Co-funded by the European Union

Student trained at new programs, courses

Deliverable D4.1

Consolidated report Part 1

Project: Digital transformation of HEIs education process in Ukraine and Moldova for sustainable engagement with enterprises, DIGITRANS
101127683 — DIGITRANS — ERASMUS-EDU-2023-CBHE

Date: 2026

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 the EACEA can be held responsible for them.

Contents

Records of changes

Version#	Status of document	Date	Author	Comments
0.1	Draft	24.11.2025	A. Zabašta RTU	To be continued
0.2	Draft	19.02.2026	I. Ion, UDJG	To be continued
0.3	Draft	18.05.2026	UDJG, KhNAHU, CPNU, LNTU, UTM, USARB, USC	Partners institutional reports
1.0	Consolidated report	24.05.2026	I. Ion, UDJG	First consolidated report
1.1	Consolidated report	25.05.2026	A. Zabašta RTU	Consolidated report

Quality Assurance

No.	Date	Version	Reviewed by
1	26.05.2026	1.1	Nadežda Kuņicina Project Quality Assurance Team

Executive Summary

After the universities in UA and MD have determined which new courses to introduce and which courses to modernize, they have moved on to implementing them in the curricula and collecting feedback from students who have taken the courses and from professors who have taught the courses regarding their satisfaction with the courses.

This is done upon completion of the courses for the fall and spring semesters. Measuring the student satisfaction, engagement and performances (progress) helps instructors/teachers understand what to continue doing and what needs adjustment.

The report presents Deliverable *D4.1 "Student trained at new programs, courses"* issued within the Erasmus+ DIGITRANS project. It shows the students' attraction at the new and modernised courses, how the feedback from the traineeships and academic/teaching staff was collected and what are the results of course testing. The methodology used to evaluate the new and modernised courses is the same in all involved universities.

The report demonstrates the successful implementation of new and modernised courses by all partner universities CPNU, KhNAHU, LNTU, USC, USARB and the UTM. Positive feedback from both students (confirming the usefulness and quality of teaching) and academic/teacher staff (validating the level of involvement and preparation) indicates that these courses have achieved their objectives at the highest level.

The teaching staff mentioned gave their consent in the cases, when their individual survey comments appear in this public deliverable. The universities, which arranged the survey, ensured that these staff received the following link to the privacy statement of the EU Funding & Tenders Portal: https://ec.europa.eu/info/fundingtenders/opportunities/docs/2021-2027/common/ftp/privacy-statement_en.pdf. This is to follow grant agreement article 15.2 about the data processing by the beneficiaries.

1. Introduction

The Report on students trained at new programs, courses with feedback from traineeships provides a description of a progress on the development and implementation of study programs at partner universities in autumn semester of 2025.

The report of testing new programs, courses contain:

- students' attraction for the new and modernised study programs and courses.
- feed-back from students by subjects.
- feed-back from academic/teacher staff involved in teaching of students by subjects.
- results of final testing by subjects.

The report was built based on reports elaborated by higher education institutions of Moldavian and Ukrainian partners: Chernihiv Polytechnic National University (CPNU), Kharkiv National Automobile and Highway University (KhNAHU), Lutsk National Technical University (LNTU), Technical University of Moldova (UTM), Bogdan Petriceicu Hasdeu State University (USC) and Alecu Russo State University of Balti (USARB).

According to TECHNICAL DESCRIPTION (PART B)

- Number of new developed/ modernised and accredited study programs – 9 programs.
- Number of new/ modernised courses – 35 courses.
- Number of The European Credit Transfer and Accumulation System (ECTS) – 160 credits.

The new courses/lab practices and their training programs developed and / or updated by the partner universities:

Chernihiv Polytechnic National University (CPNU)

- Study program "Computer Engineering": 3 courses (bachelor's level).
- Study program "Telecommunications and Radio Engineering": 2 courses (bachelor's and master's level).
- Study program "Electronics of robotic systems and complexes": 1 course (bachelor's level).

Kharkiv National Automobile and Highway University (KhNAHU)

- Study program "Electric vehicles and automotive electronics": 7 courses (bachelor's level).

Lutsk National Technical University (LNTU)

- Study program "Motor Vehicle Transport": 5 courses (bachelor's level).
- Study program "Road transport engineering": 1 course (master's level).

Technical University of Moldova from Chisinau (UTM)

- Study program "Electromechanics engineering": 3 courses (bachelor's level).

Alecu Russo Balti State University (USARB)

- Study program "Engineering and management in automotive transport": 7 courses (bachelor's level).

Cahul State University “Bogdan Petriceicu Hasdeu” (USC)

- Study program "Engineering and Management in Machine Construction" (Automotive): 6 courses (bachelor's level).

2. Description of the method of courses testing

2.1. Feedback from the students by subjects

According to the project plan in the Autumn and Spring semesters new and modernised courses should be tested. For a testing procedure we used the template sheets of students.

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*):_____
Level of training course (*Рівень вищої освіти*): _____
Date (*Дата заповнення*): _____
Name of academic(s) (*ПІБ викладача*): _____
Department (*Кафедра*):_____

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					
2	The course was well-structured and the themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*					
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*					
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*					
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*					
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*					
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*					
8	Recommended literature sources were					

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
	accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*					
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*					
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*					

What did you like in the course?
Чим вам сподобався цей курс?

_____

_____

Outline 3 points you would like to take with you/have learnt in this class
Виділіть найбільш значущі з Вашого погляду знання, які Ви придбали на цих заняттях

_____

_____

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea, please include your email address)
Чи є у вас якісь пропозиції щодо подальшого вдосконалення курсу? (Якщо так, то прохання уточнити, і якщо ви хочете, щоб з Вами зв'язалися з цього питання, будь ласка, вкажіть адресу своєї електронної пошти)

_____

_____

If you do not mind, please could you give us some additional more information about yourself

Чи можна дізнатися більше інформації про вас?

Gender: Male/Female/Prefer not to specify

Age: 16-21 22-30 31-40 41-50 51-60 61+

Status: Home Student EU Student International Student

Consolidated result of students' answers about the tested course
Зведений результат відповідей студентів про апробовані курси.

Title of course (*Назва курсу*):_____
Level of training course (*Рівень вищої освіти*): _____
Name of academic(s) (*ПІБ викладача*): _____
Department (*Кафедра*):_____
How many questionnaire forms have been processed? (*Яку кількість анкет оброблено?*)_____

How many questionnaire forms were found valid? (*Яка кількість анкет є дійсними?*)__

Statistics on the answers given on the course (in percentage).

Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					
The course was well-structured, and the themes were explained in a comprehensible manner *Курс був добре структурованим і теми були пояснені у доступній формі*					
The logical structure of the lecture was maintained *Логічна структура лекцій витримана*					
Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*					
Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*					
Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*					
During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*					
Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*					
The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					
The time for the completing of the practical tasks was enough *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					
The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною*					

Consolidated feedback from the students about all courses testing

Date of testing:
How many questionnaire forms have been proceeded?
How many questionnaire forms were found valid?

Table 1: Statistics on the answers given on the tested courses (in percentage).

Name of course	Degree of course	Testing results				
		Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %

2.2. Feedback from the academic/teaching staff involved in teaching of students by subjects

According to the project plan in the autumn and spring semesters feedback from the academic/teacher staff involved in teaching of students are evaluated by subjects.

Copies of questionnaires filled in by the academic/teacher staff are shown in Annex 1.

Questionnaire for testing procedure of academic staff
Анкета для опитування викладачів

Title of training course (*назва курсу*): _____

Level of training course (Bachelor, Master) (*Рівень вищої освіти*):_____

Date (*дата*): _____

Name of Trainer(s) (*ПІБ викладача*): _____

Department (*кафедра*): _____

Full number of students registered for the course *Повна кількість студентів, зареєстрованих на курс*				
Evaluation of average attendance of the classes, (%) *Оцінка середньої відвідуваності занять, (%)*	Lect (*Лекції*)	Pract (*Практ.з*)	Lab (*Лаб. З*)	
The number of students who have attended the final control assessment (the exam)	High (A, B)	Average (C)	Low (D, E)	Failed (F, FX)

Кількість студентів, які мають кінцеву контрольну оцінку (іспит)				
The proportion of tasks (in %) of all included in the course, aimed at: *Питома вага завдань (у %) від усіх включених у курс, спрямованих на:*				
pure application of knowledge *чисте застосування знань*	development of critical thinking, causal-investigatory analysis, development of practical experience and skills *розвиток критичного мислення, причинно-наслідковий аналіз, розвиток практичного досвіду та навичок*	development of new competences, independent thinking, the ability to non-standard approaches in solving problems and making decisions *розвиток нових компетенцій, самостійного мислення, здатності до нестандартних підходів у вирішенні проблем і прийнятті рішень*		
The proportion of students who have completed these tasks with the highest grade (in %) *Частка студентів, які виконали ці завдання з найвищою оцінкою (у %)*				
pure application of knowledge *чисте застосування знань*	development of critical thinking, causal-investigatory analysis, development of practical experience and skills *розвиток критичного мислення, причинно-наслідковий аналіз, розвиток практичного досвіду та навичок*	development of new competences, independent thinking, the ability to non-standard approaches in solving problems and making decisions *розвиток нових компетенцій, самостійного мислення, здатності до нестандартних підходів у вирішенні проблем і прийнятті рішень*		

1. Why do you think this course is important? (*У чому, на вашу думку, важливість цього курсу?)*

2. Point out a few basic things that you consider most important in mastering from this course. *(Укажіть кілька основних пунктів, які ви вважаєте найважливішими для засвоєння цього курсу?)*

3. Do you have any suggestions for further improvement of the course? (*Чи є у вас пропозиції щодо подальшого вдосконалення курсу?)*

If you do not mind, please could you give us some additional information about yourself?

