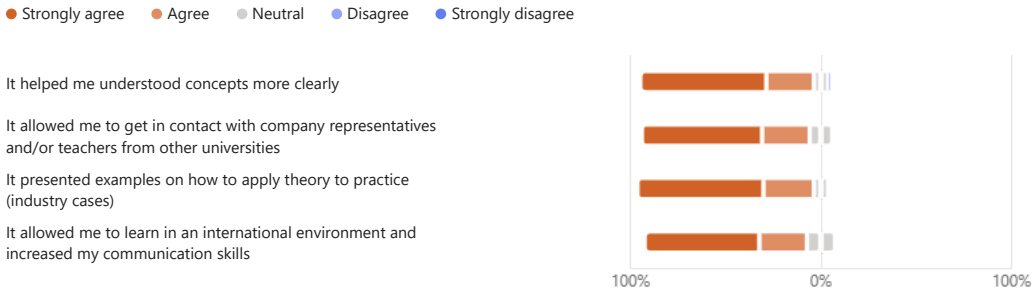


5. Did you had laboratory activities in collaboration with foreign teachers and/or experts from companies?

Yes	68
No	19

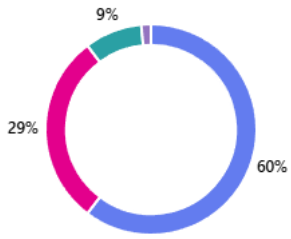


6. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



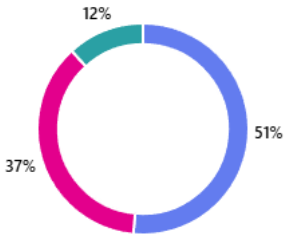
7. The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life prob lems.

Strongly agree	41
Agree	20
Neutral	6
Disagree	1
Strongly disagree	0



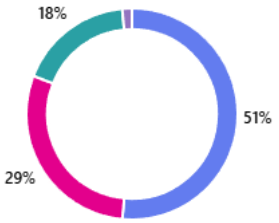
8. Do eco-friendly concepts (green skills) were integrated in the laboratory content that aim to raise awareness to students on the influence/impact on envi ronment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	35
Agree	25
Neutral	8
Disagree	0
Strongly disagree	0



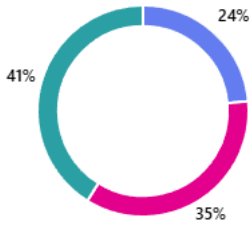
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	35
Agree	20
Neutral	12
Disagree	1
Strongly disagree	0



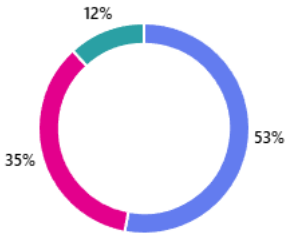
10. Was the laboratory material in a domestic or foreign language or both?

Domestic	16
Foreign	24
Both	28



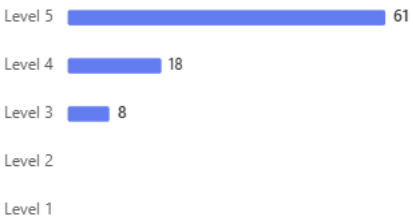
11. Did you find useful to participate in learning activities with different teaching styles and strategies?

Strongly agree	36
Agree	24
Neutral	8
Disagree	0
Strongly disagree	0



12. Rate your overall experience after participating at the laboratory.

4.61
Average Rating



13. Do you have any comments/suggestions to further improve the team-teaching activity?

74
Responses

Latest Responses

"There was a quite bit of problems with the sound so I didn't quite get everything."

"Cc"

"No,"

• • •

5 respondents (6%) answered Good for this question. Update

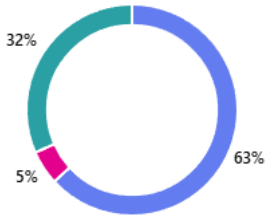
Responses Overview

Active

Responses	Average Time	Duration
38	08:50	543 Days

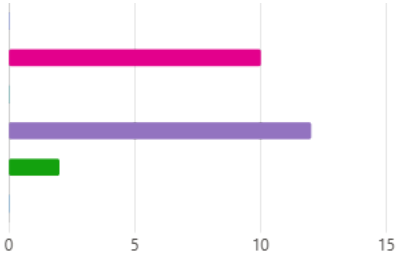
1. Please select your HEI.

Technical University of Cluj-Napoca	24
Jyväskylä University of Applied Sciences	2
Universidad de Jaén	12



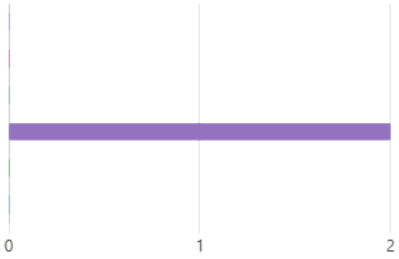
2. For what course do you take the survey?

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	10
C3 - Design și Ergonomie	0
C4 - Metrologie	12
C5 - Proiectare Asistată de Calculator	2
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



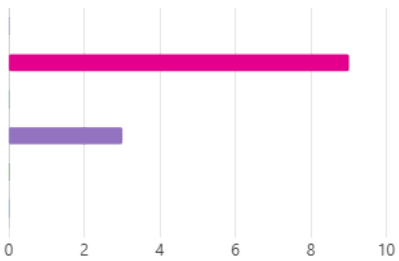
3. For what course do you take the survey?

C1 - Strength of Materials	0
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	2
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0



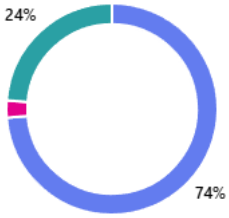
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	9
C3 - Engineering Project	0
C4 - Metrology	3
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0



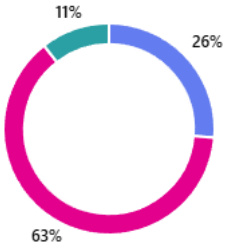
5. Do you know the learning outcomes of the course?

Yes	28
No	1
Maybe	9



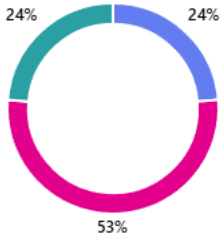
6. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	10
Agree	24
Neutral	4
Disagree	0
Strongly disagree	0



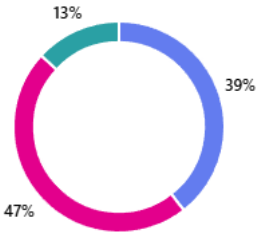
7. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environ ment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	9
Agree	20
Neutral	9
Disagree	0
Strongly disagree	0



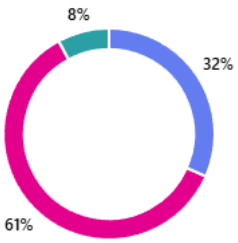
8. The course content was appropriately challenging (not too hard but not too easy).

Strongly agree	15
Agree	18
Neutral	5
Disagree	0
Strongly disagree	0



9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	12
Agree	23
Neutral	3
Disagree	0
Strongly disagree	0

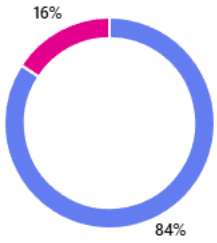


10. The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Strongly agree	20
Agree	17
Neutral	1
Disagree	0
Strongly disagree	0

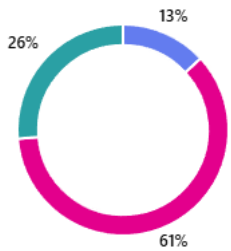
11. Have you had international visiting professors at the course?

Yes	32
No	6



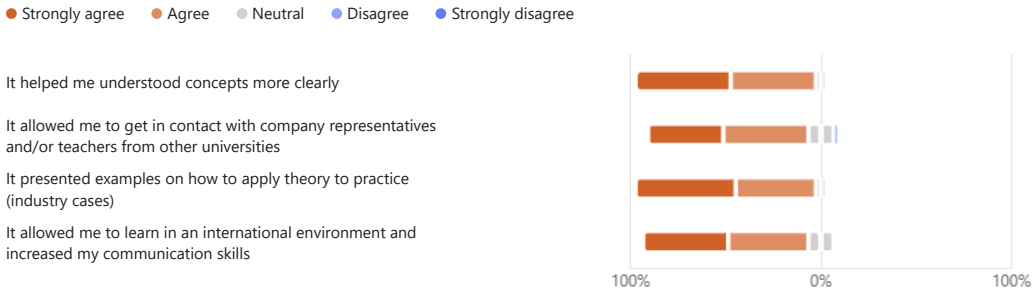
12. Was the learning material in a domestic or foreign language or both?

Domestic	5
Foreign	23
Both	10



13. To what extent do you agree with the following statements?

14. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



15. Did you find useful to participate in learning activities with different teaching styles and strategies?

16. Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course

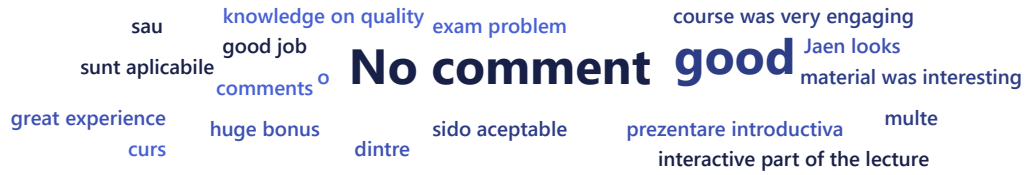
17. Do you have any comments/suggestions to further improve the team-teaching activity?

36
Responses

Latest Responses
"All perfect"
"It was great"
"Every ok"
• • •

4 respondents (11%) answered No comment for this question.

Update



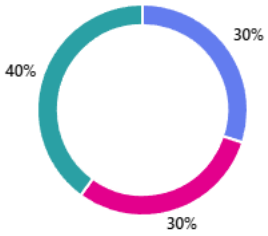
Responses Overview

Active

Responses	Average Time	Duration
10	02:46	543 Days

1. Please select your HEI.

Technical University of Cluj-Napoca	3
Jyväskylä University of Applied Sciences	3
Universidad de Jaén	4



2. For what course do you take the survey?

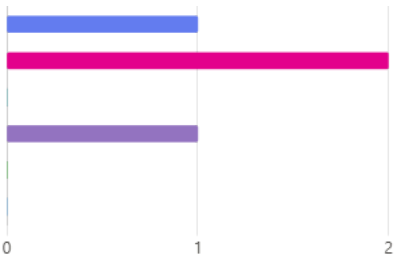
C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	1
C3 - Design și Ergonomie	0
C4 - Metrologie	1
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0

3. For what course do you take the survey?

C1 - Strength of Materials	1
C2 - DCS Systems 1	1
C3 - Laboratory Service (Project)	0
C4 - Development Technique	1
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0

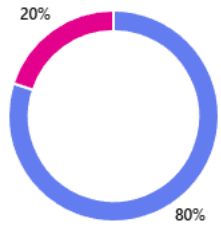
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	1
C2 - Industrial Automation	2
C3 - Engineering Project	0
C4 - Metrology	1
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0



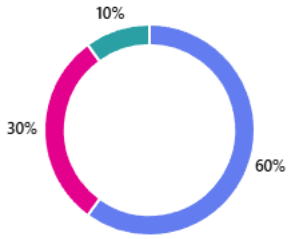
5. The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	8
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0



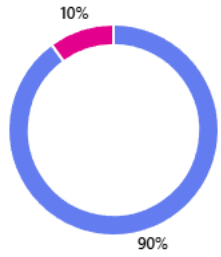
6. The course content integrates eco-friendly concepts (green skills)?

Strongly agree	6
Agree	3
Neutral	1
Disagree	0
Strongly disagree	0



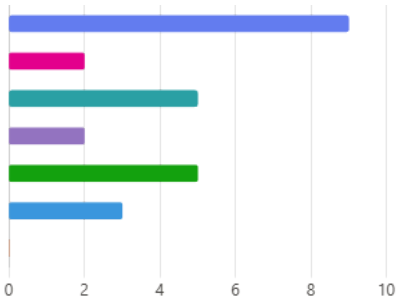
7. The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

Strongly agree	9
Agree	1
Neutral	0
Disagree	0
Strongly disagree	0



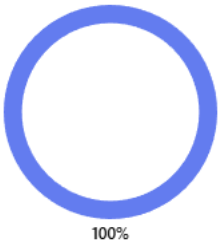
8. Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

Problem-based learning	9
Flipped classroom	2
Project-based learning	5
Inquiry-based learning	2
Cooperative learning	5
Game-based learning	3
I never heard about these methods	0



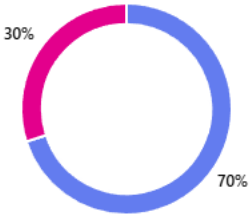
9. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Yes	10
No	0

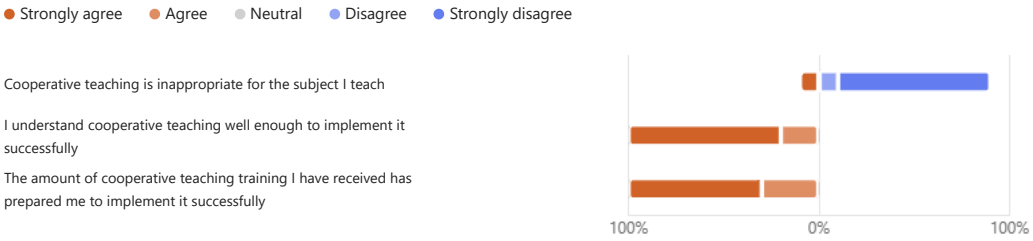


10. Did you find it useful in the context of your course?

Strongly agree	7
Agree	3
Neutral	0
Disagree	0
Strongly disagree	0

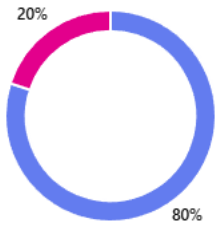


11. To what extent do you agree with the following statements?



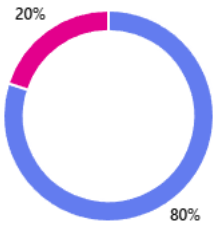
12. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	8
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0



13. The theoretical aspects of the course are closely related to industry practical applications?

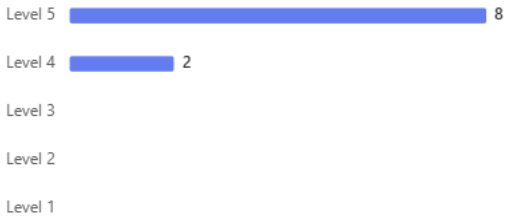
Strongly agree	8
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0



14. Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

4.80
Average Rating

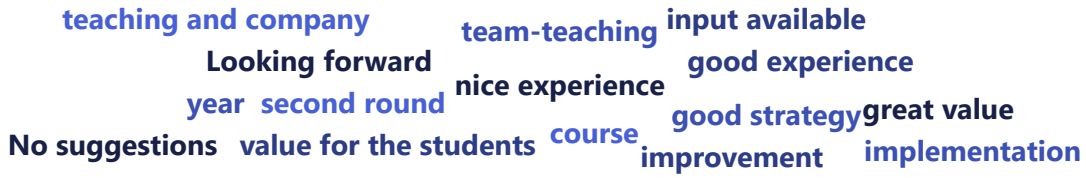


15. Do you have any comments/suggestions to further improve the team-teaching activity?

9
Responses

Latest Responses
"-"
"-"
"-"
• • •

1 respondents (10%) answered nice experience for this question. Update



Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9f

Analysis of the cooperative teaching implementation autumn semester 2024

March 2025

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

jamk

Universidad de Jaén

iSR www.isr.es

Valmet

BOSCH Invented for life

WP3.9	R3.9f Report - Analysis of the cooperative teaching implementation autumn semester 2024
Authors	Ciprian Rad
Short Description	The report analyzes feedback from teachers and students collected in the second implementation round of the team-teaching pilot program for the targeted courses (C1…C6) of the NextGEng project during the autumn semester of 2024.
Status	Final
Distribution level	Public
Date of delivery	31/03/2025
Contributions by:	Ciprian Lapusan, Rubén Dorado Vicente
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	10.01.2025	Ciprian Rad	First Draft
0.2	10.02.2025	Ciprian Lapusan	Draft amendments
0.3	15.03.2025	Rubén Dorado Vicente	Draft amendments
Final	31.03.2025	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The qualitative evaluation of the implementation of the WP3 team-teaching pilot program is performed in Activity A3.9. In this process information on the learning process and feedback is collected from target groups in three project implementation phases.