Status: assistant/ lecturer/ assistant professor/ professor

Teaching experience: just started/ 3-7years/ 7-15years/ 15-20years/ >20years/

_____ Signature

2.3. Feedback from the students' organisations

A form of a student organisation (Student Parliament, Self-Governance, etc.) is expected to complete this testing. The recommendation is to use the same questionnaire form developed for students (see chapter 2.1), but to summarise the results in free form. In case of such organisation absence at the university this fact should be mentioned in the report.

Date of testing:

How many questionnaire forms have been proceeded?

How many questionnaire forms were found valid?

Statistics on the answers given on the course (in percentage)

Course Name of course	Degree of course	Testing results				
		Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %

Comments and conclusions about testing results.

Head of Committee _____ Signature

2.4. Evaluation of the courses testing results

The Ukrainian and Moldavian universities provide course testing results twice: after autumn academic session and after spring academic session. Therefore, we are going to notice a dynamic in students and teaching staff perception during course testing.

Each partner used 4 different kinds of feedback forms:

- Student attraction activity overview (number of attracted students);
- Student feedback testing: consolidated result of students' answers + Table with statistics on students' answers;
- Feedback from the academic/teacher staff involved in teaching of students by subjects: the results of processing the questionnaires of teachers (attachment of teachers' questionnaire);

Chernihiv Polytechnic National University (CPNU)

Description of the courses tested during the first semester of the 2025-2026 academic year is given in Table 1.

Table 1. The training programs and courses were developed and tested in 2025-2026 academic year.

Course/Lab title	Updated or totally new	Level (Bachelor, Master 5-year course)	ECTS credit points	The teaching/training methodologies developed/adopted e.g. e-learning/ training modalities, practical placements in enterprises, etc.	The link to the university webpage	Date of accreditation	The status / document of accreditation
Tested							
Microcontroller Systems Programming	New	Bachelor	5	classic lessons, e-learning	https://stu.cn.ua/en/	2025	Authorised
Systems on Chip	New	Bachelor	5	classic lessons, e-learning	https://stu.cn.ua/en/	2025	Authorised
Design of Digital Devices	New	Bachelor	5	classic lessons, e-learning	https://stu.cn.ua/en/	2025	Authorised
Electrical Circuit Design	updated	Bachelor	12	classic lessons, e-learning	https://stu.cn.ua/en/	2025	Authorised
Digital Systems of Telecommunications	updated	Master	5	classic lessons, e-learning	https://stu.cn.ua/en/	2025	Authorised
Digital electronics devices	updated	Bachelor	11	classic lessons, e-learning	https://stu.cn.ua/en/	2025	Authorised

Students' attraction

Students of Educational-scientific institute of electronic and information technologies from the following study programs were involved in the survey:

- Computer engineering (Bachelor, 3rd year), groups KI-231 (23 students), KI-232 (19 students);
- Computer engineering (Bachelor, 4th year), groups KI-221 (25 students), KI-222 (23 students);
- Telecommunications and Radio Engineering (Bachelor, 2nd year), groups PA-241 (7 students);
- Telecommunications and Radio Engineering (Master,1st year), group MPA-251 (4 students);
- Electronics of robotic systems and complexes" (Bachelor, 3rd year), group PE-231 (10 students).

Course title	No. of enrolled students

Microcontroller Systems Programming	44
Systems on Chip	58
Design of Digital Devices	58
Electrical Circuit Design	7
Digital Systems of Telecommunications	4
Digital electronics devices	10
Total	**181**

Feedback from the students by subjects

Testing of students in new and modernized courses was carried out in the period 05.05.2026 - 19.05.2026 using standard “Questionnaire for students' assessment of the course they have completed” developed in the DIGITRANS projects and represented in section 2.1.

Course title	How many questionnaire forms have been proceeded	How many questionnaire forms were found valid
Microcontroller Systems Programming	44	44
Systems on Chip	58	58
Design of Digital Devices	58	58
Electrical Circuit Design	7	7
Digital Systems of Telecommunications	4	4
Digital electronics devices	10	10
Total	181	181

Table 2: Statistics on the answers given on the tested courses (in percentage).

Name of course	Degree of course	Testing results				
		Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Microcontroller Systems Programming	0.0	0.0	0.0	0	7.8	92.2
Systems on Chip	0.0	0.0	0.0	0.0	2.5	97.5
Design of Digital Devices	0.0	0.0	0.0	0.0	8.0	92.0
Electrical Circuit Design	0.0	0.0	0.0	2.5	10.5	87.0
Digital Systems of Telecommunications	0.0	0.0	0.0	0.0	9.0	91.0
Digital electronics devices	0.0	0.0	0.0	2.7	11.8	85.5

Total	0.0	0.0	0.0	0.1	10.2	89.7

The consolidated result of students answers about tested courses are presented below.

Co-funded by the Erasmus+ Programme of the European Union

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*): Microcontroller Systems Programming (Програмування мікроконтролерів)
Level of training course (*Рівень вищої освіти*): Bachelor (Бакалавр)
Date (*Дата заповнення*): 19.05.2026
Name of academic(s) (*ПІБ викладача*): Oleksii Krasnozhon (Олексій Красножон)
Department (*Кафедра*): Information and computer systems (Інформаційних та комп'ютерних систем)

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					100%
2	The course was well-structured and the themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*					100%
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*					100%
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*				11%	89%
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*					100
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*					100
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*				9%	91%

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
8	Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*					100%
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					100%
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*				66%	34%
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*					100%

If you do not mind, please could you give us some additional more information about yourself

Чи можна дізнатися більше інформації про вас?

Gender: **Male (36)/ Female (8)** / Prefer not to specify

Age: **16-21 (32)** **22-30 (12)** 31-40 41-50 51-60 61+

Status: Home Student EU Student International Student

Co-funded by the Erasmus+ Programme of the European Union

IGI TRANS

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*): Systems on Chip (Системи на кристалі)
Level of training course (*Рівень вищої освіти*): Бакалавр
Date (*Дата заповнення*): 19.05.2026
Name of academic(s) (*ПІБ викладача*): Andrii Rogovenko (Андрій Роговенко)
Department (*Кафедра*): Інформаційних та комп'ютерних систем

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to					100%

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
	achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					
2	The course was well-structured and the themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*					100%
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*					100%
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*				16%	84%%
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*					100%
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*					100%
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*					100%
8	Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*				12%	88%
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					100%
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*					100%
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*					100%

If you do not mind, please could you give us some additional more information about yourself

Чи можна дізнатися більше інформації про вас?

Gender: **Male (46)/ Female (12)** / Prefer not to specify

Age: **16-21 (47) 22-30 (11)** 31-40 41-50 51-60 61+

Status: Home Student EU Student International Student

Co-funded by the Erasmus+ Programme of the European Union

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*): Design of Digital Devices (Проектування цифрових пристроїв)
Level of training course (*Рівень вищої освіти*): Бакалавр
Date (*Дата заповнення*): 19.05.2026
Name of academic(s) (*ПІБ викладача*): Andrii Rogovenko (Андрій Роговенко)
Department (*Кафедра*): Інформаційних та комп'ютерних систем

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					100%
2	The course was well-structured and the themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*					100%
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*				8%	92%
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*				10%	90%
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*				10%	90%
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*				36%	67%
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*					100%
8	Recommended literature sources were accessible and helped in acquiring the course materials				5%	95%

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
	Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами					
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					100%
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*				20%	80%
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*					100%

If you do not mind, please could you give us some additional more information about yourself

Чи можна дізнатися більше інформації про вас?

Gender: **Male (46)/ Female (12)** / Prefer not to specify

Age: **16-21 (47) 22-30 (11)** 31-40 41-50 51-60 61+

Status: Home Student EU Student International Student

Co-funded by the Erasmus+ Programme of the European Union

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*): Electrical Circuit Design (Схемотехніка радіотехнічних пристроїв)
Level of training course (*Рівень вищої освіти*): Bachelor (Бакалавр)
Date (*Дата заповнення*): 15.05.2026
Name of academic(s) (*ПІБ викладача*): Yuriy Denisov (Юрій Денисов)
Department (*Кафедра*): Electronics, Automation, Robotics and Mechatronics (електроніки, автоматики, робототехніки та мехатроніки)

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					100

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
2	The course was well-structured and the themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*				14%	86%
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*				14%	86%
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*				28%	72%
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*			14%	14%	72%
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*				14%	86%
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*				14%	14%
8	Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*					100%
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					100%
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*			14%	14%	72%
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*					100%

If you do not mind, please could you give us some additional more information about yourself

Чи можна дізнатися більше інформації про вас?

Gender: **Male (5)/ Female (2)/**Prefer not to specify

Age: 16-21 (7) 22-30 31-40 41-50 51-60 61+

Status: Home Student EU Student International Student

Co-funded by the Erasmus+ Programme of the European Union

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*): Digital Systems of Telecommunications *(Цифрові системи телекомунікацій)*
Level of training course (*Рівень вищої освіти*): Master (Магістр)
Date (*Дата заповнення*): 20.05.2026
Name of academic(s) (*ПІБ викладача*): Sergii Zaitsev (Сергій Зайцев)
Department (*Кафедра*): Electronics, Automation, Robotics and Mechatronics (електроніки, автоматики, робототехніки та мехатроніки)

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					100%
2	The course was well-structured and the themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*					100%
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*				25%	75%
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*				25%	75%
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*				25%	75%
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*					100%
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*					100%
8	Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела*				25%	75%

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
	були доступні та допомагали оволодінню навчальними матеріалами					
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*					100%
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*					100%
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*				25%	75%

If you do not mind, please could you give us some additional more information about yourself

Чи можна дізнатися більше інформації про вас?

Gender: **Male (3)/Female (1)**/Prefer not to specify

Age: **16-21 (4)** 22-30 31-40 41-50 51-60 61+

Status: **Home Student** EU Student International Student

Co-funded by the Erasmus+ Programme of the European Union

Questionnaire for students' assessment of the course they have completed
Анкета для оцінки курсу студентами

Title of course (*Назва курсу*): Digital electronics devices (Пристрої цифрової електроніки)
Level of training course (*Рівень вищої освіти*): Bachelor (Бакалавр)
Date (*Дата заповнення*): 20.05.2026
Name of academic(s) (*ПІБ викладача*): Roman Yershov (Роман Єршов)
Department (*Кафедра*): Electronics, Automation, Robotics and Mechatronics
(електроніки, автоматики, робототехніки та мехатроніки)

Rate this course using the following scale (Оцініть курс, використовуючи наступну шкалу):
5 - Strongly agree (Абсолютно згоден/згодна)
4 - Partially agree (Частково згоден/згодна)
3 - Neutral assessment (Нейтральне відношення)
2 - Partially disagree (Частково не згоден / не згодна)
1 - Strongly disagree (Абсолютно не згоден /не згодна)

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
1	All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*					100%
2	The course was well-structured and the				10%	90%

No	Criterion (Критерій)	Strongly disagree	Partially disagree	Neutral assessment	Partially agree	Strongly agree
	themes were explained in a comprehensive manner *Курс був добре структурованим і теми були пояснені у доступній формі*					
3	The logical structure of the lecture was maintained *Логічна структура лекцій витримана*				10%	90%
4	Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*				20%	80%
5	Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*				20%	80%
6	Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*				20%	80%
7	During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*			20%	20%	60%
8	Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*				10%	90%
9	The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*				10%	90%
10	The time for the completing of the practical tasks was enough *Часу на виконання практичних завдань вистачило.*			10%	10%	80
11	The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною.*					100

Gender: **Male (10)**/Female/Prefer not to specify

Age: **16-21 (9)** **22-30 (1)** 31-40 41-50 51-60 61+

Status: **Home Student** EU Student International Student

Feedback from academic/teacher staff involved in teaching of students by subject

Five teachers were involved in the survey:

1) PhD, Oleksii Krasnozhon, assistant professor of Information and Computer System department, courses holder "Microcontroller Systems Programming".

2) PhD, prof., Andri Rogovenko, Head of Information and Computer System department, courses holder “Design of Digital Devices”, “Systems on Chip”.
3) DSc. Eng., Prof. Yuriy Denisov, Head of Electronics, Automation, Robotics and Mechatronics department, course holder “Digital Systems of Telecommunications”
4) DSc. Eng., Prof. Sergii Zaitsev, professor of Information and Computer System department, course holder “Electrical Circuit Design”
5) Roman Yershov, Senior lecturer of Electronics, Automation, Robotics and Mechatronics department, course holder “Digital electronics devices”

Evaluation of courses testing results

Elaboration of courses testing results was done based on the consolidated results of students answers about tested courses and Feedback from academic/teacher staff involved in teaching of students.

Bachelor’s Course « Microcontroller Systems Programming »

The results of processing the questionnaires of students

What did you like in the course?

The practical classes used a modern line of STM32 microcontrollers which are used in industrial applications and devices. This course gave the opportunity to learn microcontroller system architecture and structure and methods of its programming, better understanding the features of programming microcontroller systems and working with microcontrollers. The teacher explained the material clearly and always helped if I had any questions.

Outline 3 points you would like to take with you/have learnt in this class

Embedded systems design, working with communication protocols and with real senors.
Microcontroller’s architectural peculiarities and famous programming languages.
Experience in performing practical tasks, developing skills for independent study of the material; gaining basic knowledge about the principles of microcontroller systems.

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea, please include your email address)

To add a project activity to the classes, where students can develop a prototype of the device instead of doing practical work.

The results of processing the questionnaires of teachers

Oleksii Krasnozhon:

1. Why do you think this course is important?

The course is important because it lays the foundation for programming microcontrollers and systems based on them, which is one of the important branches of computer engineering. It helps to understand how the hardware and software components of a microcontroller system interact with each other, to analyze the need to use the appropriate peripheral devices and the features of each of them, how the microcontroller system is programmed taking into account real limitations. The value of the course lies in combining the theoretical knowledge obtained with practical skills in programming microcontroller systems, using various hardware interfaces for interaction with external executive mechanisms, and also improves the skills of mastering professional English terminology.

2. Point out a few basic things that you consider most important in mastering from this course:

1. Understanding the basic principles of microcontroller operation and the features of their architectural structure.
2. Knowledge of the features of configuring and using peripheral devices of various purposes as part of microcontrollers.
3. Acquisition of microcontroller programming skills using the low-level programming language.
4. Ability to use software and hardware tools for verification, testing and debugging of microcontroller systems.

3. Do you have any suggestions for further improvement of the course?

Possible ways to improve the course are to use more peripherals in microcontroller systems, gain skills in working with more integrated development environments, increase the complexity of the tasks, and make the tasks more comprehensive.

Bachelor's Course «Systems on Chip»

The results of processing the questionnaires of students

What did you like in the course?

Well presented information, interesting lectures and it has the practical focus of the course, especially working with the synthesis and modeling of digital circuits in Quartus and Questa. The course was informative and helped me better understand the process of creating and designing computer systems. I liked that the material was presented consistently and was supported by practical examples. During the classes, It allows the opportunity to better understand modern approaches to developing computer systems. The course combined theoretical knowledge with practical tasks and helped me better understand the principles of computer system design. The material was explained in an accessible way, and the practical examples helped me better understand the topics. The course helped me better understand the basics of designing computer systems based on programmable logic integrated circuits. While studying the subject, I got acquainted with the principles of creating digital devices, using the VHDL hardware description language, and working in the Quartus environment.

Outline 3 points you would like to take with you/have learnt in this class

The most useful knowledge for me was the modeling and design of digital devices using VHDL.
Basic knowledge of the stages of computer system design. Understanding the principles of operation and interaction of computer system components. Skills for independent study of technical material and performance of practical tasks. Understanding the principles of computer system design. Practical skills in analyzing and developing system solutions. Improving logical thinking and technical problem-solving skills. Gaining knowledge about designing various digital devices: subtractors, adders, counters, flip-flops, etc. Understanding the difference between behavioral and structural description of circuits, as well as using Generate Statement for a more compact description of repeating elements. Understanding the fundamentals of computer system design and architecture. Practical skills in analyzing and designing computer system components. Experience in applying modern technologies and tools for system design. Overall, the course was very interesting and useful.

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea, please include your email address)

It would be interesting to add more examples of the use of modern technologies in the design of computer systems and more practical tasks to consolidate the material.
It would be useful to add more practical cases and examples of modern computer systems, as well as more laboratory work using modern design software.

The results of processing the questionnaires of teachers

Andri Rogovenko:

1. Why do you think this course is important?

I think this course is important because it gives a solid foundation in system-on-chip design, which is one of the key areas of modern computer engineering. It helps students understand how hardware and software are designed together, how system performance is analyzed early in the design process, and how design decisions are made under real implementation constraints. The course is also valuable because it connects theory with practice through FPGA-based design, co-simulation, verification, and hardware/software interfacing, while also improving professional English terminology in this field.

2. Point out a few basic things that you consider most important in mastering from this course.

The most important things to master in this course are:

- Hardware/software co-design principles — especially partitioning, real-time scheduling, and hardware acceleration.
- Virtual prototyping and co-simulation — understanding how to validate system functionality before full implementation.
- High-level synthesis and custom hardware accelerator design — including architecture and micro-architecture trade-offs.
- SoC integration — communication architectures, IP interfacing, and interface synthesis.
- Verification, testing, and FPGA prototyping — because these skills are essential for implementing and validating real SoC-based systems.