The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are used in the international team-teaching pilot program for the selected 6 joint courses: C1 – Strength of Materials, C2 – Industrial Automation, C3 – Design Projects, C4 – Quality Assurance and Applied Methods, C5 – Computer Aided Design and C6 – Manufacturing Technology. The joint courses are taught to students from the second, third and fourth year from the following specializations: Mechatronics (TUCN), Mechanical Engineering (TUCN, JAMK and UJA), Electrical and Automation Engineering (UJA), Industrial Economic Engineering (UTCN), Electrical Engineering, Electronic and Automation Engineering (UJA). Teachers are experts in their field of activity and have taught the selected courses for several years in their university. Each of the company partners nominated the experts based on their qualification and activity carried out in the company which is related to the selected courses.

In the first implementation phase feedback was collected from the target groups (students and teachers) before implementing the team-teaching pilot program (TTPP) to obtain the *control results*. This data is used to compare the results that are collected after the first and second implementation rounds of the team-teaching learning process. The data collection was already performed during the two exam sessions in each HEI (autumn semester 2022 and spring semester 2023) and the results are documented in reports R3.9b and R3.9c. In the second implementation phase, feedback is collected from target groups participating in the first and second round of TTPP. The second implementation round of TTPP covers the academic year 2024-2025 in all HEIs. The activities associated with the second round are A3.6 (UTCN – host university), A3.7 (JAMK – host university) and A3.8 (UJA – host university). In these activities the HEI partners and company experts work together to deliver the new joint courses content (C1…C6) in the framework of the team-teaching pilot program to the students. An international blended learning environment is created where the teachers, company experts and students participate in face-to-face and online learning activities.

This report aims to analyze the feedback collected from the target groups (students, teachers) that participated in the courses held in autumn semester 2024 in the second implementation round of TTPP.

Questionnaires for gathering feedback from teachers and students involved in targeted courses held in autumn semester 2024 were previously developed and documented in *Report R3.9a - Plan for analyzing the quality of pilot program*. The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

The links to surveys can be found at:

- survey for students – laboratory activities: https://forms.office.com/e/cKhG1Nf95e
- survey for students – tailored lectures activities: https://forms.office.com/e/fTVgN7QunV
- survey for teachers: https://forms.office.com/e/FUQUh3XiPg

2. Questionnaire feedback analysis

Next are presented the results obtained for the two questionnaires. Student's responses are presented first and teacher's responses afterwards.

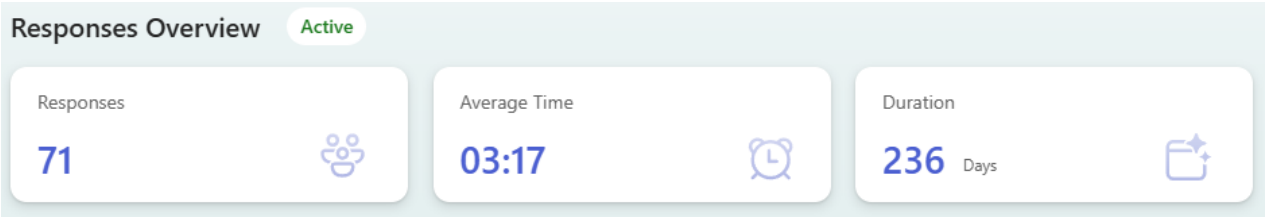
2.1 Survey for students (autumn semester 2024)

The feedback was collected from students that participated in activities (lectures and laboratories) held in autumn semester of academic year 2024-2025 in each partner HEIs. These activities were part of the second implementation round of TTPP where the new joint courses content (C1…C6) were delivered.

The questionnaire for students was split in two for this evaluation phase: one for the laboratory's activities and another one for the tailored lectured activities. We decided that this approach is more appropriate, because we had situations in autumn semester 2023 where the students that participated in the tailored lectures did not attend the laboratory activities or vice versa because of the schedule of activities implementation in each HEI. In this way, it was much easier to get the appropriate feedback from each participating student.

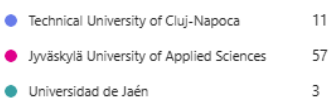
Survey for students – tailored lectures activities

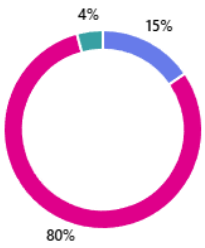
A total of 71 students responded to the survey for tailored lectures activities with an average time to complete of 3:17 minutes.



Question 1: Please select your HEI.

Of the total number of respondents, 15% answered Technical University of Cluj-Napoca (TUCN), 80% answered Jyväskylä University of Applied Sciences (JAMK) and 4% answered Universidad de Jaén (UJA).



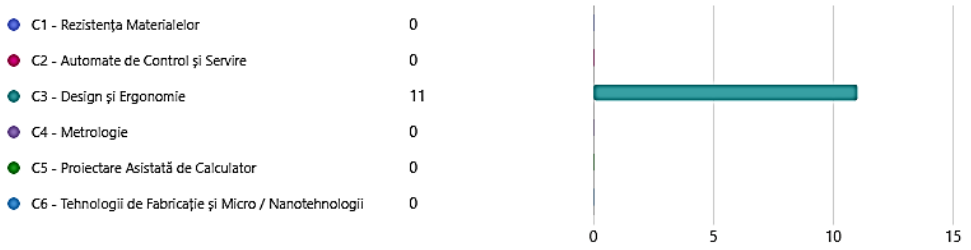


Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

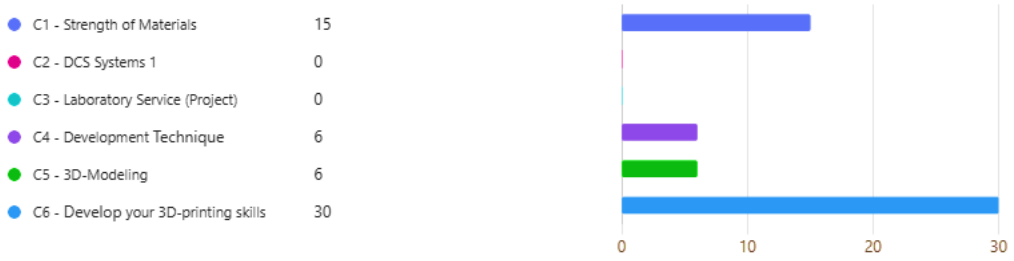
C1 – 0
C2 – 0
C3 – 11
C4 – 0
C5 – 0
C6 – 0



Total = 11

JAMK

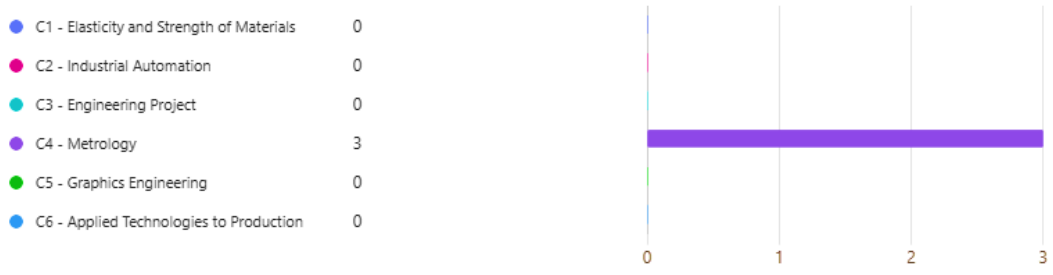
C1 – 15
C2 – 0
C3 – 0
C4 – 6
C5 – 6
C6 – 30



Total = 57

UJA

C1 – 0
C2 – 0
C3 – 0
C4 – 3
C5 – 0
C6 – 0

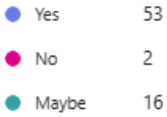


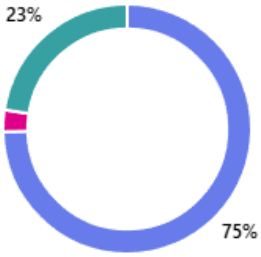
Total = 3

Question 3: Do you know the learning outcomes of the course?

For this question, 75% of students answered “Yes”, 3% answered “No” and 23% answered “Maybe”. The results indicate that most of the students questioned know the learning outcomes of the course while a few of them are not sure.

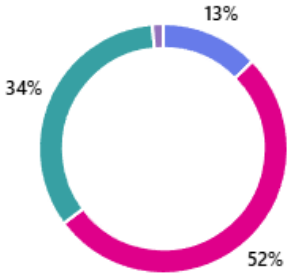
Learning outcomes of the course/lecture are very important because are student-centered measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course/lecture.





Question 4: Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

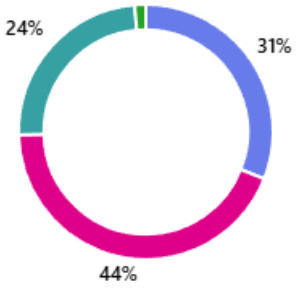
As can be seen from the chart below, 65% of the participants agreed that the course promotes soft skills. However, 34% cannot decide and only 1% disagree. This suggests that improvements can be made in this direction.



Question 5: Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 75% of the students agreed that green skills are present in the course content. Almost a quarter of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 85% positive feedback.

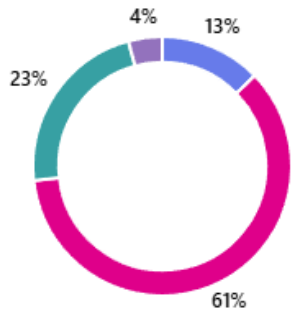
Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.



Question 6: The course content was appropriately challenging (not too hard but not too easy).

Almost 75% of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students.

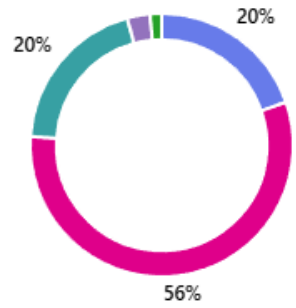
Strongly agree	9
Agree	43
Neutral	16
Disagree	3
Strongly disagree	0



Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 75% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures) increased their knowledge and skills in the subject matter.

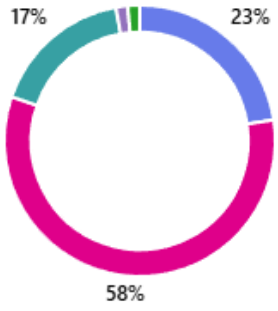
Strongly agree	14
Agree	40
Neutral	14
Disagree	2
Strongly disagree	1



Question 8: The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Almost 81% of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS provided by HEI. This means that most of the newly created learning materials are compatible with digital teaching and learning technologies.

Strongly agree	16
Agree	41
Neutral	12
Disagree	1
Strongly disagree	1



Question 9: Have you had international visiting professors at the course?

Almost 92% of the students agreed that they had international visiting teachers on the course. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (only 6% of the students answered "Yes" to this question).

This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

Question 10: Was the learning material in a domestic or foreign language or both?

In this case, 97% of students agreed that the learning materials were given both in domestic and foreign languages. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

Question 11: To what extent do you agree with the following statements?

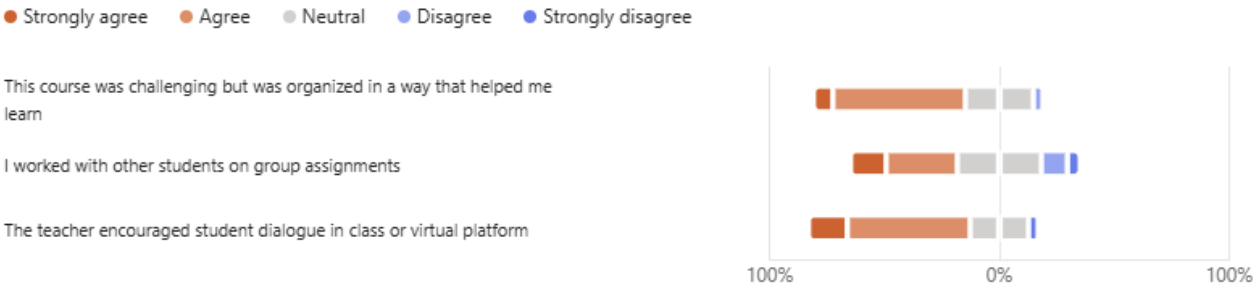
Student-Centered Approach in educational process is very important for students. In this way, abilities such as teamwork, understanding problems, thinking critically, and decision-making can be developed.

Analyzing the answers to these questions, approximately 61% of the students consider that student-centered approaches are promoted at the course. The result is an important improvement compared with the initial one. Almost 30% of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter.

Students highlighted that the educational material was organized in such a way that helped them think critically. The teamwork activities for various assignments were also mentioned as a plus.

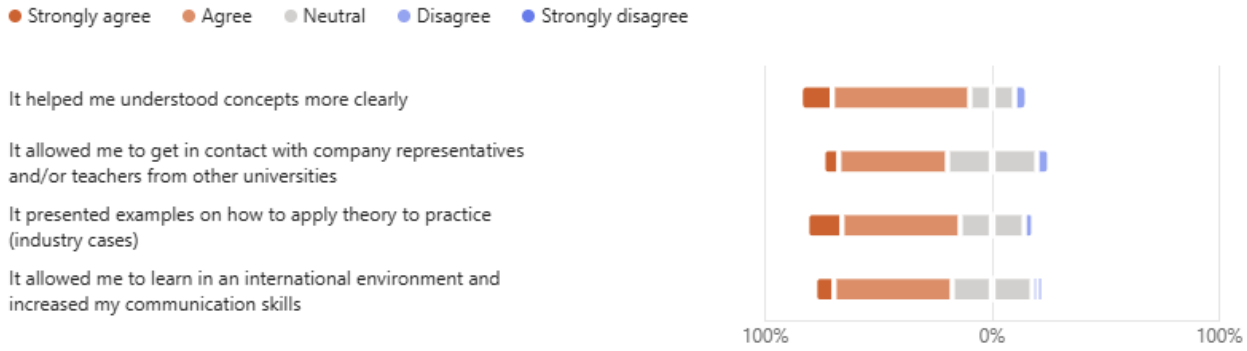
Teachers also provided for their students the necessary virtual tools/platforms to encourage the dialogue face-to-face and/or online to develop decision-making abilities.

Only 5% of students still consider that there is a lack of such things. This is a very good result.



Question 12: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students were asked to give a degree of satisfaction to the following 4 statements presented below. More than 65% of the students gave positive feedback. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



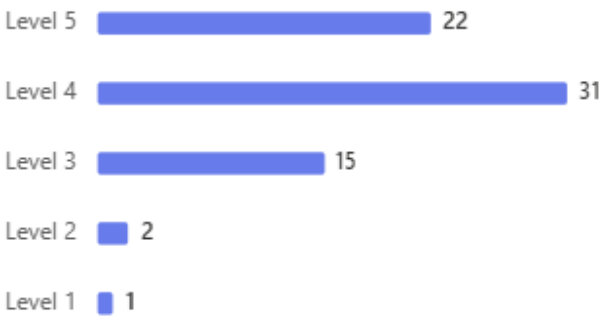
Question 13: Did you find useful to participate in learning activities with different teaching styles and strategies?