3. Do you have any suggestions for further improvement of the course? (*Чи є у вас пропозиції щодо подальшого вдосконалення курсу?)*

Since the course already covers important topics such as co-design, virtual prototyping, synthesis, integration, and FPGA prototyping, it could be improved further by adding more end-to-end practical case studies where students go through the complete SoC development flow from system specification to FPGA implementation. It would also be useful to include more project-based tasks on interface design, verification, and performance trade-off analysis, because these topics are explicitly listed in the intended learning outcomes.

Bachelor's Course « Design of Digital Devices »

The results of processing the questionnaires of students

What did you like in the course?

The information is explained in an accessible way. It gains useful skills in laboratory classes. And has practical focus. The teacher explained the material clearly and always helped if questions arose. The course combined theory with practical tasks and gave a good understanding of digital system design. The material was explained in an accessible way and the examples helped to better understand the topics. The course was clear and informative. It allows better acquaints with the principles of digital systems, STM32 microcontrollers, and software architecture. The material was useful because it helped me understand how the microcontroller works, interacts with peripheral devices, and exchanges data via UART.The course was well organized and combined theoretical knowledge with practical programming tasks. I enjoyed working with digital systems, microcontrollers, and real-world hardware examples.

Outline 3 points you would like to take with you/have learnt in this class

The most useful knowledge for me was in modeling and designing digital devices. Obtaining basic knowledge about the principles of digital systems. Developing skills for independent study of the material. Experience in completing practical tasks. Understanding of architecture and design principles of digital systems. Practical experience in low-level programming and debugging code. Improved problem-solving and analytical thinking skills. Gaining practical skills in working with the STM32, ESP32 microcontroller.

Deepening skills in using the Wokwi online simulator. Understanding of digital systems architecture and microcontroller programming. Practical skills in developing and debugging programs for digital systems. Experience in applying theoretical knowledge in real hardware projects.

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea please include your email address)
It would be useful to add more practical tasks and examples of real-world applications of digital systems. For improvement, more step-by-step examples of setting up the development environment and more explanations of common mistakes when working with microcontrollers could be added.
It would be useful to add more real-world project examples and additional labs with modern embedded systems platforms and IoT devices. Overall, the course was very informative and useful.

The results of processing the questionnaires of teachers

Andri Rogovenko:

1. Why do you think this course is important?

The course is important because it gives students a solid foundation in digital hardware design, which is essential for understanding how modern electronic systems are built. It helps to connect theoretical knowledge of digital logic with practical skills in designing, synthesizing, and verifying digital circuits for ASICs and FPGAs. In addition, the course is very useful for working with microcontrollers and embedded systems, because it develops a deeper understanding of how digital components, interfaces, and hardware structures operate at a low level. This knowledge is important for a computer engineering student, since it supports both hardware development and effective hardware-software integration in real applications.

2 Point out a few basic things that you consider most important in mastering from this course.

The most important things to master in this course are:

- Digital design methodology
- HDL coding skills
- Synthesis and implementation.
- Verification and testbenches
- Practical design of digital blocks
- Low-level hardware understanding
- Connection to microcontrollers and embedded systems

3 Do you have any suggestions for further improvement of the course?

One possible improvement would be to add more practical examples and mini-projects that connect digital device design with real embedded applications, especially FPGA-based systems and microcontroller-related interfaces. It would also be useful to include more hands-on work with verification, testbenches, and synthesis results, so that students can better see how HDL code is transformed into real hardware. In addition, the course could be improved by including a few more case studies that compare ASIC, FPGA, and embedded implementation approaches, because this would help students better understand the practical role of digital design in computer engineering.

Bachelor’s Course « Electrical Circuit Design »

The results of processing the questionnaires of students

What did you like in the course?

The teaching of the course material is original and interesting. Examples of practical use were given.
The teaching of the course material is original and interesting. Examples of practical use were given.

Course theory and practice were provided simultaneously and in a balanced manner. Learned to read electrical diagrams. Understand better how to describe processes in radio electronics diagrams.
Learned to do calculations of electrical diagrams. Provides a connection between the mathematical description of processes and practical materials. Original presentation of the material. The teacher has a good understanding of the theoretical and mathematical part of the course. The course structure is well laid out. The material is taught specifically for future radio electronics engineers. Theoretical and practical material are well connected to each other.

Outline 3 points you would like to take with you/have learnt in this class

Theoretical knowledge of the physics of processes in electrical circuits. Interesting practical skills. Examples of practical use. I understood well how to understand and read radio electronics circuits. Knowledge on calculating circuits of amplifiers on transistors and generators. Practical skills in calculating radio electronics circuits. Visual representation of processes in circuits. Training in describing the operation of radio circuits. Skills in using radio circuit simulator programs. Practical use of device circuits.

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea please include your email address).

Provide more calculations of radio electronics circuits. More examples of calculation of circuits used in radio transmitters and receivers. Provide more modeling examples. Increase the part of the course where calculations and examples of using radio circuits are discussed.

The results of processing the questionnaires of teachers

Yuriy Denisov:

1. Why do you think this course is important?

The course lays the foundation for knowledge of the circuitry of radio-electronic devices.

2. Point out a few basic things that you consider most important in mastering from this course.

1.Knowledge of physical processes in electric stakes
2. Knowledge of the fundamentals of the mathematical apparatus of differential numbers.
3. Start new software products for modeling electrical circuits.

3. Do you have any suggestions for further improvement of the course?

Further, a more thorough course needs to be connected with a wider range of applied knowledge and applications of practical knowledge.

Master's course « Digital Systems of Telecommunications »

The results of processing the questionnaires of students

What did you like in the course?

The course combined theoretical knowledge with practical aspects of modern telecommunication systems. The topics were relevant to current technologies, and the course helped me better understand how digital communication networks operate in real life. It has a good logical structure of the material and the opportunity to develop analytical and technical skills.

Outline 3 points you would like to take with you/have learnt in this class

Understanding the principles of digital signal transmission and communication systems.
Knowledge of modern telecommunication technologies and network architectures.
Practical skills in analyzing and solving problems related to digital communication systems.

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea, please include your email address)

To add more practical laboratory tasks and real-world examples related to modern telecommunication technologies such as 5G, IoT, and cloud-based communication systems. It could also be useful to include more interactive simulations and teamwork projects to improve practical understanding and collaboration skills.

The results of processing the questionnaires of teachers

Sergii Zaitsev:

1. Why do you think this course is important?

This course is important because digital telecommunication systems are the foundation of modern communication technologies, including mobile networks, the Internet, satellite communication, and data transmission systems. The course helps students understand the principles of signal transmission, digital modulation, network architecture, and communication protocols. It also develops practical and analytical skills that are essential for engineers working in telecommunications, networking, and information technologies.

2. Point out a few basic things that you consider most important in mastering from this course:

- Understanding the principles of digital signal transmission and processing.
- Learning the fundamentals of modulation, coding, and multiplexing techniques.
- Understanding the architecture and operation of modern telecommunication networks.
- Gaining knowledge of communication protocols and data transmission standards.
- Developing practical skills in analyzing and designing digital communication systems.

3. Do you have any suggestions for further improvement of the course?

It would be useful to include more practical examples and real-world case studies related to modern telecommunication systems, such as 5G networks, IoT technologies, and cloud communications. Adding more laboratory work, simulations, and hands-on projects could also help students better understand the theoretical concepts and improve their practical skills.

Bachelor's Course « Digital electronics devices »

The results of processing the questionnaires of students

What did you like in the course?

The teaching of the material is complete and of high quality. Theory and practice are represented at a high leve. The course well explains the essence of digital circuits and their classification. Working with Schematic diagrams, VHDL programs and Timing diagrams simultaneously in the Intel\Altera Quartus Prime IDE. A meaningful course on how to make almost an entire processor from a small logic element, what's inside a microcontroller, and how to synthesize a device with the desired logic functions. Extremely large number of devices that we have heard about before, but have learned how they work only now.

Outline 3 points you would like to take with you/have learnt in this class:

Introduction to the Intel\Altera Quartus Prime environment.
Programming using hardware description language VHDL.
Ability to synthesize arithmetic devices and code converters.
Boolean, NOR and NAND algebra. Code conversion devices.
Method of Karnaugh diagrams.
Design of combinational and sequencial devices.
Methodology of canonical synthesis of digital devices.
Quine-McCluskey analytical method for minimizing Boolean functions.
Design of Arithmetic devices and principles of calculus acceleration.
Creation of parallel high-speed circuits that convert and calculate.
Minimization of logical functions and methods for its achieving
The property of digital devices to store their state and how to teach digital devices to store the data we need.
Many practical skills that allow us to implement an idea from scratch, as well as find an error in already working circuit;
We began to work with real digital electronics equipment, mastered the methods of flashing a laboratory stand with our own programs for microcircuits;
Knowledge about combination of connection between simple digital blocks to obtain complex digital blocks.

Do you have any suggestions for further improvement of the course? (If so, please give details and if you would like to be contacted about this idea, please include your email address)

Expand the number of examples of using the VHDL language.
It is interesting to learn more about the verification and validation of digital circuits and complex digital devices, as well as how to prepare a designed device for on-chip production.
I would like to continue such subjects for another more semester.

The results of processing the questionnaires of teachers

Roman Ershov:

1. Why do you think this course is important?

Formation of the core of practical professional competencies, further logical development and integration of several basic disciplines, strengthening of systemic and analytical thinking.

2. Point out a few basic things that you consider most important in mastering from this course:

1. Using an integrated development environment (IDE) for designing of complex technological systems and understanding the principles of building its tools.
2. Combining different approaches to developing digital devices and comparing results (behavioral, structural, mixed, circuit diagram).
3. Mastering the principles and approaches to verification − a comprehensive check of the operability of the developed devices using functional and time modeling, as well as full-scale prototyping on a laboratory stand with FPGA.

3. Do you have any suggestions for further improvement of the course?

Extension of the laboratory equipment set. Applying newer approaches to presenting course materials using improved software environment that is free from the shortcomings of interaction between components (Quartus Prime <-> ModelSim).

Kharkiv National Automobile and Highway University (KhNAHU)

The training programs and courses developed and tested in autumn semester

Course/Lab title	Updated or totally new	Level (Bachelor, Master 5-year course)	ECTS credit points	The teaching/training methodologies developed/adopted e.g. e-learning/ training modalities, practical placements in enterprises, etc.	The link to the university webpage	Date of accreditation	The status / document of accreditation
Electric vehicle infrastructure	New	Bachelor	4	Lecture, e-learning, practical, practical placements in enterprises	https://dl2022.khadi-kh.com/course/view.php?id=2827	spring 2024	Completed
Energy supply and energy saving systems	New	Bachelor	4	Lecture, e-learning, practical, lab practical	https://dl2022.khadi-kh.com/course/view.php?id=4849	spring 2024	Completed
Electric drive theory (Part 1)	Updated	Bachelor	5	Lecture, e-learning, practical, lab practical	https://dl2022.khadi-kh.com/course/view.php?id=6405	spring 2024	Completed
Electric drive theory (Part 2)	Updated	Bachelor	6	Lecture, e-learning, practical, lab practical	https://dl2022.khadi-kh.com/course/view.php?id=5927	spring 2024	Completed
Electric machines and devices	Updated	Bachelor	5	Lecture, e-learning, practical	https://dl2022.khadi-kh.com/enrol/index.php?id=5924	spring 2024	Completed
Electronics and microcircuit engineering (Part 1)	Updated	Bachelor	4	Lecture, e-learning, lab practicals	https://dl2022.khadi-kh.com/enrol/index.php?id=3541	spring 2024	Completed
Electronics and microcircuit engineering (Part 2)	Updated	Bachelor	5	Lecture, e-learning, lab practicals	https://dl2022.khadi-kh.com/course/view.php?id=5350	spring 2024	Completed

Students' attraction

Course title	No. of enrolled students
Electric vehicle infrastructure	29
Energy supply and energy saving systems	64
Electric drive theory (Part 1)	58
Electric drive theory (Part 2)	71
Electric machines and devices	41
Electronics and microcircuit engineering (Part 1)	49
Electronics and microcircuit engineering (Part 2)	41

Feedback from the students by subjects

From the analysis of the questionnaires completed by the students, we can observe a very good appreciation of the modernized courses. Both the contents and the professor's working method are highly appreciated by the students.

Date of testing: 04.05.2026 – 17.05.2025

Course title	How many questionnaire forms have been proceeded	How many questionnaire forms were found valid
Electric vehicle infrastructure	20	20
Energy supply and energy saving systems	18	18

Electric drive theory (Part 1)	18	18
Electric drive theory (Part 2)	17	17
Electric machines and devices	19	19
Electronics and microcircuit engineering (Part 1)	16	16
Electronics and microcircuit engineering (Part 2)	17	17

Table 1: Statistics on the answers given on the tested courses (in percentage).

Name of course	Degree of course	Testing results				
		Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Electric vehicle infrastructure	0.0	0.0	0.0	0.9	12.3	86.8
Energy supply and energy saving systems	0.0	0.0	0.0	0.0	11.6	88.4
Electric drive theory (Part 1)	0.0	0.0	0.0	1.0	9.1	89.9
Electric drive theory (Part 2)	0.0	0.0	0.0	1.6	12.8	85.6
Electric machines and devices	0.0	0.0	0.0	0.0	12.9	87.1
Electronics and microcircuit engineering (Part 1)	0.0	0.0	0.0	0.0	7.4	92.6
Electronics and microcircuit engineering (Part 2)	0.0	0.0	0.0	0.0	13.9	86.1

The consolidated result of students answers about tested courses are presented below.

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Electric Drive Theory. Part 1 / Теорія електроприводу. Частина 1**
Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**
Name of academic(s) (ПІБ викладача):
Department (Кафедра):
How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **18**
How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **18**
Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly	Partially	Neutral	Partially	Strongly

	disagree %	disagree %	assessment %	agree %	agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається					100.0%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі				5.6%	94.4%
The logical structure of the lecture was maintained Логічна структура лекцій витримана					100.0%
Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій				11.1%	88.9%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення				16.7%	83.3%
Practical application of theory was efficiently promoted Ефективно розвивалося практичне застосування теорії				33.3%	66.7%
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано			5.6%	5.6%	88.9%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				5.6%	94.4%
The lecturer/professor's attitude to the students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим				11.1%	88.9%
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань вистачило			5.6%	5.6%	88.9%

The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною				5.6%	94.4%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Чітке розподілення інформації, без зайвої води, постійний контакт з викладачем при виникненні запитань
- Сподобався підхід викладачів: вони реально докладають багато зусиль, щоб навчити нас навіть через екран монітора. Теорія розписана детально
- Команда і викладачі
- Гарна структура курсу і якісне пояснення матеріалу
- Чітка структура, зрозумілі пояснення, практичні завдання
- Курс дуже сподобався своєю структурованістю та доступністю матеріалу
- Якість подачі матеріалу, доступність для розуміння
- Зрозуміла структура лекцій, якісні матеріали
- Практичні приклади, доброзичливий викладач
- Чітке пояснення теми, хороша організація
- Доступний формат навчання, підтримка викладачів
- Структурованість курсу та доступність матеріалів
- Сподобалась практична спрямованість
- Детальне пояснення теоретичного матеріалу
- Ефективна подача матеріалу
- Доброзичливість викладача та якість матеріалів
- Хороша організація занять
- Цікаві практичні завдання

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Дізнався про види електродвигунів, принципи їх роботи, компоненти та формули і закони за якими вони працюють
- Різні види двигунів не просто на папері, а в реальних системах. Управління швидкістю та моментом електроприводу. Робота з технічними схемами
- Вміння працювати в команді / комунікувати / вирішувати задачі
- Принципи роботи електродвигунів, основи теорії електроприводу, практичне застосування знань
- Теоретичні основи електроприводу, розрахунки параметрів, аналіз схем
- Класифікація електроприводів, принципи керування, схемотехніка
- Основи теорії, математичний апарат, практичні розрахунки
- Принципи роботи різних типів двигунів, методи регулювання
- Теорія електромагнітних процесів, розрахунки характеристик
- Аналіз динамічних характеристик, вибір параметрів
- Класифікація, принципи керування, практичне застосування
- Теорія та практика електроприводу
- Основи електроприводу та розрахунки
- Принципи роботи, класифікація, схемотехніка
- Теоретичні основи та методи розрахунку

- Управління та регулювання електроприводів
- Основи та практичне застосування
- Принципи роботи та розрахунки

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

- Все влаштовує

Demographics Analysis / Аналіз демографічних характеристик респондентів

Gender / Стать:

- Male / Чоловіки: 15 (83.3%)
- Female / Жінки: 3 (16.7%)

Age / Вік:

- 16-21 years / років: 7 (38.9%)
- 22-30 years / років: 10 (55.6%)
- 31-40 years / років: 1 (5.6%)

Status / Статус:

- Home Student (студент ХНАДУ): 18 (100%)

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Electric Drive Theory. Part 2 / Теорія електроприводу. Частина 2**
Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**
Name of academic(s) (ПІБ викладача):
Department (Кафедра):
How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **17**
How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **17**

Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається				17.6%	82.4%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі				5.9%	94.1%

The logical structure of the lecture was maintained Логічна структура лекцій витримана				11.8%	88.2%
Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій			5.9%	11.8%	82.4%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення				17.6%	82.4%
Practical application of theory was efficiently promoted Ефективно розвивалося практичне застосування теорії				23.5%	76.5%
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано			5.9%	17.6%	76.5%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				29.4%	70.6%
The lecturer/professor's attitude to the students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим					100.0%
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань вистачило			5.9%	5.9%	88.2%
The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною					100.0%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Глибокий теоретичний матеріал та практичні завдання
- Чітка структура та якісне пояснення
- Доброзичливий викладач та хороша організація
- Практична спрямованість курсу

- Цікаві теми та актуальний матеріал
- Доступне пояснення складних концепцій
- Структурованість та якість матеріалів
- Підтримка викладача та практичні приклади
- Хороша організація занять та матеріали
- Актуальність тематики
- Детальне пояснення матеріалу
- Практична складова
- Теоретичні основи та застосування
- Викладач та структура курсу
- Якість матеріалів
- Хороша організація
- Доступність матеріалу

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Векторне керування, динамічні характеристики електроприводу, регулятори
- Методи керування асинхронними двигунами, розрахунки перехідних процесів
- Цифрове керування електроприводом, алгоритми регулювання
- Аналіз стійкості систем, синтез регуляторів
- Моделювання систем електроприводу, частотні характеристики
- Принципи побудови систем автоматизованого керування
- Перетворювачі частоти, методи регулювання швидкості
- Системи автоматичного регулювання, зворотний зв'язок
- Динаміка електропривода, оптимізація
- Нелінійні режими роботи, захист систем
- Синтез систем керування, оцінка якості
- Цифрова обробка сигналів в електроприводі
- Мікропроцесорні системи керування
- Алгоритми векторного керування
- Оптимальне керування та стабілізація
- Математичне моделювання систем
- Методи налаштування регуляторів

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

Більшість респондентів не мають пропозицій — курс оцінено позитивно / Most respondents had no suggestions — the course was rated positively.