The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

Question 14: Rate your overall experience at the course considering the following aspects:

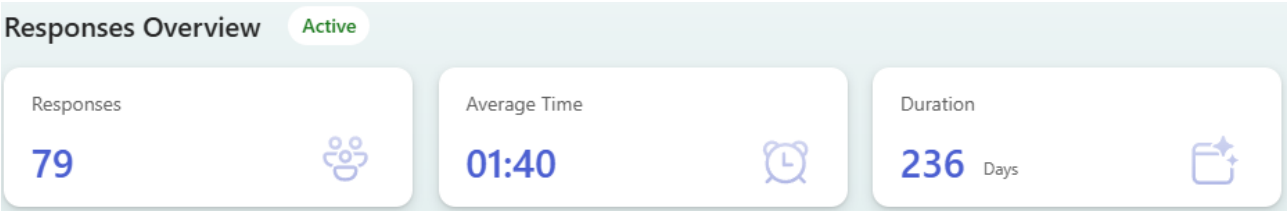
- ***learning outcomes***
- ***course content and quality of the teaching materials***
- ***internationalization***
- ***teaching methods used at the course***

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4 was obtained which is higher than 3.96 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng helped the students to increase their knowledge on the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.



Survey for students – laboratory activities

A total of 79 students responded to the survey for laboratory activities with an average time to complete of 1:40 minutes.



Question 1: Please select your HEI.

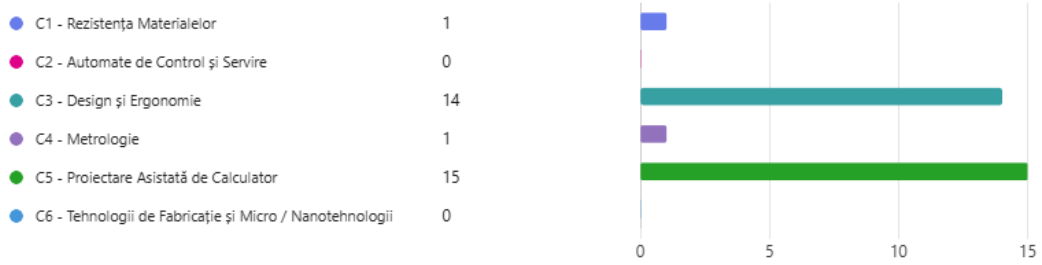
Of the total number of respondents, 39% answered Technical University of Cluj-Napoca (TUCN), 56% answered Jyväskylä University of Applied Sciences (JAMK) and 5% answered Universidad de Jaén (UJA).

Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9.a - Plan for analyzing the quality of pilot program*.

TUCN

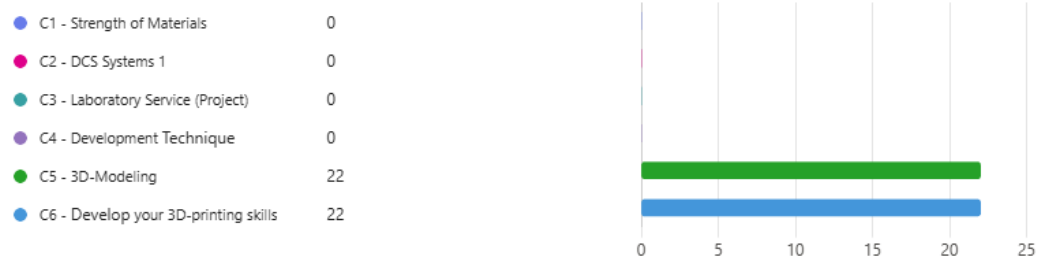
C1 – 1
C2 – 0
C3 – 14
C4 – 1
C5 – 15
C6 – 0



Total = 31

JAMK

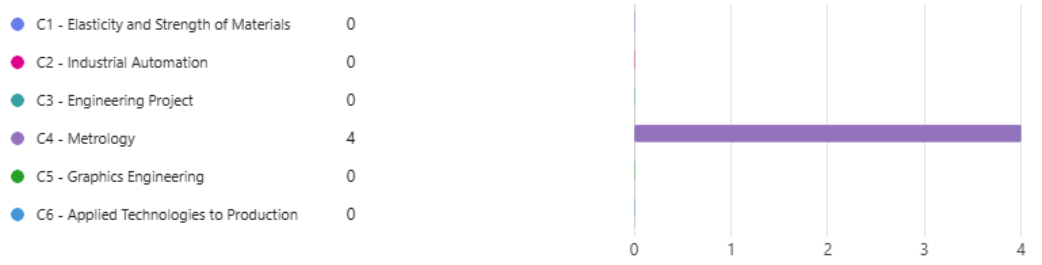
C1 – 0
C2 – 0
C3 – 0
C4 – 0
C5 – 22
C6 – 22



Total = 44

UJA

C1 – 0
C2 – 0
C3 – 0
C4 – 4
C5 – 0
C6 – 0



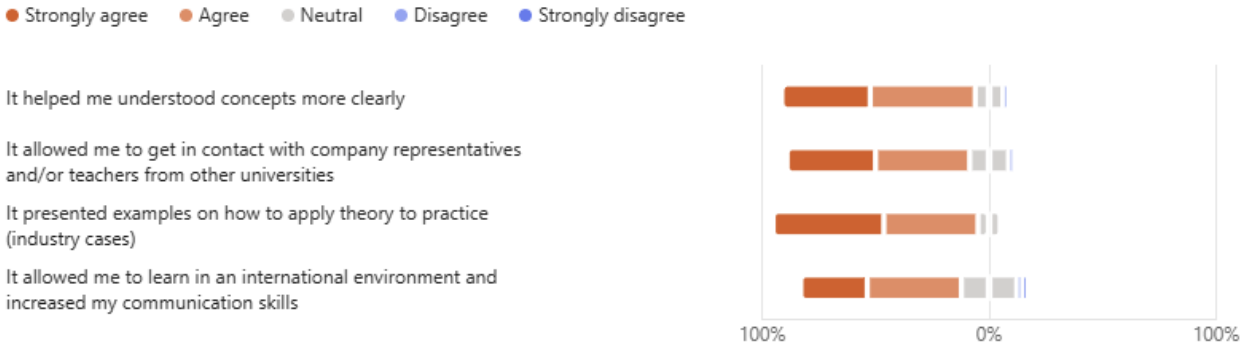
Total = 4

Question 3: Did you had laboratory activities in collaboration with foreign teachers and/or experts from companies?

To this question, 52% answered “Yes”. This is a big improvement compared with the initial values obtained in autumn semester 2022 (only 10% of students answered “Yes” to this question). This is an indicator that NextGEng approaches shifts the educational process to a student centered-learning approach and at the same time stimulates experiential learning through case studies and experiments developed in collaboration with industry.

Question 4: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students were asked to give a degree of satisfaction to the following 4 statements presented below. More than 82% of the students gave positive feedback. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.

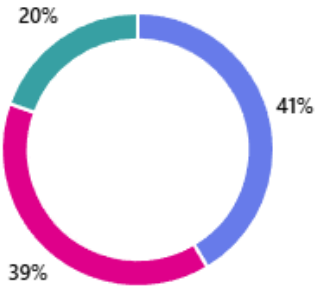


Question 5: The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.

Almost 80% of the students consider that theoretical aspects presented by the teachers are closely related to practical applications. This is a big improvement compared with the previous results where only 65% agreed with this.

These results emphasize even further the need for experiential learning through study cases and experiments developed in collaboration with experts from industry/companies.

Strongly agree	17
Agree	16
Neutral	8
Disagree	0
Strongly disagree	0

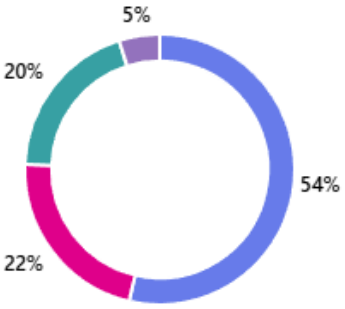


Question 6: Do eco-friendly concepts (green skills) were integrated in the laboratory content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 76% of the students agreed that green skills are present in the laboratory content. Almost 20% of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 85% positive feedback.

Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.

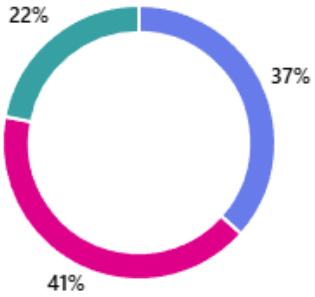
Strongly agree	22
Agree	9
Neutral	8
Disagree	2
Strongly disagree	0



Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 78% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures) increased their knowledge and skills in the subject matter.

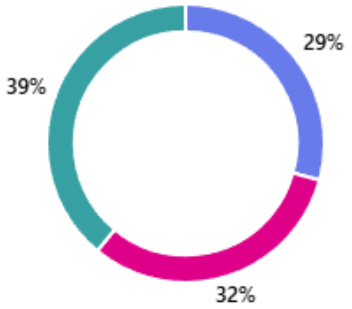
Strongly agree	15
Agree	17
Neutral	9
Disagree	0
Strongly disagree	0



Question 8: Was the laboratory material in a domestic or foreign language or both?

In this case, 72% percent of students agreed that the learning materials were given both in domestic and foreign languages. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

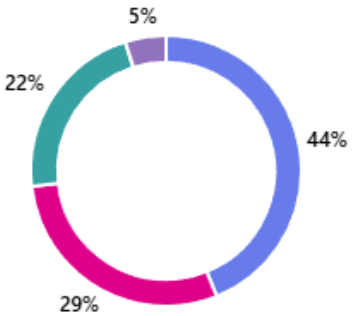
Domestic	12
Foreign	13
Both	16



Question 9: Did you find useful to participate in learning activities with different teaching styles and strategies?

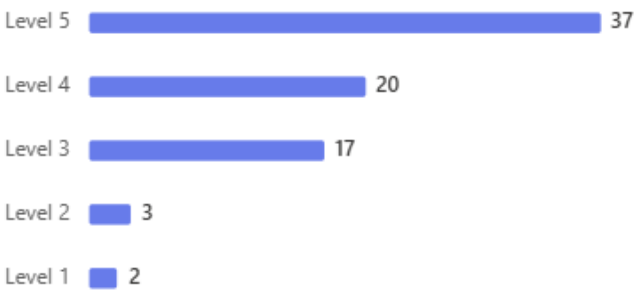
The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process. This is an improvement compared with the initial results.

Strongly agree	18
Agree	12
Neutral	9
Disagree	2
Strongly disagree	0



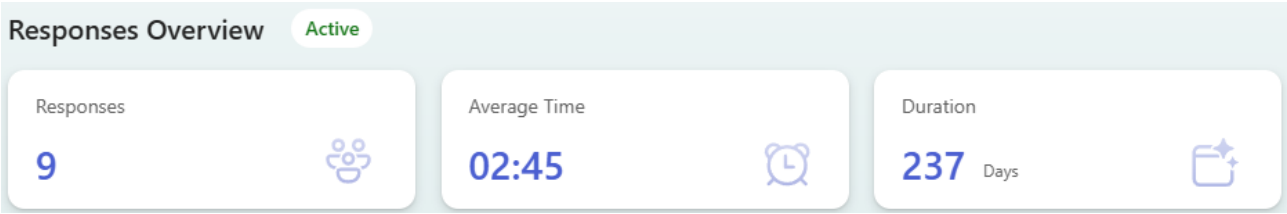
Question 10: Rate your overall experience after participating at the laboratory.

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.1 was obtained which is higher than 3.96 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng helped the students to increase their knowledge on the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.



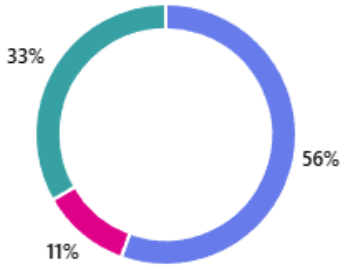
2.2 Survey for teachers (autumn semester 2024)

A total of 9 teachers responded to this survey with an average time to complete of 02:45 minutes. The feedback was collected from teachers that participated in team-teaching activities held in the autumn semester of academic year 2024-2025 in each partner HEIs. These activities were part of the second implementation round of TTPP where the new joint courses content (C1…C6) were delivered.



Question 1: Please select your HEI.

Of the total number of respondents, 56% answered Technical University of Cluj-Napoca (TUCN), 11% answered Jyväskylä University of Applied Sciences (JAMK) and 33% answered Universidad de Jaén (UJA).

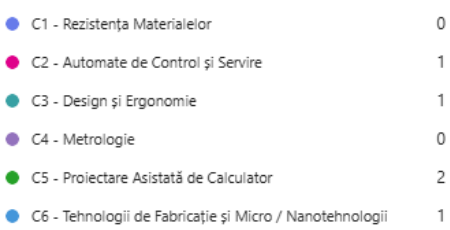


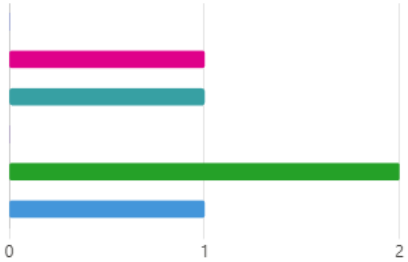
Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for every joint course in each HEI (TUCN, JAMK, UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

C1 – 0
C2 – 1
C3 – 1
C4 – 0
C5 – 2
C6 – 1

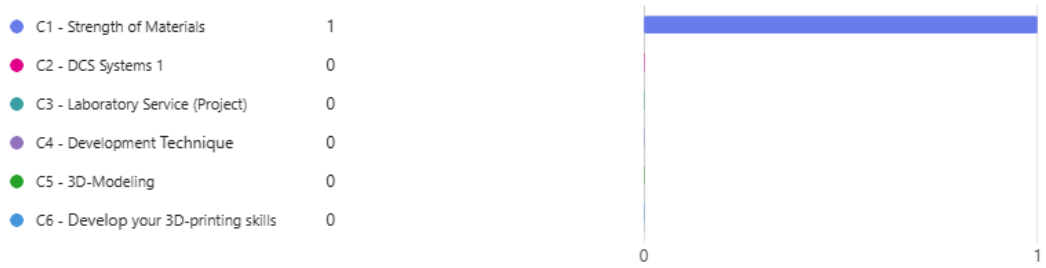




Total = 5

JAMK

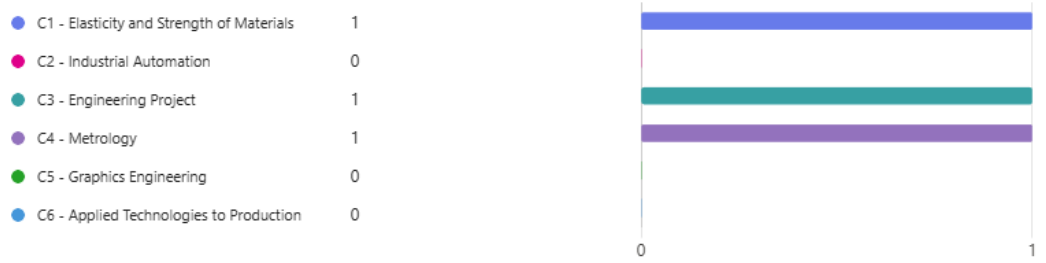
C1 – 1
C2 – 0
C3 – 0
C4 – 0
C5 – 0
C6 – 0



Total = 1

UJA

C1 – 1
C2 – 0
C3 – 1
C4 – 1
C5 – 0
C6 – 0



Total = 3

Question 3: The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

According to the responses, 100% of the teachers agree that the course promotes soft skills. The percentage is like the one obtained from the survey addressed to the students.

Question 4: The course content integrates eco-friendly concepts (green skills)?

100% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). In the survey addressed to the students, 65% of the students agreed that green skills are present on the courses. Although eco-friendly concepts are integrated in the courses some students have problems identifying them.

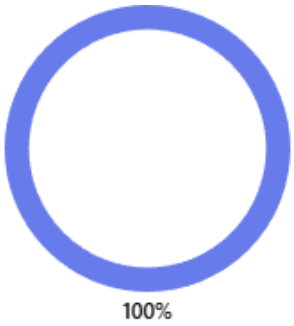
The approaches proposed in NextGEng project aim to increase student's green skills (impact on the environment based on their decisions in the development and life span of a certain engineering product).

Strongly agree	4
Agree	5
Neutral	0
Disagree	0
Strongly disagree	0

Question 5: The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

According to the teachers, all the teaching materials are compatible with digital learning technologies which agrees with the responses provided by students.

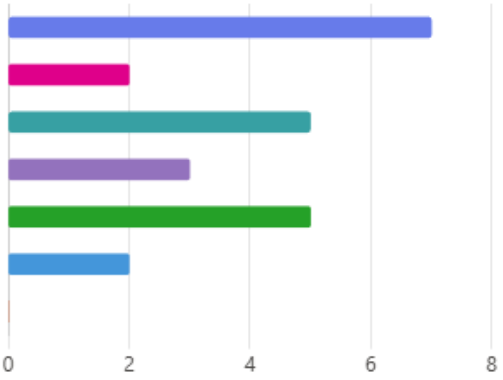
Strongly agree	9
Agree	0
Neutral	0
Disagree	0
Strongly disagree	0



Question 6: Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

The responses provided to this question highlight that teachers are familiar with modern teaching methods such as problems-based learning, project/game-based learning, and cooperative-learning. NextGEng aims also to improve cooperative teaching/learning between the teachers involved in the project.

Problem-based learning	7
Flipped classroom	2
Project-based learning	5
Inquiry-based learning	3
Cooperative learning	5
Game-based learning	2
I never heard about these methods	0



Question 7: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

Cooperative teaching/learning is very important to improve the educational process. As can be seen at this level of TTPP implementation, 100% of the teachers have collaborations with other teachers or experts from companies when doing teaching activities. This is a very good result considering that only 50% of the teachers agreed with this question on the first survey (autumn semester 2022).

Question 8: Did you find it useful in the context of your course?

Teachers who responded with "Yes" at Question 7 also agreed that cooperative/teaching learning is useful in the context of their course.

Question 9: To what extent do you agree with the following statements?

Regarding the level of understanding of cooperative teaching through practice or training, 90% of the teachers consider that they can manage such types of activities. However, there's still some of them who consider additional training and practice is necessary for them.

Question 10: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

The initial percentage at this question was 38%. Only a third of the teachers confirmed that they have activities in collaboration with industry companies. Compared with the current results, the situation has clearly improved. Now, we have 100% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies.

Question 11: The theoretical aspects of the course are closely related to industry practical applications?

The examples presented at the lectures on the course are related to practical applications. This can be seen from the results, as 100% of the teachers agreed with this situation. Also, here we have seen a slight improvement compared with the initial results.

Question 12: Rate your overall experience at the course considering the following aspects:

- ***promotion of eco-friendly concepts and soft skills***
- ***compatibility of course materials with digital teaching and learning***
- ***cooperative teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.78 was obtained which is higher than 3.88 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng project helped the teachers to upgrade their teaching materials, to increase their team-teaching abilities and the collaborations with experts from industry.

3. Conclusion and further improvements

Based on the analysis performed in Chapter 2, at this level of TTPP implementation the following conclusion and further improvements directions are presented:

1) There is a small percentage of students that are not sure what the **learning outcomes** of the course they attend. Learning outcomes are very important because they are measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course (learning activity). **The modules were designed in such a way that learning outcomes are presented in the beginning of both team-teaching activities (lectures and laboratories). It is expected that these measures will increase the percentage in this case.**

2) The feedback obtained from the survey sent to students in **autumn/spring semester 2022/2023** highlighted the fact that almost **50% of the students considered that green skills are not present on the course**. On the other hand, **80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills).** This means that although eco-friendly concepts are integrated in some courses, students have problems identifying them. **The situation has been improved since the start of TTPP and the current value of 75% suggests that the new learning materials created in the project facilitate students to understand these aspects much better.**

3) Almost **92% of the students agreed that they had international visiting teachers on the course**. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (**only 6% of the students answered "Yes" to this question**). This is a clear indicator that **NextGEng project has widened the interactions between students and international teachers**. This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

4) We now have **100% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies**. This indicator is much better after implementing TTPP because in the beginning only a **third of the teachers** confirmed that they have these types of activities.

5) The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average **rating of 4.05 was given by students** and **4.80 by teachers**. The results are higher compared with the initial ones. This indicates that the degree of satisfaction has clearly improved.

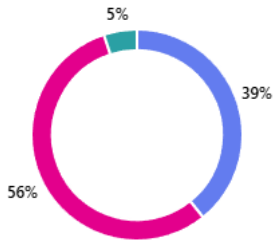
Responses Overview

Active

Responses	Average Time	Duration
79	01:40	372 Days

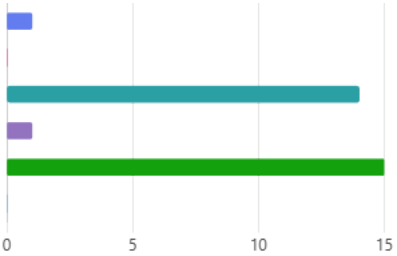
1. Please select your University.

Technical University of Cluj-Napoca	31
Jyväskylä University of Applied Sciences	44
Universidad de Jaén	4



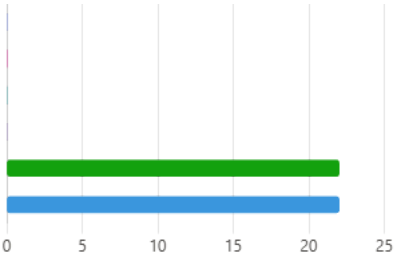
2. For what course do you take the survey?

C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	14
C4 - Metrologie	1
C5 - Proiectare Asistată de Calculator	15
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



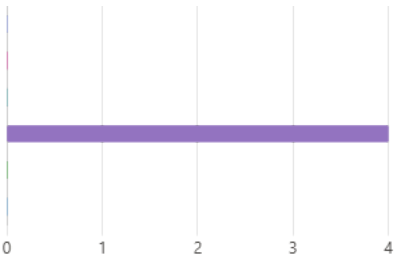
3. For what course do you take the survey?

C1 - Strength of Materials	0
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	0
C5 - 3D-Modeling	22
C6 - Develop your 3D-printing skills	22



4. For what course do you take the survey?

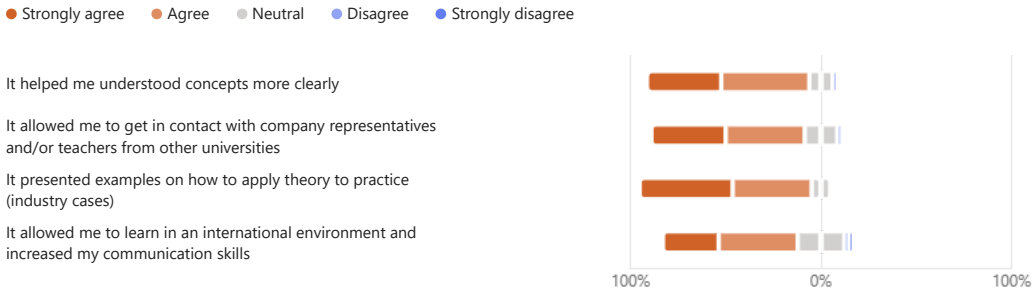
C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	0
C3 - Engineering Project	0
C4 - Metrology	4
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0



5. Did you had laboratory activities in collaboration with foreign teachers and/or experts from companies?

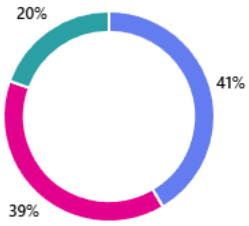
Yes	41
No	38

6. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



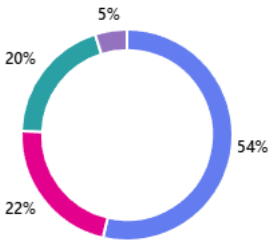
7. The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life prob lems.

Strongly agree	17
Agree	16
Neutral	8
Disagree	0
Strongly disagree	0



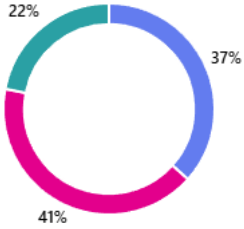
8. Do eco-friendly concepts (green skills) were integrated in the laboratory content that aim to raise awareness to students on the influence/impact on envi ronment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	22
Agree	9
Neutral	8
Disagree	2
Strongly disagree	0



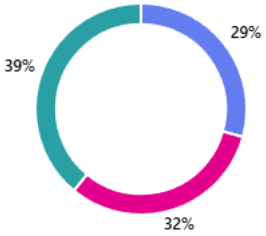
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	15
Agree	17
Neutral	9
Disagree	0
Strongly disagree	0



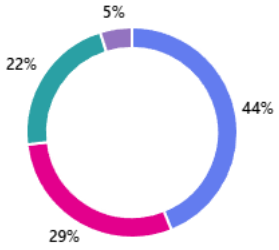
10. Was the laboratory material in a domestic or foreign language or both?

Domestic	12
Foreign	13
Both	16



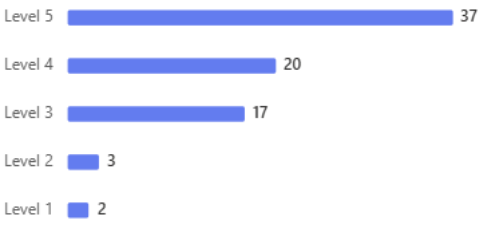
11. Did you find useful to participate in learning activities with different teaching styles and strategies?

Strongly agree	18
Agree	12
Neutral	9
Disagree	2
Strongly disagree	0



12. Rate your overall experience after participating at the laboratory.

4.10
Average Rating



13. Do you have any comments/suggestions to further improve the team-teaching activity?

76
Responses

Latest Responses
"I dom't have"
"nope"
"Nu"
• • •

5 respondents (6%) answered Nu for this question. Update

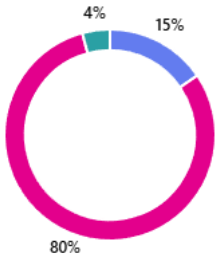
Responses Overview

Active

Responses	Average Time	Duration
71	03:17	372 Days

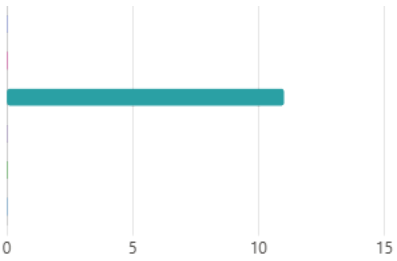
1. Please select your HEI.

Technical University of Cluj-Napoca	11
Jyväskylä University of Applied Sciences	57
Universidad de Jaén	3



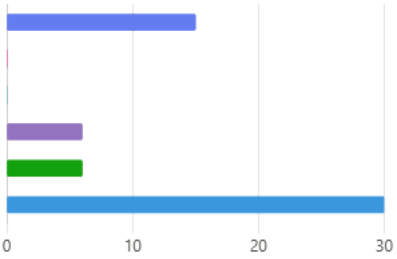
2. For what course do you take the survey?

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	11
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0



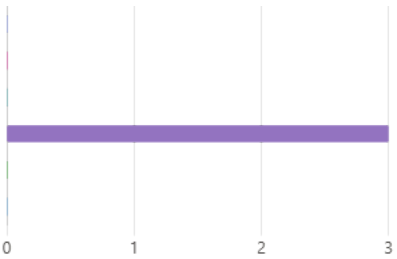
3. For what course do you take the survey?

C1 - Strength of Materials	15
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	6
C5 - 3D-Modeling	6
C6 - Develop your 3D-printing skills	30



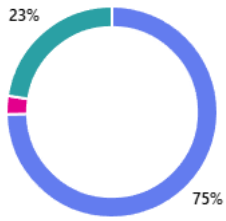
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	0
C3 - Engineering Project	0
C4 - Metrology	3
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0



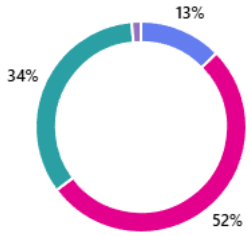
5. Do you know the learning outcomes of the course?

Yes	53
No	2
Maybe	16



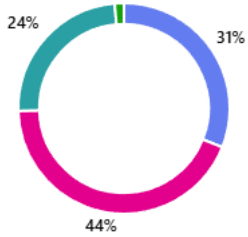
6. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	9
Agree	37
Neutral	24
Disagree	1
Strongly disagree	0



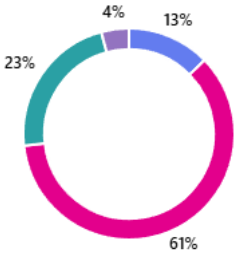
7. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environ ment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	22
Agree	31
Neutral	17
Disagree	0
Strongly disagree	1



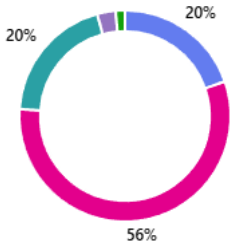
8. The course content was appropriately challenging (not too hard but not too easy).

Strongly agree	9
Agree	43
Neutral	16
Disagree	3
Strongly disagree	0



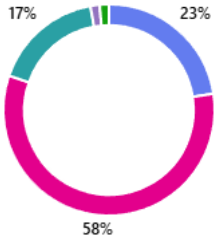
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	14
Agree	40
Neutral	14
Disagree	2
Strongly disagree	1



10. The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Strongly agree	16
Agree	41
Neutral	12
Disagree	1
Strongly disagree	1

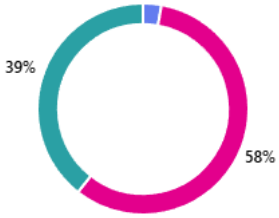


11. Have you had international visiting professors at the course?

Yes	65
No	6

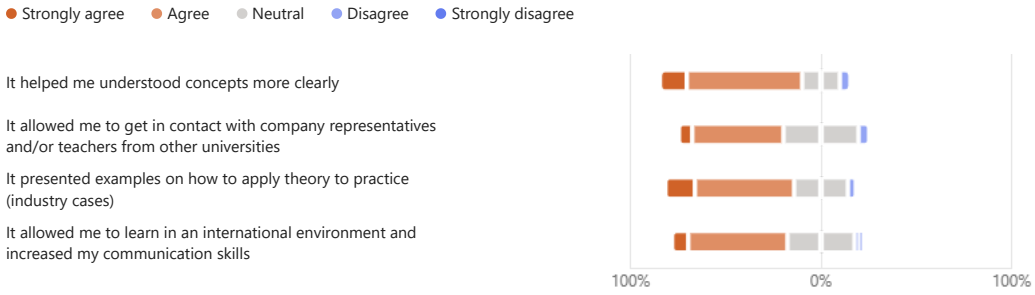
12. Was the learning material in a domestic or foreign language or both?