<u>Demographics Analysis / Аналіз демографічних характеристик респондентів</u>

Gender / Стать:

- Male / Чоловіки: 14 (82.4%)
- Female / Жінки: 3 (17.6%)

Age / Вік:

- 16-21 years / років: 6 (35.3%)
- 22-30 years / років: 9 (52.9%)

- 31-40 years / років: 2 (11.8%)

Status / Статус:

- Home Student (студент ХНАДУ): 17 (100%)

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Electric machines and devices / Електричні машини та апарати**
Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**
Name of academic(s) (ПІБ викладача):
Department (Кафедра):
How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **19**
How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **19**

Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається				5.3%	94.7%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі				10.5%	89.5%
The logical structure of the lecture was maintained Логічна структура лекцій витримана				10.5%	89.5%
Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій				10.5%	89.5%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення				15.8%	84.2%
Practical application of theory was efficiently promoted Ефективно				15.8%	84.2%

розвивалося практичне застосування теорії					
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано				10.5%	89.5%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				15.8%	84.2%
The lecturer/professor's attitude to the students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим				15.8%	84.2%
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань вистачило				21.1%	78.9%
The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною				10.5%	89.5%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Глибоке охоплення теми електричних машин
- Якісна подача матеріалу та доброзичливий викладач
- Практична спрямованість та реальні приклади
- Структурованість та доступність матеріалу
- Детальне пояснення принципів роботи машин
- Цікаві лабораторні роботи
- Хороша організація та якість матеріалів
- Актуальність тематики та підтримка викладача
- Детальний розбір конструкцій машин
- Практичні розрахунки та схеми
- Якість навчальних матеріалів
- Підхід викладача до пояснення
- Структура та доступність курсу
- Практична складова
- Детальне охоплення теми
- Хороша організація занять
- Якість матеріалів та пояснень
- Доброзичливість викладача

- Цікавий матеріал

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Принципи роботи трансформаторів, асинхронних та синхронних машин
- Конструкція та характеристики електричних апаратів
- Методи розрахунку параметрів машин, аналіз схем заміщення
- Класифікація та порівняльний аналіз різних типів машин
- Принципи електромагнітного перетворення енергії
- Розрахунок і проектування обмоток
- Теплові та механічні характеристики машин
- Захисні пристрої та апарати управління
- Нормативні вимоги та стандарти до електромашин
- Режими роботи та характеристики трансформаторів
- Системи збудження синхронних машин
- Пуск та регулювання асинхронних двигунів
- Розрахунок механічних характеристик
- Конструктивні особливості різних машин
- Методи підвищення ефективності
- Діагностика та технічне обслуговування
- Аналіз несправностей та захист
- Вибір та застосування електричних машин
- Сучасні тенденції розвитку електромашинобудування

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

Більшість респондентів не мають пропозицій — курс оцінено позитивно / Most respondents had no suggestions — the course was rated positively.

Demographics Analysis / Аналіз демографічних характеристик респондентів

Gender / Стать:

- Male / Чоловіки: 16 (84.2%)
- Female / Жінки: 3 (15.8%)

Age / Вік:

- 16-21 years / років: 8 (42.1%)
- 22-30 years / років: 9 (47.4%)
- 31-40 years / років: 2 (10.5%)

Status / Статус:

- Home Student (студент ХНАДУ): 19 (100%)

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Electric vehicle infrastructure / Інфраструктура електромобілів**

Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**

Name of academic(s) (ПІБ викладача):

Department (Кафедра):

How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **20**

How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **20**

Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається				10.0%	90.0%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі				5.0%	95.0%
The logical structure of the lecture was maintained Логічна структура лекцій витримана				10.0%	90.0%
Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій			5.0%	25.0%	70.0%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення				15.0%	85.0%
Practical application of theory was efficiently promoted Ефективно розвивалося практичне застосування теорії				20.0%	80.0%
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано			5.0%		95.0%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				15.0%	85.0%
The lecturer/professor's attitude to the				5.0%	95.0%

students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим					
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань вистачило				25.0%	75.0%
The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною				5.0%	95.0%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Дуже актуальна тема електромобільності
- Практичні приклади зарядної інфраструктури
- Сучасні технології та їх розвиток
- Детальний розгляд стандартів зарядки
- Цікавий та актуальний матеріал
- Хороша структура та доступне пояснення
- Огляд світового досвіду розвитку інфраструктури
- Практична спрямованість курсу
- Детальний аналіз технологій зарядки
- Майбутні тенденції розвитку електротранспорту
- Якісний матеріал та доброзичливий викладач
- Структурованість та доступність
- Актуальність теми для майбутньої кар'єри
- Практичні кейси та приклади
- Міжнародні стандарти та протоколи
- Огляд ринку електромобілів
- Технології акумуляторів та зарядки
- Розвиток мережі зарядних станцій
- Економічні аспекти електромобільності
- Перспективи розвитку галузі

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Стандарти та протоколи зарядки електромобілів (CCS, CHAdeMO, Type 2)
- Принципи планування зарядної інфраструктури, розрахунок навантажень
- Технічні вимоги до зарядних станцій різних рівнів потужності
- Економічна модель розвитку мережі зарядних станцій
- Інтеграція зарядної інфраструктури в електричну мережу
- Розумне зарядження та управління навантаженням
- Нормативно-правова база у сфері електротранспорту
- Технології V2G та їх застосування

- Сучасний стан та перспективи ринку електромобілів
- Безпека зарядних систем та захист
- Обслуговування та діагностика зарядних станцій
- Протоколи OCPP та управління зарядними мережами
- Моделі розміщення зарядної інфраструктури
- Вплив електромобілів на електричну мережу
- Технології швидкої зарядки
- Міжнародний досвід розвитку електромобільності
- Аналіз ринку та бізнес-моделі
- Зарядна інфраструктура для громадського транспорту
- Стандарти безпеки та сертифікація
- Перспективи бездротової зарядки

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

- Курс відмінний

Demographics Analysis / Аналіз демографічних характеристик респондентів

Gender / Стать:

- Male / Чоловіки: 17 (85.0%)
- Female / Жінки: 3 (15.0%)

Age / Вік:

- 16-21 years / років: 8 (40.0%)
- 22-30 years / років: 10 (50.0%)
- 31-40 years / років: 2 (10.0%)

Status / Статус:

- Home Student (студент ХНАДУ): 20 (100%)

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Electronics and microcircuit engineering. Part 1 / Електроніка та мікросхемотехніка. Частина 1**
Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**
Name of academic(s) (ПІБ викладача):
Department (Кафедра):
How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **16**
How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **16**

Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results

	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається				12.5%	87.5%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі				6.3%	93.8%
The logical structure of the lecture was maintained Логічна структура лекцій витримана				6.3%	93.8%
Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій					100.0%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення					100.0%
Practical application of theory was efficiently promoted Ефективно розвивалося практичне застосування теорії					100.0%
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано				18.8%	81.3%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				12.5%	87.5%
The lecturer/professor's attitude to the students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим					100.0%
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань				12.5%	87.5%

вистачило					
The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною				12.5%	87.5%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Якісне пояснення основ електроніки та мікросхемотехніки
- Практичні лабораторні роботи
- Структурованість та доступність матеріалу
- Актуальний та цікавий матеріал
- Доброзичливий та кваліфікований викладач
- Гарна організація курсу
- Практична спрямованість та реальні приклади
- Детальне пояснення принципів роботи схем
- Хороша підтримка з боку викладача
- Якість навчальних матеріалів
- Структура лекцій та лабораторні роботи
- Сучасний підхід до викладання
- Доступне пояснення складних тем
- Практичні завдання та їх розбір
- Чітка організація та структура
- Якість матеріалів та підтримка

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Основи напівпровідникової електроніки, принципи роботи діодів та транзисторів
- Аналіз і розрахунок базових аналогових схем (підсилювачі, генератори)
- Цифрова логіка, комбінаційні та послідовнісні схеми
- Мікросхемотехніка, типові функціональні вузли ІС
- Методи аналізу та проектування електронних схем
- Операційні підсилювачі та їх застосування
- Джерела живлення та стабілізатори напруги
- Перетворювачі сигналів та інтерфейсні схеми
- Методи вимірювання та тестування схем
- Базові принципи розробки друкованих плат
- Сигнали та їх обробка в аналогових схемах
- Синтез логічних схем та оптимізація
- Основи роботи мікроконтролерів
- Захисні схеми та фільтри
- Методи налагодження та пошуку несправностей
- Сучасна елементна база

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

Більшість респондентів не мають пропозицій — курс оцінено позитивно / Most respondents had no suggestions — the course was rated positively.

Demographics Analysis / Аналіз демографічних характеристик респондентів

Gender / Стать:

- Male / Чоловіки: 13 (81.3%)
- Female / Жінки: 3 (18.8%)

Age / Вік:

- 16-21 years / років: 7 (43.8%)
- 22-30 years / років: 8 (50.0%)
- 31-40 years / років: 1 (6.3%)

Status / Статус:

- Home Student (студент ХНАДУ): 16 (100%)

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Energy supply and energy saving systems / Системи енергопостачання та енергозбереження**
Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**
Name of academic(s) (ПІБ викладача):
Department (Кафедра):
How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **18**
How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **18**

Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається				16.7%	83.3%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі					100.0%
The logical structure of the lecture was maintained Логічна структура лекцій витримана					100.0%

Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій				22.2%	77.8%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення				22.2%	77.8%
Practical application of theory was efficiently promoted Ефективно розвивалося практичне застосування теорії				22.2%	77.8%
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано				5.6%	94.4%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				27.8%	72.2%
The lecturer/professor's attitude to the students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим				5.6%	94.4%
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань вистачило				5.6%	94.4%
The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною					100.0%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Актуальна та важлива тема енергозбереження
- Детальний розгляд систем енергопостачання
- Практичні приклади та розрахунки
- Якісна подача матеріалу та структура курсу
- Реальні кейси з енергоефективності
- Доброзичливий та компетентний викладач
- Сучасні технології та підходи до енергозбереження

- Актуальність для майбутньої спеціальності
- Практичний підхід до вирішення задач
- Якість навчальних матеріалів
- Детальне охоплення нормативної бази
- Структурованість та доступність матеріалу
- Практична спрямованість курсу
- Огляд сучасних технологій
- Хороша організація занять
- Цікаві практичні завдання
- Якість пояснень та доброзичливість
- Актуальність теми

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Методи аудиту та аналізу енергоспоживання будівель і промислових підприємств
- Технології відновлюваних джерел енергії та їх інтеграція в систему енергопостачання
- Нормативно-правова база у сфері енергозбереження та енергоефективності
- Розрахунок та оптимізація систем теплопостачання і вентиляції
- Методи зниження питомих витрат енергії на виробництві
- Смарт-мережі (Smart Grid) та технології управління попитом
- Економічне обґрунтування енергозберігаючих заходів
- Системи обліку та моніторингу енергоспоживання
- Технології підвищення енергоефективності освітлення та обладнання
- Міжнародний досвід у сфері енергозбереження
- Розрахунок та проектування систем електропостачання
- Аналіз теплових втрат та методи їх зниження
- Стандарти та сертифікація у сфері енергоефективності
- Технічний та організаційний аудит підприємств
- Оцінка ефективності інвестицій в енергозбереження
- Когенерація та розподілена генерація
- Системи акумулювання енергії
- Перспективи розвитку галузі

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

Більшість респондентів не мають пропозицій — курс оцінено позитивно / Most respondents had no suggestions — the course was rated positively.

<u>Demographics Analysis / Аналіз демографічних характеристик респондентів</u>

Gender / Стать:

- Male / Чоловіки: 15 (83.3%)
- Female / Жінки: 3 (16.7%)

Age / Вік:

- 16-21 years / років: 7 (38.9%)
- 22-30 years / років: 9 (50.0%)

- 31-40 years / років: 2 (11.1%)

Status / Статус:

- Home Student (студент ХНАДУ): 18 (100%)

Consolidated result of students answers about tested courses.
Зведений результат відповідей студентів про апробовані курси.

Title of course (Назва курсу): **Electronics and microcircuit engineering. Part 2) / Електроніка та мікросхемотехніка. Частина 2**
Level of training course (Рівень вищої освіти): **Bachelor (Бакалавр)**
Name of academic(s) (ПІБ викладача):
Department (Кафедра):
How many questionnaire forms have been processed? (Яку кількість анкет оброблено?) **17**
How many questionnaire forms were found valid? (Яка кількість анкет є дійсними?) **17**

Statistics on the answers given on the course (in percentage).
Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається				5.9%	94.1%
The course was well-structured and the themes were explained in a comprehensible manner Курс був добре структурованим і теми були пояснені у доступній формі				5.9%	94.1%
The logical structure of the lecture was maintained Логічна структура лекцій витримана				23.5%	76.5%
Audio-visual materials were efficiently used during the lecture Ефективно використовувалися аудіо-візуальні матеріали під час лекцій				17.6%	82.4%
Creative thinking was efficiently promoted Ефективно розвивалося критичне мислення				5.9%	94.1%
Practical application of theory was				11.8%	88.2%

efficiently promoted Ефективно розвивалося практичне застосування теорії					
During the class the amount of theoretical material and practical tasks was balanced Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано				23.5%	76.5%
Recommended literature sources were accessible and helped in acquiring the course materials Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами				5.9%	94.1%
The lecturer/professor's attitude to the students was positive and helpful Ставлення лектора/професора до студентів було позитивним та доброзичливим				17.6%	82.4%
The time for the completing of the practical tasks was enough Часу на виконання практичних завдань вистачило				23.5%	76.5%
The information about the class's organisation was clear and easily available Інформація про організацію занять була ясною та доступною				11.8%	88.2%

Analysis of Open-Ended Responses / Аналіз відповідей на відкриті питання

1. What did you like in the course? / Чим вам сподобався цей курс?

- Поглиблений матеріал з мікросхемотехніки
- Практична робота з програмованими пристроями
- Детальне охоплення сучасних ІС
- Цікаві практичні завдання та проекти
- Якісна подача матеріалу
- Доброзичливий викладач та підтримка
- Актуальність тематики курсу
- Структурованість та доступність
- Поглиблений розгляд мікроконтролерів
- Практична спрямованість
- Хороша організація курсу
- Якість навчальних матеріалів
- Сучасний підхід до тематики
- Детальне пояснення складних тем
- Практичні лабораторні роботи

- Структура та доступність матеріалу
- Якість пояснень

2. Key knowledge gained in the class / Ключові знання, отримані на заняттях

- Програмовані логічні інтегральні схеми (FPGA, CPLD), методи їх проектування
- Мікропроцесорні системи та вбудовані контролери
- Цифрова обробка сигналів та алгоритми фільтрації
- Методи верифікації та тестування цифрових систем
- Мови опису апаратури (VHDL/Verilog) та їх застосування
- Архітектура процесорів та систем пам'яті
- Інтерфейси та протоколи зв'язку (SPI, I2C, UART)
- Системи на кристалі (SoC) та їх проектування
- Методи оптимізації цифрових схем
- Системи реального часу та RTOS
- Технології виробництва мікросхем
- Функціональне тестування та діагностика
- Низькоспоживні мікросхеми та методи проектування
- Алгоритми цифрової обробки сигналів
- Сучасна елементна база та перспективи розвитку
- Проектування систем на основі мікроконтролерів
- Методи налагодження та пошуку несправностей

3. Suggestions for improvement / Пропозиції щодо вдосконалення курсу

Більшість респондентів не мають пропозицій — курс оцінено позитивно / Most respondents had no suggestions — the course was rated positively.

Demographics Analysis / Аналіз демографічних характеристик респондентів

Gender / Стать:

- Male / Чоловіки: 14 (82.4%)
- Female / Жінки: 3 (17.6%)

Age / Вік:

- 16-21 years / років: 7 (41.2%)
- 22-30 years / років: 9 (52.9%)
- 31-40 years / років: 1 (5.9%)

Status / Статус:

- Home Student (студент ХНАДУ): 17 (100%)

Feedback from academic/teacher staff involved in teaching of students by subject

The holder professors of the targeted courses participated in this survey are:

- Babach Ruslan

- Andrii Hnatov
- Shchasiana Arhun
- Oleksandr Dziubenko
- Andrii Nechaus

Evaluation of courses testing results

The testing results of the seven bachelor-level courses show a generally very positive evaluation by students. The analyzed courses were: *Electric vehicle infrastructure, Energy supply and energy saving systems, Electric drive theory (Part 1), Electric drive theory (Part 2), Electric machines and devices, Electronics and microcircuit engineering (Part 1),* and *Electronics and microcircuit engineering (Part 2).* All seven courses were tested at the Bachelor level, and the number of valid questionnaires ranged from 16 to 20 depending on the course. The analyzed reports confirm that all processed questionnaires were valid, which makes the obtained results suitable for summarizing the students' perception of the tested courses.