Domestic	2
Foreign	41
Both	28



13. To what extent do you agree with the following statements?

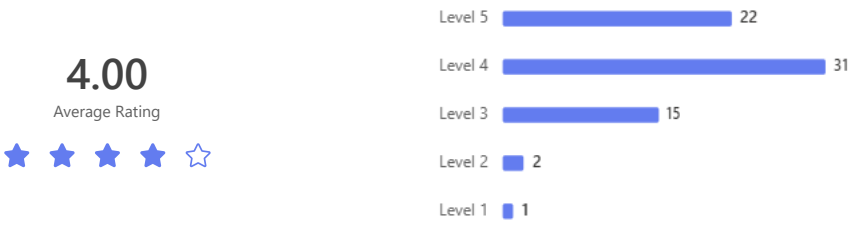
14. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



15. Did you find useful to participate in learning activities with different teaching styles and strategies?

16. Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course



17. Do you have any comments/suggestions to further improve the team-teaching activity?

70
Responses

Latest Responses
"No"
"No"
"maybe more interaction"
• • •

6 respondents (8%) answered No comments for this question. Update

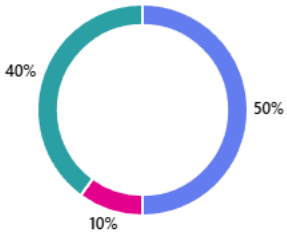
Responses Overview

Active

Responses	Average Time	Duration
10	02:54	372 Days

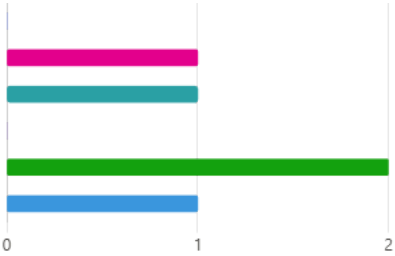
1. Please select your HEI.

Technical University of Cluj-Napoca	5
Jyväskylä University of Applied Sciences	1
Universidad de Jaén	4



2. For what course do you take the survey?

C1 - Rezistența Materialelor	0
C2 - Automate de Control și Servire	1
C3 - Design și Ergonomie	1
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	2
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	1



3. For what course do you take the survey?

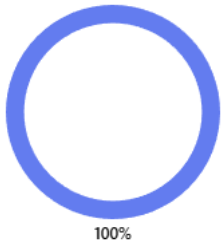
C1 - Strength of Materials	1
C2 - DCS Systems 1	0
C3 - Laboratory Service (Project)	0
C4 - Development Technique	0
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0

4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	1
C2 - Industrial Automation	0
C3 - Engineering Project	1
C4 - Metrology	2
C5 - Graphics Engineering	0
C6 - Applied Technologies to Production	0

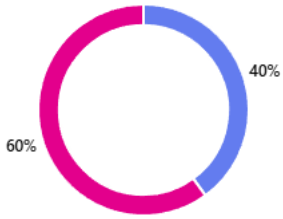
5. The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	10
Agree	0
Neutral	0
Disagree	0
Strongly disagree	0



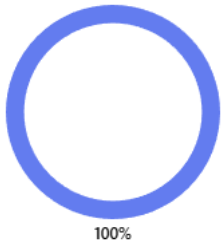
6. The course content integrates eco-friendly concepts (green skills)?

Strongly agree	4
Agree	6
Neutral	0
Disagree	0
Strongly disagree	0



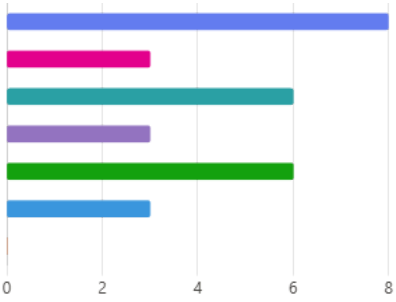
7. The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

Strongly agree	10
Agree	0
Neutral	0
Disagree	0
Strongly disagree	0



8. Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

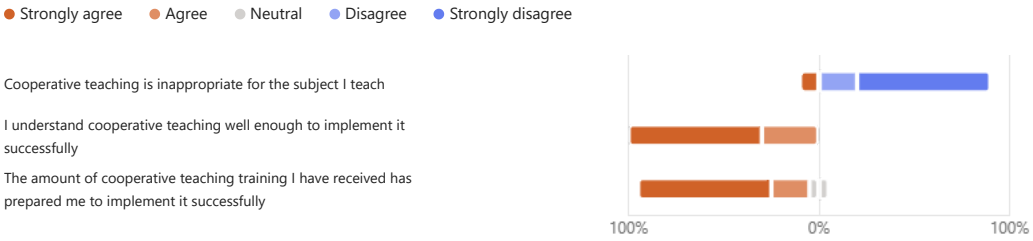
Problem-based learning	8
Flipped classroom	3
Project-based learning	6
Inquiry-based learning	3
Cooperative learning	6
Game-based learning	3
I never heard about these methods	0



9. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

10. Did you find it useful in the context of your course?

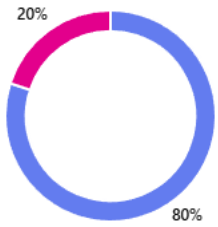
11. To what extent do you agree with the following statements?



12. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

13. The theoretical aspects of the course are closely related to industry practical applications?

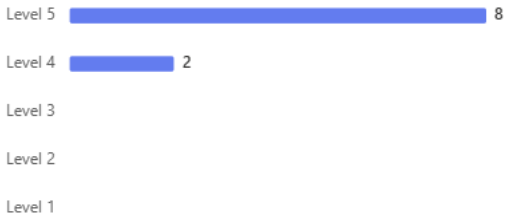
Strongly agree	8
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0



14. Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

4.80
Average Rating



15. Do you have any comments/suggestions to further improve the team-teaching activity?

10
Responses

Latest Responses
"It has been srongly good to teach with professsor from another countries"
"-"
"-"
• • •

2 respondents (20%) answered course for this question.

Co-funded by the European Union

NextGEng

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

NextGEng Project

WP3

International team-teaching pilot program

Deliverable 3.9g

Analysis of the cooperative teaching implementation spring semester 2025

July 2025

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

jamk

Universidad de Jaén

iSR www.isr.es

Valmet

BOSCH Invented for life

WP3.9	R3.9g Report - Analysis of the cooperative teaching implementation spring semester 2025
Authors	Ciprian Rad
Short Description	The report analyzes feedback from teachers and students collected in the second implementation round of the team-teaching pilot program for the targeted courses (C1…C6) of the NextGEng project during the spring semester of 2025.
Status	Final
Distribution level	Public
Date of delivery	31/07/2025
Contributions by:	Ciprian Lapusan, Rubén Dorado Vicente
Project web site	www.nextgeng.eu

Document History

Version	Date	Author/Reviewer	Description
0.1	10.06.2025	Ciprian Rad	First Draft
0.2	10.07.2025	Ciprian Lapusan	Draft amendments
0.3	15.07.2025	Rubén Dorado Vicente	Draft amendments
Final	31.07.2025	Ciprian Rad	Final Version

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of Contents

1. Introduction

The qualitative evaluation of the implementation of the WP3 team-teaching pilot program is performed in Activity A3.9. In this process information on the learning process and feedback is collected from target groups in three project implementation phases.

The target groups addressed by WP3 are the teachers of engineering degrees from partner HEIs, company experts taking part in the co-teaching teams and the students enrolled in the courses that are used in the international team-teaching pilot program for the selected 6 joint courses: C1 – Strength of Materials, C2 – Industrial Automation, C3 – Design Projects, C4 – Quality Assurance and Applied Methods, C5 – Computer Aided Design and C6 – Manufacturing Technology. The joint courses are taught to students from the second, third and fourth year from the following specializations: Mechatronics (TUCN), Mechanical Engineering (TUCN, JAMK and UJA), Electrical and Automation Engineering (UJA), Industrial Economic Engineering (UTCN), Electrical Engineering, Electronic and Automation Engineering (UJA). Teachers are experts in their field of activity and have taught the selected courses for several years in their university. Each of the company partners nominated the experts based on their qualification and activity carried out in the company which is related to the selected courses.

In the first implementation phase feedback was collected from the target groups (students and teachers) before implementing the team-teaching pilot program (TTPP) to obtain the *control results*. This data is used to compare the results that are collected after the first and second implementation rounds of the team-teaching learning process. The data collection was already performed during the two exam sessions in each HEI (autumn semester 2022 and spring semester 2023) and the results are documented in reports R3.9b and R3.9c. In the second implementation phase, feedback is collected from target groups participating in the first and second round of TTPP. The second implementation round of TTPP covers the academic year 2024-2025 in all HEIs. The activities associated with the second round are A3.6 (UTCN – host university), A3.7 (JAMK – host university) and A3.8 (UJA – host university). In these activities the HEI partners and company experts work together to deliver the new joint courses content (C1…C6) in the framework of the team-teaching pilot program to the students. An international blended learning environment is created where the teachers, company experts and students participate in face-to-face and online learning activities.

This report aims to analyze the feedback collected from the target groups (students, teachers) that participated in the courses held in spring semester 2025 in the second implementation round of TTPP.

Questionnaires for gathering feedback from teachers and students involved in targeted courses held in spring semester 2025 were previously developed and documented in *Report R3.9a - Plan for analyzing the quality of pilot program*. The questions addressed the following topics:

- learning outcomes
- course content and quality of the teaching materials
- teaching methods used at the course
- interaction with industry

The links to surveys can be found at:

- survey for students – laboratory activities: https://forms.office.com/e/nbVziSrvGP
- survey for students – tailored lectures activities: https://forms.office.com/e/CN9p3PshWC
- survey for teachers: https://forms.office.com/e/aVhHc69nzV

2. Questionnaire feedback analysis

Next are presented the results obtained for the two questionnaires. Student's responses are presented first and teacher's responses afterwards.

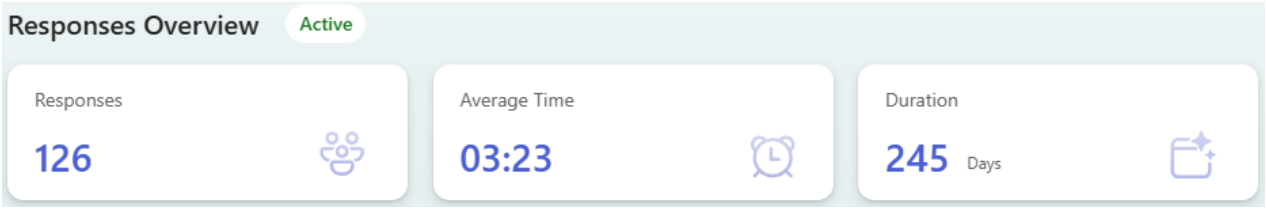
2.1 Survey for students (spring semester 2025)

The feedback was collected from students that participated in activities (lectures and laboratories) held in spring semester of academic year 2024-2025 in each partner HEIs. These activities were part of the second implementation round of TTPP where the new joint courses content (C1…C6) were delivered.

The questionnaire for students was split in two for this evaluation phase: one for the laboratory's activities and another one for the tailored lectured activities. We decided that this approach is more appropriate, because we had situations in autumn semester 2023 where the students that participated in the tailored lectures did not attend the laboratory activities or vice versa because of the schedule of activities implementation in each HEI. In this way, it was much easier to get the appropriate feedback from each participating student.

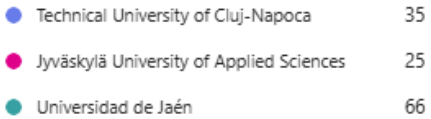
Survey for students – tailored lectures activities

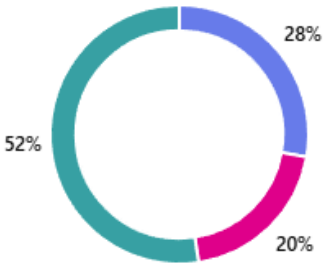
A total of 126 students responded to the survey for tailored lectures activities with an average time to complete of 3:23 minutes.



Question 1: Please select your HEI.

Of the total number of respondents, 28% answered Technical University of Cluj-Napoca (TUCN), 20% answered Jyväskylä University of Applied Sciences (JAMK) and 52% answered Universidad de Jaén (UJA).



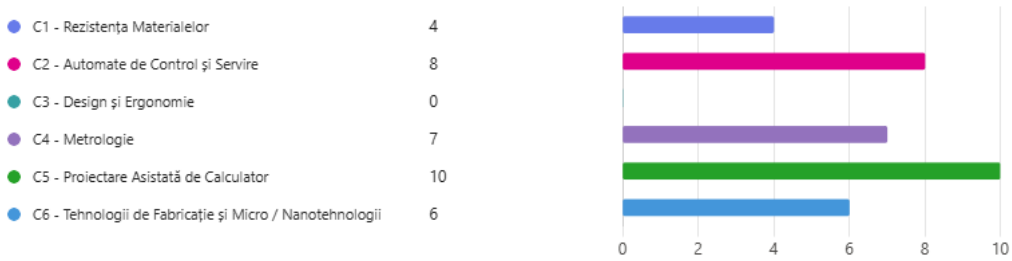


Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

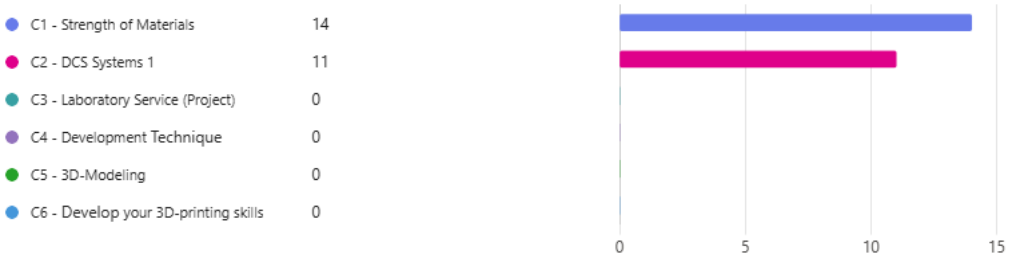
C1 – 4
C2 – 8
C3 – 0
C4 – 7
C5 – 10
C6 – 6



Total = 35

JAMK

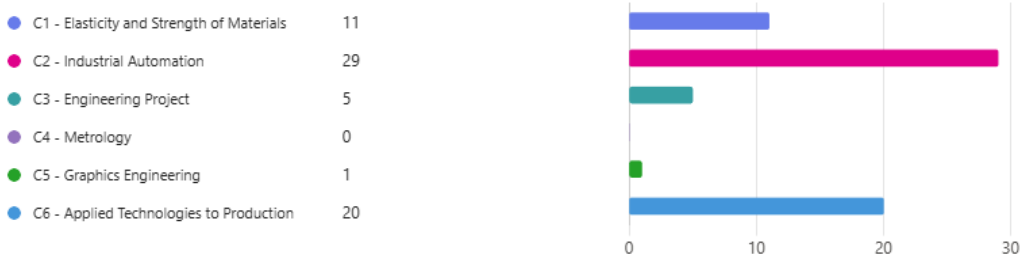
C1 – 14
C2 – 11
C3 – 0
C4 – 0
C5 – 0
C6 – 0



Total = 25

UJA

C1 – 11
C2 – 29
C3 – 5
C4 – 0
C5 – 1
C6 – 20

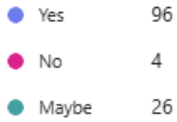


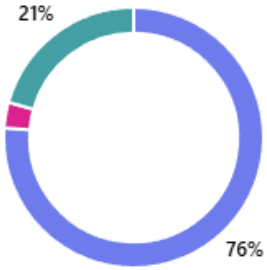
Total = 66

Question 3: Do you know the learning outcomes of the course?

For this question, 76% of students answered “Yes”, 3% answered “No” and 21% answered “Maybe”. The results indicate that most of the students questioned know the learning outcomes of the course while a few of them are not sure.

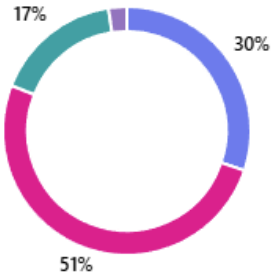
Learning outcomes of the course/lecture are very important because are student-centered measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course/lecture.





Question 4: Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

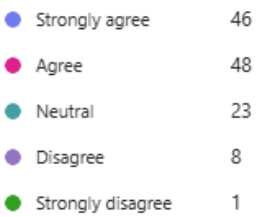
As can be seen from the chart below, 81% of the participants agreed that the course promotes soft skills. However, 17% cannot decide and only 2% disagree. This suggests that improvements can be made in this direction.

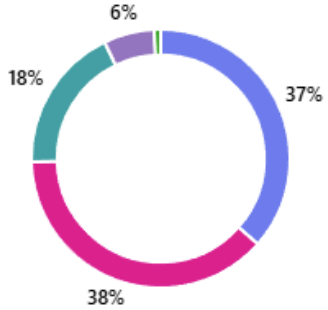


Question 5: Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 75% of the students agreed that green skills are present in the course content. Almost 18% of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 85% positive feedback.

Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.

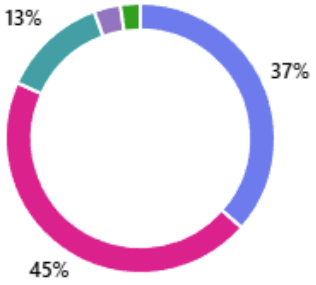




Question 6: The course content was appropriately challenging (not too hard but not too easy).

Almost 82% of the students agreed that the content of the course was appropriately challenging (not too hard but not too easy). This percentage suggests that the teachers from each HEIs deliver the information in a balanced/appropriate manner to their students.

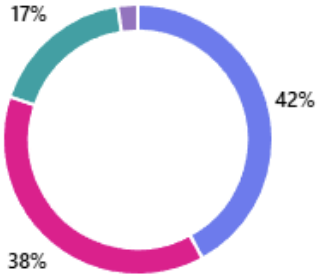
Strongly agree	46
Agree	57
Neutral	16
Disagree	4
Strongly disagree	3



Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 80% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures) increased their knowledge and skills in the subject matter.

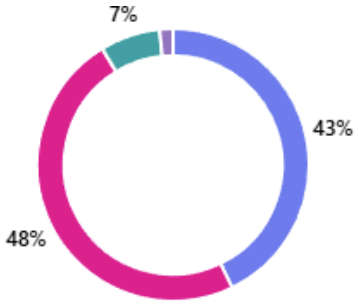
Strongly agree	53
Agree	48
Neutral	22
Disagree	3
Strongly disagree	0



Question 8: The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Almost 91% of the correspondents suggest that the course instructional materials and specific activities related to the course are compatible with digital LMS provided by HEI. This means that most of the newly created learning materials are compatible with digital teaching and learning technologies.

Strongly agree	54
Agree	61
Neutral	9
Disagree	2
Strongly disagree	0



Question 9: Have you had international visiting professors at the course?

Almost 80% of the students agreed that they had international visiting teachers on the course. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (only 6% of the students answered "Yes" to this question).

This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

Question 10: Was the learning material in a domestic or foreign language or both?

In this case, 88% of students agreed that the learning materials were given both in domestic and foreign languages. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

Question 11: To what extent do you agree with the following statements?

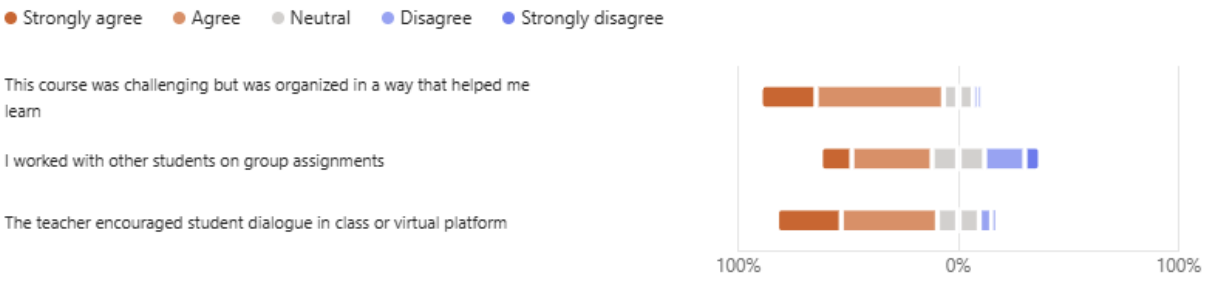
Student-Centered Approach in educational process is very important for students. In this way, abilities such as teamwork, understanding problems, thinking critically, and decision-making can be developed.

Analyzing the answers to these questions, approximately 70% of the students consider that student-centered approaches are promoted at the course. The result is an important improvement compared with the initial one. Almost 20% of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter.

Students highlighted that the educational material was organized in such a way that helped them think critically. The teamwork activities for various assignments were also mentioned as a plus.

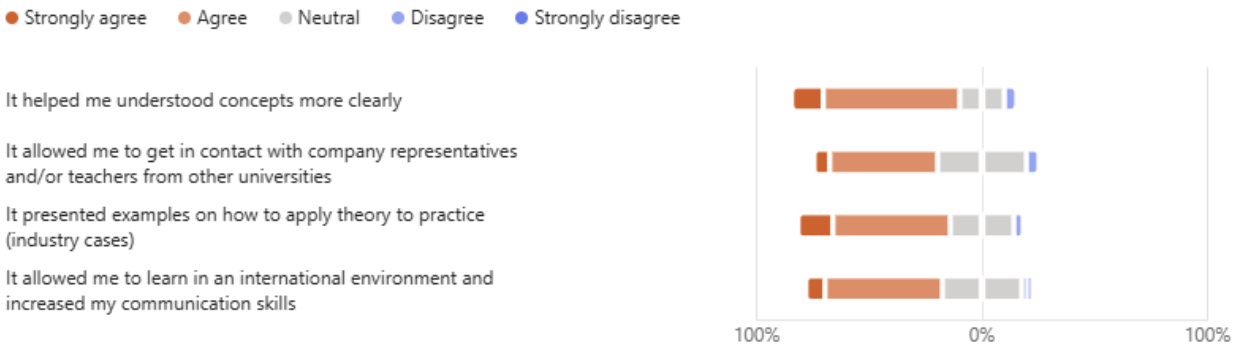
Teachers also provided for their students the necessary virtual tools/platforms to encourage the dialogue face-to-face and/or online to develop decision-making abilities.

Only 10% of students still consider that there is a lack of such things. This is a very good result.



Question 12: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students were asked to give a degree of satisfaction to the following 4 statements presented below. More than 81% of the students gave positive feedback. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.



Question 13: Did you find useful to participate in learning activities with different teaching styles and strategies?

The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process.

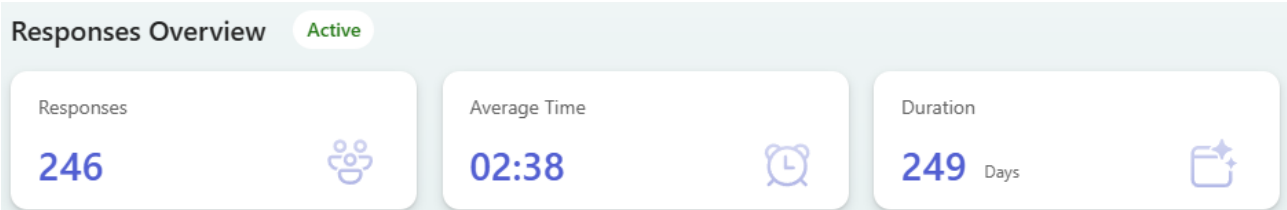
Question 14: Rate your overall experience at the course considering the following aspects:

- ***learning outcomes***
- ***course content and quality of the teaching materials***
- ***internationalization***
- ***teaching methods used at the course***

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.43 was obtained, which is slightly higher than 4.41 previously obtained in spring semester 2022. This means that the activities implemented in NextGEng helped the students to increase their knowledge on the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.

Survey for students – laboratory activities

A total of 246 students responded to the survey for laboratory activities with an average time to complete of 2:38 minutes.



Question 1: Please select your HEI.

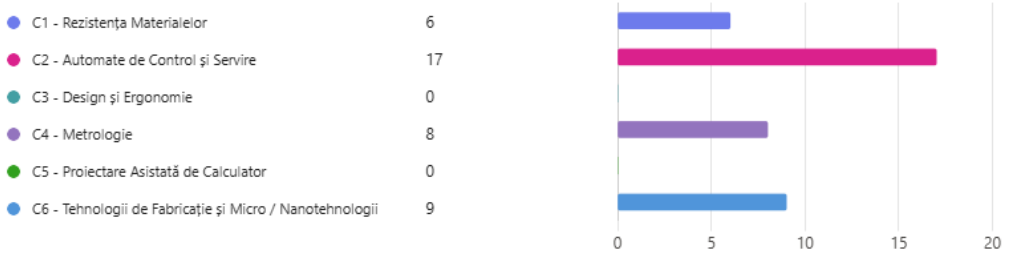
Of the total number of respondents, 16% answered Technical University of Cluj-Napoca (TUCN), 20% answered Jyväskylä University of Applied Sciences (JAMK) and 64% answered Universidad de Jaén (UJA).

Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for the targeted courses in each partner HEIs (TUCN, JAMK and UJA). The number of responses is also related to the schedule of the courses in every HEI and was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

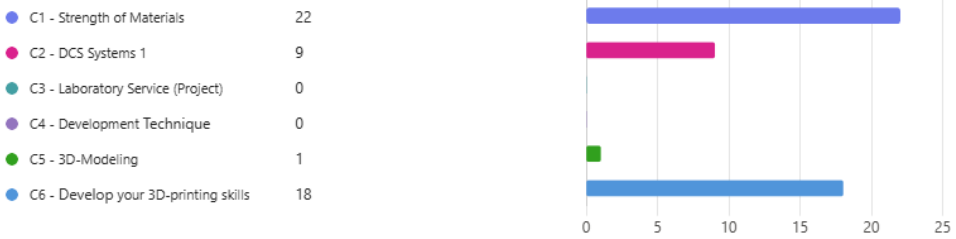
C1 – 6
C2 – 17
C3 – 0
C4 – 8
C5 – 0
C6 – 9



Total = 40

JAMK

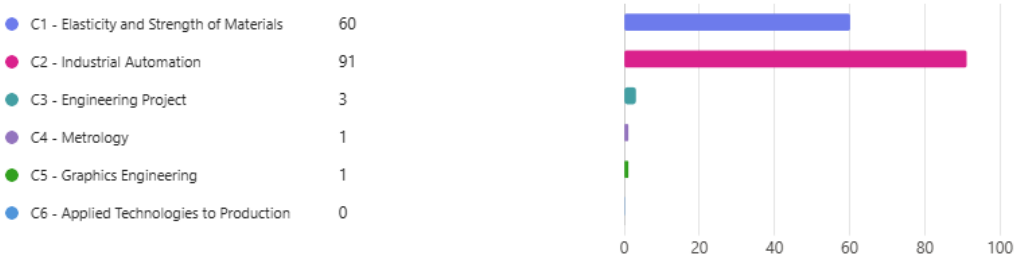
C1 – 22
C2 – 9
C3 – 0
C4 – 0
C5 – 1
C6 – 18



Total = 50

UJA

C1 – 60
C2 – 91
C3 – 3
C4 – 1
C5 – 1
C6 – 0



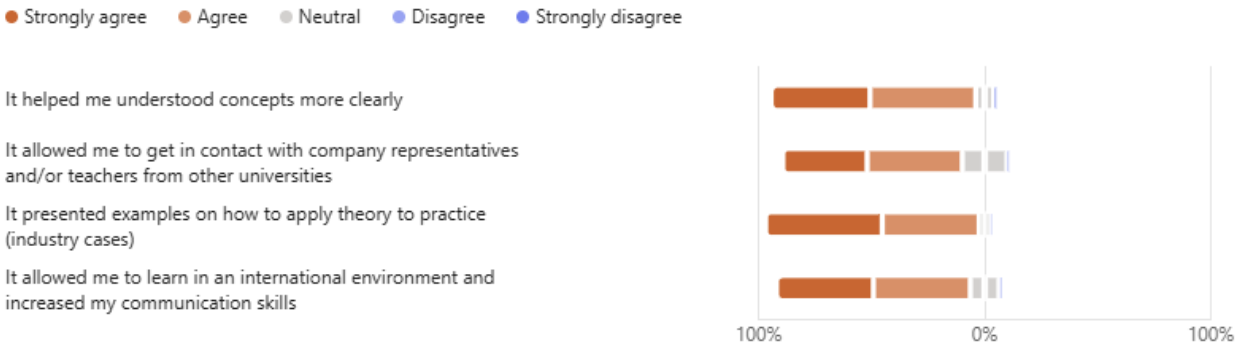
Total = 156

Question 3: Did you had laboratory activities in collaboration with foreign teachers and/or experts from companies?

To this question, 51% answered "Yes". This is a significant improvement compared with the initial values obtained in autumn semester 2022 (only 10% of students answered "Yes" to this question). This is an indicator that NextGEng approaches shifts the educational process to a student centered-learning approach and at the same time stimulates experiential learning through case studies and experiments developed in collaboration with industry.

Question 4: How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?

The students were asked to give a degree of satisfaction to the following four statements presented below. More than 82% of the students gave positive feedback. The conclusion is that interaction of students with experts from companies and/or foreign teachers provides added values to their educational process and professional development.

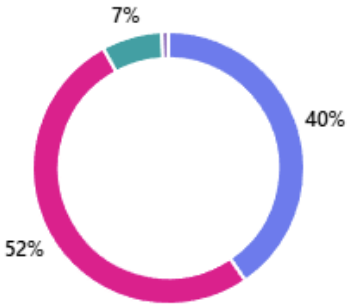


Question 5: The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life problems.

Almost 93% of the students consider that theoretical aspects presented by the teachers are closely related to practical applications. This is a significant improvement compared with the previous results where only 65% agreed with this.

These results emphasize even further the need for experiential learning through study cases and experiments developed in collaboration with experts from industry/companies.

Strongly agree	51
Agree	65
Neutral	9
Disagree	1
Strongly disagree	0

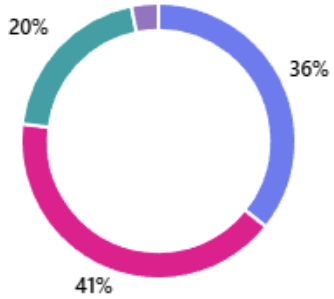


Question 6: Do eco-friendly concepts (green skills) were integrated in the laboratory content that aim to raise awareness to students on the influence/impact on environment based on their decisions in the developing and life span of a certain engineering product?

Considering the answers here, 77% of the students agreed that green skills are present in the laboratory content. Almost 20% of the students checked the "neutral" option here which means that they lean slightly towards agreeing or disagreeing in this matter. If we consider that at least half of these students tend to agree with the question we get a total percentage of 87% positive feedback.

Comparing the results with the initial ones (47% of the students agreed that green skills are present on the course while 53% disagree with this fact) we can see an important improvement in this area at this level of TTPP implementation.

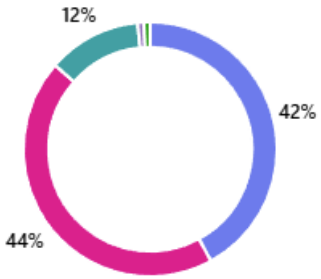
Strongly agree	45
Agree	52
Neutral	25
Disagree	4
Strongly disagree	0



Question 7: The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Regarding this question, more than 86% of the students appreciated positively that the instruction materials provided by their teachers at the team-teaching sessions (lectures) increased their knowledge and skills in the subject matter.

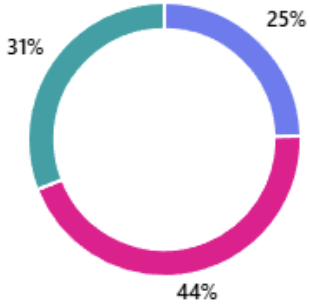
Strongly agree	53
Agree	56
Neutral	15
Disagree	1
Strongly disagree	1



Question 8: Was the laboratory material in a domestic or foreign language or both?

In this case, 75% percent of students agreed that the learning materials were given both in domestic and foreign languages. The upgraded joint-courses in NextGEng project were prepared in English for students so they can develop/improve their communication skills too.

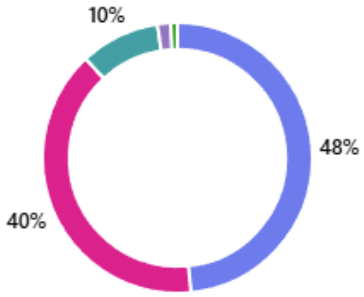
Domestic	31
Foreign	56
Both	39



Question 9: Did you find useful to participate in learning activities with different teaching styles and strategies?

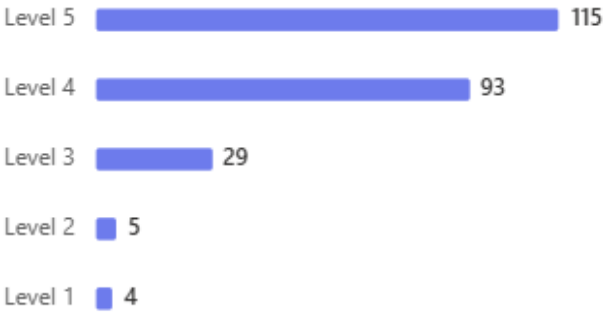
The high levels of satisfaction provided for this question confirm that different teaching styles and strategies between teachers/experts from companies and students are beneficial for the educational process. This is an improvement compared with the initial results.

Strongly agree	61
Agree	50
Neutral	12
Disagree	2
Strongly disagree	1



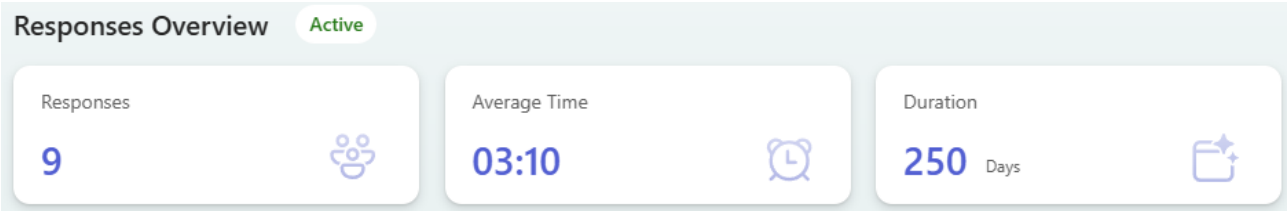
Question 10: Rate your overall experience after participating at the laboratory.

The overall experience at the selected course was evaluated by the students based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.1 was obtained which is higher than 3.96 previously obtained in autumn semester 2022. This means that the activities implemented in NextGEng helped the students to increase their knowledge on the selected course. The directions where these improvements can be seen are: (1) activities in collaboration with foreign teachers and/or experts from companies, (2) didactic materials and (3) soft/green skills.



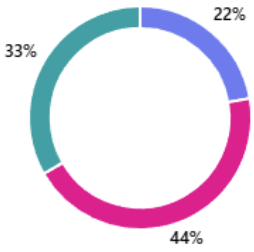
2.2 Survey for teachers (spring semester 2025)

A total of 9 teachers responded to this survey with an average time to complete of 02:45 minutes. The feedback was collected from teachers that participated in team-teaching activities held in the autumn semester of academic year 2024-2025 in each partner HEIs. These activities were part of the second implementation round of TTPP where the new joint courses content (C1…C6) were delivered.



Question 1: Please select your HEI.

Of the total number of respondents, 23% answered Technical University of Cluj-Napoca (TUCN), 44% answered Jyväskylä University of Applied Sciences (JAMK) and 33% answered Universidad de Jaén (UJA).

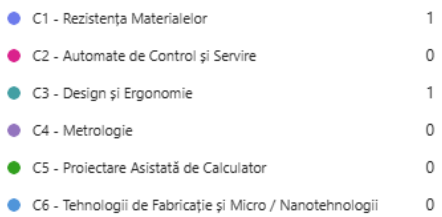


Question 2: For what course do you take the survey?

The figures below present the number of responses gathered for every joint course in each HEI (TUCN, JAMK, UJA). The number of responses is also related to the schedule of the implemented courses that was presented in *Table 3* in *Report R3.9a - Plan for analyzing the quality of pilot program*.

TUCN

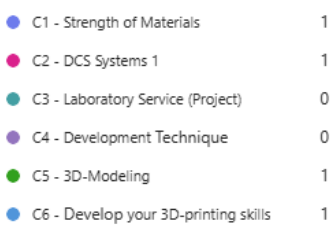
C1 – 1
C2 – 0
C3 – 1
C4 – 0
C5 – 0
C6 – 0



Total = 2

JAMK

C1 – 1
C2 – 1
C3 – 0
C4 – 0
C5 – 1
C6 – 1



Total = 4

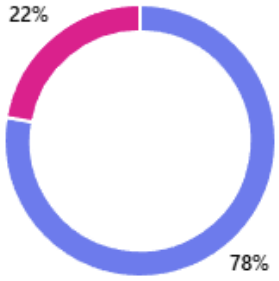
UJA

C1 – 0
C2 – 1
C3 – 0
C4 – 1
C5 – 1
C6 – 0

Total = 3

Question 3: The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

According to the responses, 100% of the teachers agree that the course promotes soft skills. The percentage is like the one obtained from the survey addressed to the students.



Question 4: The course content integrates eco-friendly concepts (green skills)?

100% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills). In the survey addressed to the students, 65% of the students agreed that green skills are present on the courses. Although eco-friendly concepts are integrated in the courses some students have problems identifying them.

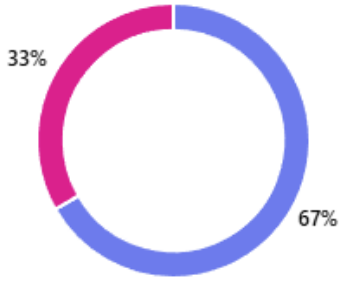
The approaches proposed in NextGEng project aim to increase student's green skills (impact on the environment based on their decisions in the development and life span of a certain engineering product).

Strongly agree	5
Agree	4
Neutral	0
Disagree	0
Strongly disagree	0

Question 5: The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

According to the teachers, all the teaching materials are compatible with digital learning technologies which agree with the responses provided by students.

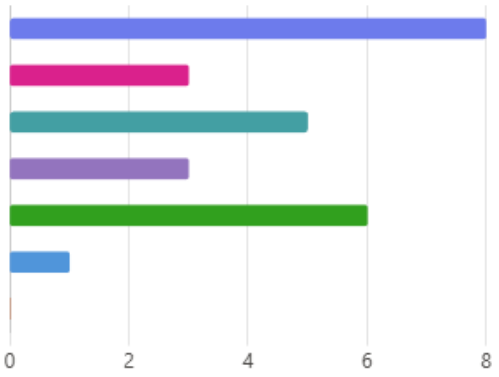
Strongly agree	6
Agree	3
Neutral	0
Disagree	0
Strongly disagree	0



Question 6: Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

The responses provided to this question highlight that teachers are familiar with modern teaching methods such as problems-based learning, project/game-based learning, and cooperative-learning. NextGEng aims also to improve cooperative teaching/learning between the teachers involved in the project.

Problem-based learning	8
Flipped classroom	3
Project-based learning	5
Inquiry-based learning	3
Cooperative learning	6
Game-based learning	1
I never heard about these methods	0



Question 7: Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

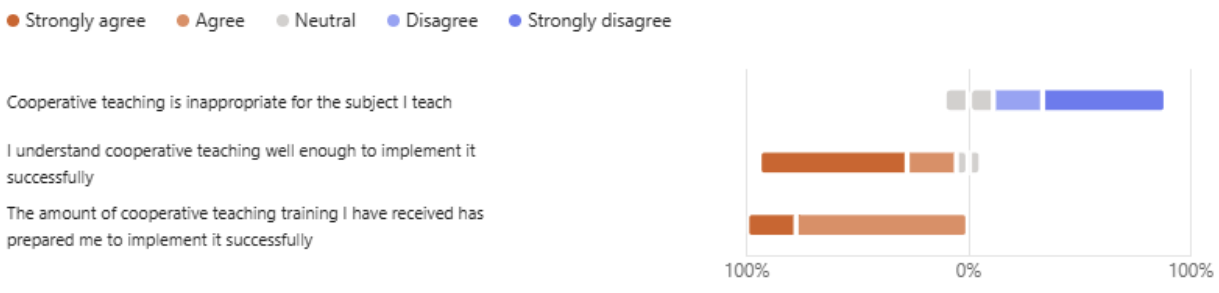
Cooperative teaching/learning is very important to improve the educational process. As can be seen at this level of TTPP implementation, 100% of the teachers have collaborations with other teachers or experts from companies when doing teaching activities. This is a very good result considering that only 50% of the teachers agreed with this question on the first survey (autumn semester 2022).

Question 8: Did you find it useful in the context of your course?

Teachers who responded with "Yes" at Question 7 also agreed that cooperative/teaching learning is useful in the context of their course.

Question 9: To what extent do you agree with the following statements?

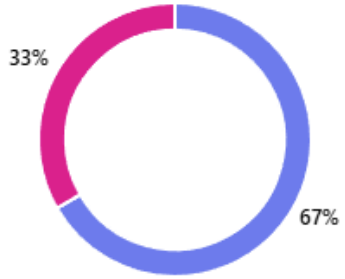
Regarding the level of understanding of cooperative teaching through practice or training, 90% of the teachers consider that they can manage such types of activities. However, there's still some of them who consider additional training and practice is necessary for them.



Question 10: Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

The initial percentage at this question was 38%. Only a third of the teachers confirmed that they have activities in collaboration with industry companies. Compared with the current results, the situation has clearly improved. Now, we have 100% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies.

Strongly agree	6
Agree	3
Neutral	0
Disagree	0
Strongly disagree	0



Question 11: The theoretical aspects of the course are closely related to industry practical applications?

The examples presented at the lectures on the course are related to practical applications. This can be seen from the results, as 100% of the teachers agreed with this situation. Also, here we have seen a slight improvement compared with the initial results.

Strongly agree	5
Agree	4
Neutral	0
Disagree	0
Strongly disagree	0

Question 12: Rate your overall experience at the course considering the following aspects:

- ***promotion of eco-friendly concepts and soft skills***
- ***compatibility of course materials with digital teaching and learning***
- ***cooperative teaching methods used at the course***
- ***interaction with industry***

The overall experience at the selected course was evaluated by the teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average rating of 4.78 was obtained which is higher than 3.88 previously obtained in autumn semester 2022. This means that the

activities implemented in NextGEng project helped the teachers to upgrade their teaching materials, to increase their team-teaching abilities and the collaborations with experts from industry.

3. Conclusion and further improvements

Based on the analysis performed in Chapter 2, at this level of TTPP implementation the following conclusion and further improvements directions are presented:

1) There is a small percentage of students that are not sure what the **learning outcomes** of the course they attend. Learning outcomes are very important because they are measurable skills, abilities, knowledge, or values that describe what the students can do after completing the course (learning activity). **The modules were designed in such a way that learning outcomes are presented in the beginning of both team-teaching activities (lectures and laboratories). It is expected that these measures will increase the percentage in this case.**

2) The feedback obtained from the survey sent to students in **autumn/spring semester 2022/2023** highlighted the fact that almost **50% of the students considered that green skills are not present on the course**. On the other hand, **80% of the teachers consider that the course they teach promotes eco-friendly concepts (green skills).** This means that although eco-friendly concepts are integrated in some courses, students have problems identifying them. **The situation has been improved since the start of TTPP and the current value of 75% suggests that the new learning materials created in the project facilitate students to understand these aspects much better.**

3) Almost **92% of the students agreed that they had international visiting teachers on the course**. This is a big improvement compared to the initial values obtained in autumn/spring semester 2022/2023 (**only 6% of the students answered "Yes" to this question**). This is a clear indicator that **NextGEng project has widened the interactions between students and international teachers**. This is a clear indicator that NextGEng project has widened the interactions between students and international teachers. This offer students a new international/European learning platform/environment allowing them to experience different learning (methods, content, applications) approaches that are used in other EU HEIs and at the same time develop new soft skills related to communication.

4) We now have **100% of teachers that have laboratory activities/tasks (projects) in collaboration with industry companies**. This indicator is much better after implementing TTPP because in the beginning only a **third of the teachers** confirmed that they have these types of activities.

5) The overall experience at the selected course was evaluated by the students and teachers based on a rating score from 1 to 5 (Rating Scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). An average **rating of 4.34 was given by students** and **4.44 by teachers**. The results are higher compared with the initial ones. This indicates that the degree of satisfaction has clearly improved.

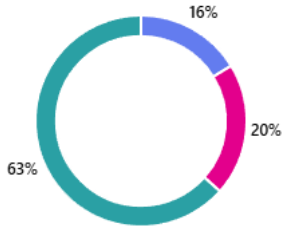
Responses Overview

Active

Responses	Average Time	Duration
246	02:38	251 Days

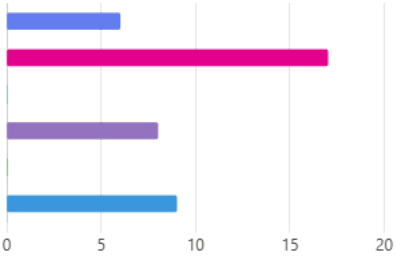
1. Please select your University.

Technical University of Cluj-Napoca	40
Jyväskylä University of Applied Sciences	50
Universidad de Jaén	156



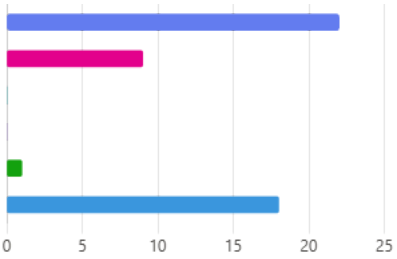
2. For what course do you take the survey?

C1 - Rezistența Materialelor	6
C2 - Automate de Control și Servire	17
C3 - Design și Ergonomie	0
C4 - Metrologie	8
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	9



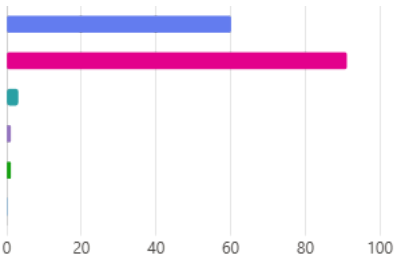
3. For what course do you take the survey?

C1 - Strength of Materials	22
C2 - DCS Systems 1	9
C3 - Laboratory Service (Project)	0
C4 - Development Technique	0
C5 - 3D-Modeling	1
C6 - Develop your 3D-printing skills	18



4. For what course do you take the survey?

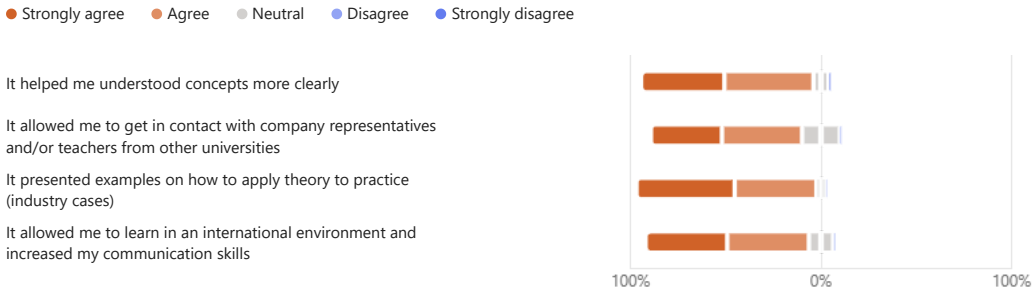
C1 - Elasticity and Strength of Materials	60
C2 - Industrial Automation	91
C3 - Engineering Project	3
C4 - Metrology	1
C5 - Graphics Engineering	1
C6 - Applied Technologies to Production	0



5. Did you had laboratory activities in collaboration with foreign teachers and/or experts from companies?

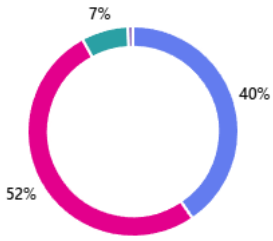
Yes	126
No	120

6. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



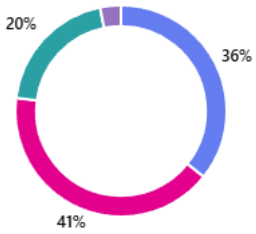
7. The theoretical aspects of the course were closely related to industry practical applications/laboratories thus increasing my abilities to solve real-life prob lems.

Strongly agree	51
Agree	65
Neutral	9
Disagree	1
Strongly disagree	0



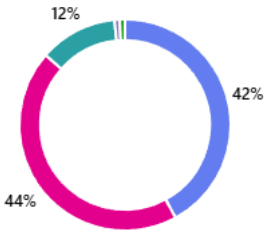
8. Do eco-friendly concepts (green skills) were integrated in the laboratory content that aim to raise awareness to students on the influence/impact on envi ronment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	45
Agree	52
Neutral	25
Disagree	4
Strongly disagree	0



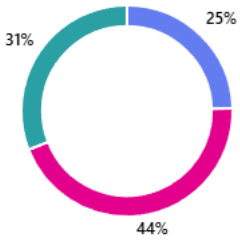
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	53
Agree	56
Neutral	15
Disagree	1
Strongly disagree	1



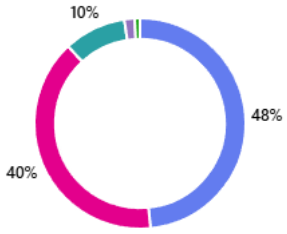
10. Was the laboratory material in a domestic or foreign language or both?

Domestic	31
Foreign	56
Both	39



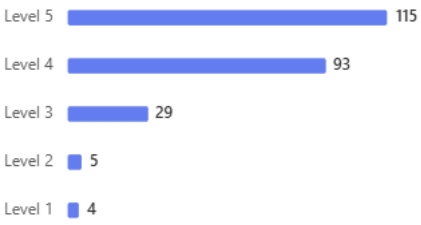
11. Did you find useful to participate in learning activities with different teaching styles and strategies?

Strongly agree	61
Agree	50
Neutral	12
Disagree	2
Strongly disagree	1



12. Rate your overall experience after participating at the laboratory.

4.26
Average Rating



13. Do you have any comments/suggestions to further improve the team-teaching activity?

244
Responses

Latest Responses
"Its a good activity"
"Congratulations!"
"-"
...

19 respondents (8%) answered Good for this question. Update

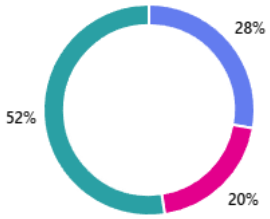
Responses Overview

Active

Responses	Average Time	Duration
126	03:23	251 Days

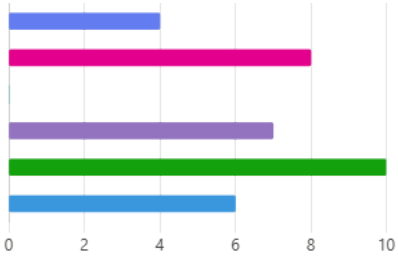
1. Please select your HEI.

Technical University of Cluj-Napoca	35
Jyväskylä University of Applied Sciences	25
Universidad de Jaén	66



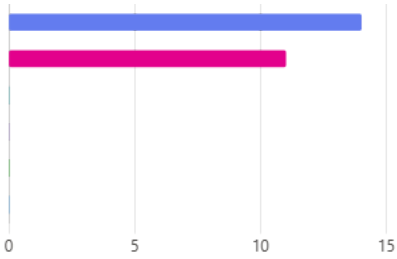
2. For what course do you take the survey?

C1 - Rezistența Materialelor	4
C2 - Automate de Control și Servire	8
C3 - Design și Ergonomie	0
C4 - Metrologie	7
C5 - Proiectare Asistată de Calculator	10
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	6



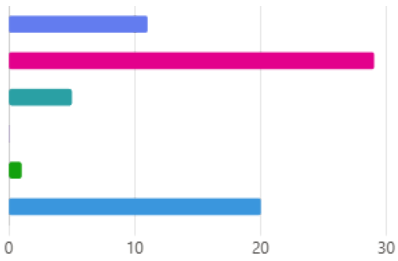
3. For what course do you take the survey?

C1 - Strength of Materials	14
C2 - DCS Systems 1	11
C3 - Laboratory Service (Project)	0
C4 - Development Technique	0
C5 - 3D-Modeling	0
C6 - Develop your 3D-printing skills	0



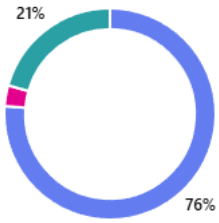
4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	11
C2 - Industrial Automation	29
C3 - Engineering Project	5
C4 - Metrology	0
C5 - Graphics Engineering	1
C6 - Applied Technologies to Production	20



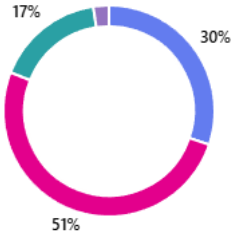
5. Do you know the learning outcomes of the course?

Yes	96
No	4
Maybe	26



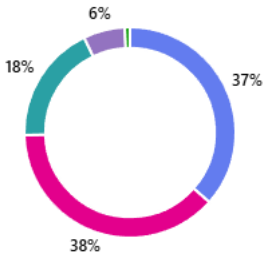
6. Did the course promoted soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	38
Agree	64
Neutral	21
Disagree	3
Strongly disagree	0



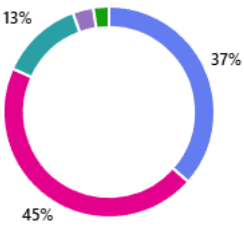
7. Do eco-friendly concepts (green skills) were integrated in the course content that aim to raise awareness to students on the influence/impact on environ ment based on their decisions in the developing and life span of a certain engineering product?

Strongly agree	46
Agree	48
Neutral	23
Disagree	8
Strongly disagree	1



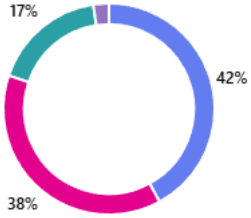
8. The course content was appropriately challenging (not too hard but not too easy).

Strongly agree	46
Agree	57
Neutral	16
Disagree	4
Strongly disagree	3



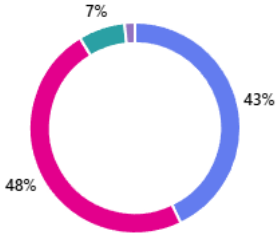
9. The instructional materials (i.e., books, readings, handouts, study guides, lab manuals, multimedia, software) increased my knowledge and skills in the subject matter.

Strongly agree	53
Agree	48
Neutral	22
Disagree	3
Strongly disagree	0



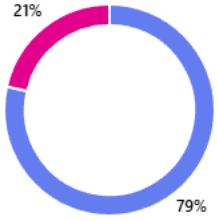
10. The teacher provided the necessary digital teaching tools to communicate with him and/or your colleagues, to download didactic materials, to upload assignments, etc.?

Strongly agree	54
Agree	61
Neutral	9
Disagree	2
Strongly disagree	0



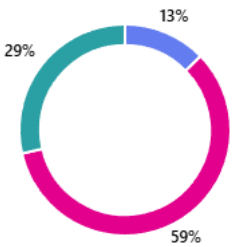
11. Have you had international visiting professors at the course?

Yes	99
No	27



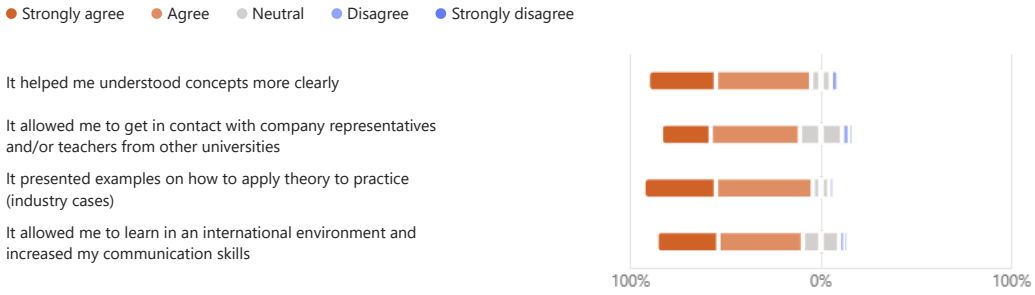
12. Was the learning material in a domestic or foreign language or both?

Domestic	16
Foreign	74
Both	36



13. To what extent do you agree with the following statements?

14. How would you appreciate the teaching activity in collaboration with foreign teachers and/or company experts?



15. Did you find useful to participate in learning activities with different teaching styles and strategies?

16. Rate your overall experience at the course considering the following aspects:

- learning outcomes
- course content and quality of the teaching materials
- internationalization
- teaching methods used at the course

17. Do you have any comments/suggestions to further improve the team-teaching activity?

123
Responses

Latest Responses
"Perhaps exercises to be delivered"
"It's all all right"
"Well done!"
• • •

13 respondents (10%) answered good for this question. Update

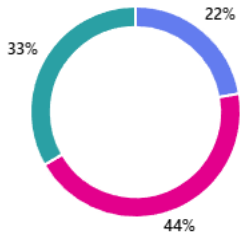
Responses Overview

Active

Responses	Average Time	Duration
9	03:10	251 Days

1. Please select your HEI.

Technical University of Cluj-Napoca	2
Jyväskylä University of Applied Sciences	4
Universidad de Jaén	3



2. For what course do you take the survey?

C1 - Rezistența Materialelor	1
C2 - Automate de Control și Servire	0
C3 - Design și Ergonomie	1
C4 - Metrologie	0
C5 - Proiectare Asistată de Calculator	0
C6 - Tehnologii de Fabricație și Micro / Nanotehnologii	0

3. For what course do you take the survey?

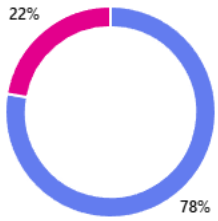
C1 - Strength of Materials	1
C2 - DCS Systems 1	1
C3 - Laboratory Service (Project)	0
C4 - Development Technique	0
C5 - 3D-Modeling	1
C6 - Develop your 3D-printing skills	1

4. For what course do you take the survey?

C1 - Elasticity and Strength of Materials	0
C2 - Industrial Automation	1
C3 - Engineering Project	0
C4 - Metrology	1
C5 - Graphics Engineering	1
C6 - Applied Technologies to Production	0

5. The course promotes soft skills such as teamwork, understand problems, think critically, decision-making etc.?

Strongly agree	7
Agree	2
Neutral	0
Disagree	0
Strongly disagree	0

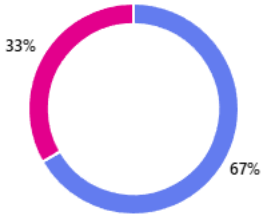


6. The course content integrates eco-friendly concepts (green skills)?

Strongly agree	5
Agree	4
Neutral	0
Disagree	0
Strongly disagree	0

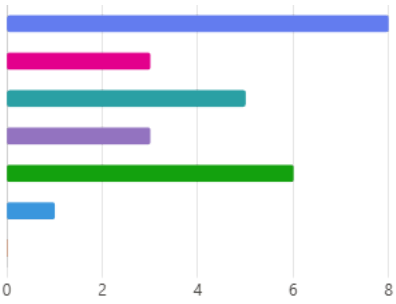
7. The course materials are compatible with digital teaching and learning tools from your Learning Management System (LMS)?

Strongly agree	6
Agree	3
Neutral	0
Disagree	0
Strongly disagree	0



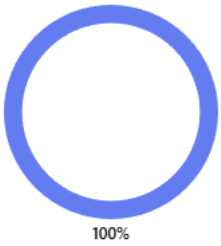
8. Had you thought the course using one or more of the following teaching methods (multiple choices can be made)?

Problem-based learning	8
Flipped classroom	3
Project-based learning	5
Inquiry-based learning	3
Cooperative learning	6
Game-based learning	1
I never heard about these methods	0



9. Did you had teaching activities in collaboration with foreign teachers and/or experts from companies?

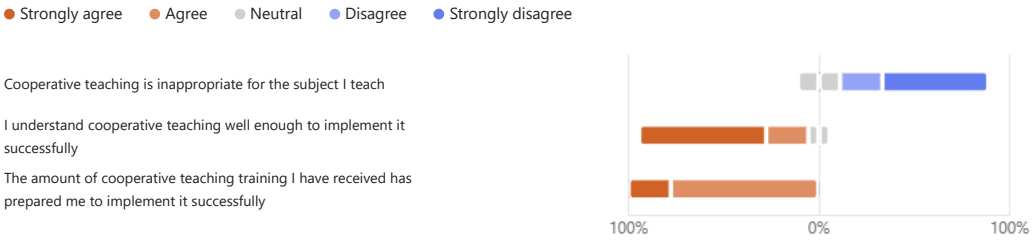
Yes	9
No	0



10. Did you find it useful in the context of your course?

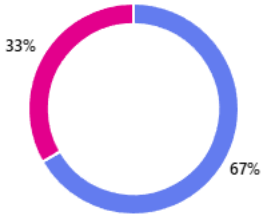
Strongly agree	8
Agree	1
Neutral	0
Disagree	0
Strongly disagree	0

11. To what extent do you agree with the following statements?



12. Did you had laboratory activities/tasks (projects) in collaboration with industry companies?

Strongly agree	6
Agree	3
Neutral	0
Disagree	0
Strongly disagree	0



13. The theoretical aspects of the course are closely related to industry practical applications?

Strongly agree	5
Agree	4
Neutral	0
Disagree	0
Strongly disagree	0

14. Rate your overall experience at the course considering the following aspects:

- promotion of eco-friendly concepts and soft skills
- compatibility of course materials with digital teaching and learning
- cooperative teaching methods used at the course
- interaction with industry

4.44
Average Rating

15. Do you have any comments/suggestions to further improve the team-teaching activity?

9
Responses

Latest Responses

"To develope teaching activities in collaboration with foreign teachers and experts ..."

"-"

"-"

• • •