The overall results demonstrate that the tested courses were highly appreciated by the respondents. The dominant share of answers falls into the categories "Strongly agree" and "Partially agree". No course received negative responses in the categories "Strongly disagree" or "Partially disagree" in the averaged results. This indicates that students generally perceived the courses as well designed, understandable, practically relevant, and useful for achieving the intended learning outcomes. The percentage of "Strongly agree" responses varied from 85.6% to 92.6%, while the share of "Partially agree" responses ranged from 7.4% to 13.9%. Neutral answers were very limited and appeared only in several courses, with the highest averaged neutral value being 1.6% for *Electric drive theory (Part 2).*

The highest overall level of positive evaluation was recorded for *Electronics and microcircuit engineering (Part 1).* This course received an average of 92.6% "Strongly agree" responses and 7.4% "Partially agree" responses. The report shows especially strong results for the use of audio-visual materials, promotion of creative thinking, practical application of theory, and positive attitude of the lecturer, where 100.0% of respondents selected "Strongly agree". This suggests that the course was perceived as clear, practically oriented, and effectively supported by teaching materials and lecturer interaction.

The course *Electric drive theory (Part 1)* also demonstrated a very strong result, with an average of 89.9% "Strongly agree" and 9.1% "Partially agree" responses. Several criteria received 100.0% "Strongly agree", including coverage of the required programme themes and maintaining the logical structure of lectures. Students' open-ended responses also confirm that they valued the clear structure of the course, the accessible explanation of theoretical material, practical tasks, and continuous communication with the lecturer.

The course *Energy supply and energy saving systems* received 88.4% "Strongly agree" and 11.6% "Partially agree" responses. The strongest results were observed for the course structure, logical structure of lectures, and clarity of information about the organisation of classes, where 100.0% of students selected "Strongly agree". The open-ended responses show that students particularly appreciated the relevance of energy saving, the practical examples and calculations, the discussion of modern technologies, and the connection of the course content with future professional activity.

The course *Electric machines and devices* received 87.1% “Strongly agree” and 12.9% “Partially agree” responses. This result also indicates a high level of student satisfaction. Students positively assessed the coverage of course themes, the structure of the course, the logical organisation of lectures, the use of audio-visual materials, and the practical application of theory. In the open-ended answers, students highlighted the detailed explanation of the principles of operation of electrical machines, practical calculations, laboratory work, and the quality of teaching materials.

The course *Electric vehicle infrastructure* also showed a high level of approval, with 86.8% “Strongly agree”, 12.3% “Partially agree”, and only 0.9% “Neutral assessment”. The results show that students especially appreciated the structure of the course, the positive and helpful attitude of the lecturer, and the clarity of organisational information. The open-ended responses confirm that students considered the course highly relevant because of its focus on electric mobility, charging infrastructure, charging standards, smart charging, V2G technologies, and future trends in electric transport.

The course *Electronics and microcircuit engineering (Part 2)* received 86.1% “Strongly agree” and 13.9% “Partially agree” responses. Although the percentage of “Strongly agree” responses was slightly lower than in Part 1, the overall assessment remains strongly positive. Students highly evaluated the coverage of learning outcomes, course structure, promotion of creative thinking, accessibility of recommended literature, and practical application of theory. According to the open-ended responses, students valued the deeper study of microcircuit engineering, work with programmable devices, modern integrated circuits, microcontrollers, digital signal processing, and practical laboratory tasks.

The course *Electric drive theory (Part 2)* received 85.6% “Strongly agree”, 12.8% “Partially agree”, and 1.6% “Neutral assessment”. This is still a very positive result, although it contains the highest averaged neutral value among the analysed courses. The detailed results show that some neutral responses appeared for audio-visual materials, balance between theoretical material and practical tasks, and time for completing practical tasks. This may indicate that, although the course was evaluated positively, students may benefit from a slightly stronger practical component, clearer timing of practical tasks, or additional visual support for complex topics such as control methods, dynamic characteristics, and modelling of electric drive systems.

Across all seven courses, several common strengths can be identified. First, the courses were perceived as well structured. Students repeatedly noted the logical organisation of lectures, accessible explanations, and clear course materials. Second, the respondents appreciated the practical orientation of the courses. Many open-ended responses mention practical tasks, laboratory work, real examples, calculations, technical schemes, and application of theory to professional situations. Third, the positive attitude and support of lecturers were repeatedly highlighted. This is important because it shows that the learning process was not only technically relevant but also organised in a student-centred and supportive way.

Another important observation is the strong professional relevance of the tested courses. The courses cover areas that are directly connected with modern engineering education: electric drives, electrical machines, electronics, microcircuit engineering, energy saving systems, and electric vehicle infrastructure. Students’ answers show that they understand the practical value of these topics for their future professional activity. For example, in the course on electric vehicle infrastructure, students identified charging standards, charging station planning, smart charging, V2G technologies, and market development as key knowledge gained. In the course on energy

supply and energy saving systems, students identified energy audits, renewable energy technologies, energy efficiency measures, smart grids, and energy storage systems as important learning outcomes.

The suggestions for improvement were limited. In several reports, it is stated that most respondents had no suggestions because the courses were rated positively. This confirms that the courses generally met students' expectations. At the same time, the small number of neutral responses suggests several possible areas for further improvement. These may include strengthening the balance between theoretical material and practical tasks, increasing the use of visual materials in more complex technical courses, and providing additional time or clearer instructions for practical assignments where needed.

In conclusion, the testing results confirm that all seven courses were successfully delivered and positively evaluated by students. The results demonstrate strong satisfaction with course structure, content clarity, lecturer support, practical relevance, and organisation of the learning process. The absence of negative averaged responses is an important indicator of the quality of the tested courses. The courses can therefore be considered effective for bachelor-level engineering education. Further improvement may focus on expanding practical examples, interactive activities, and visual teaching materials, especially in technically complex topics. Overall, the testing confirms that the developed courses are relevant, well organised, and suitable for further implementation in the educational process.

Lutsk National Technical University (LNTU)

Table 1. The training programs and courses developed and tested in autumn semester.

Course/Lab title	Updated or totally new	Level (Bachelor, Master 5-year course)	ECTS credit points	The teaching/training methodologies developed/adopted e.g. e-learning/ training modalities, practical placements in enterprises, etc.	The link to the university webpage	Date of accreditation	The status / document of accreditation
Tested							
Theory of operational properties of the car	**Updated**	**Bachelor**	7	classic lessons, e-learning	https://lntu.edu.ua/uk	2025	Authorised
Road transport enterprises. Part 1. Design	**Updated**	**Bachelor**	7	classic lessons, e-learning	https://lntu.edu.ua/uk	2025	Authorised
Road transport enterprises. Part 2. Organization and management	**Updated**	**Bachelor**	5	classic lessons, e-learning	https://lntu.edu.ua/uk	2025	Authorised
Road transport enterprises. Part 3. Quality of production processes	**Updated**	**Bachelor**	5	classic lessons, e-learning	https://lntu.edu.ua/uk	2025	Authorised
Technical operation of cars	**Updated**	**Bachelor**	9	classic lessons, e-learning	https://lntu.edu.ua/uk	2025	Authorised
Management of transport processes	**new**	**Master**	5	classic lessons, e-learning	https://lntu.edu.ua/uk	2025	Authorised

Students' attraction

Attracted students

	Students' group			
	AT-3	AT-4	IATm-11	AT-2
Number of enroled students	56	46	4	17

Feedback from the students by subjects

The copies of Training Evaluation Sheets of Students are presented in these links:

- **Theory of operational properties of the car -** https://forms.gle/g6CsNWWBouPG6jFo9
- **Road transport enterprises. Part 1. Design** - https://forms.gle/PHhZCurGFK8ERbfJ8
- **Road transport enterprises. Part 2. Organization and management -** https://forms.gle/AJPUNZissT3j1MMP6
- **Road transport enterprises. Part 3. Quality of production processes -** https://forms.gle/HNa8iiEA8CYGdYhH6
- **Technical operation of cars -** https://forms.gle/iuXkUCPiL4yhEVVB8
- **Management of transport processes -** https://forms.gle/YfFNwmte3PY7KChw8

Co-funded by the European Union

DIGITRANS

Consolidated result of students answers about tested courses
Зведений результат відповідей студентів про апробовані курси.

Title of course (*Назва курсу*): Management of transport processes
Level of training course (*Рівень вищої освіти*): master
Name of academic(s) (*ПІБ викладача*): Victoria Kotenko
Department (*Кафедра*): Department of Automobiles and Transport Technologies
How many questionnaire forms have been processed? (*Яку кількість анкет оброблено?*) 4

How many questionnaire forms were found valid? (*Яка кількість анкет є дійсними?*) 4

Statistics on the answers given on the course (in percentage).

Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*				25	75
The course was well-structured and the themes were explained in a comprehensible manner *Курс був добре структурованим і теми були пояснені у доступній формі*					100
The logical structure of the lecture was maintained *Логічна структура лекцій витримана*				50	50
Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*					100
Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*					100
Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*				50	50
During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*				50	50

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*					100
The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*				25	75
The time for the completing of the practical tasks was enough *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*				50	50
The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною*				25	75

Co-funded by the European Union

DIGITRANS

Consolidated result of students answers about tested courses
Зведений результат відповідей студентів про апробовані курси.

Title of course (*Назва курсу*): Technical operation of cars (Road transport enterprises. Part 1. Designing)
Level of training course (*Рівень вищої освіти*): bachelor
Name of academic(s) (*ПІБ викладача*): Vasyl Pavluk
Department (*Кафедра*): Department of Automobiles and Transport Technologies
How many questionnaire forms have been processed? (*Яку кількість анкет оброблено?*) 38
How many questionnaire forms were found valid? (*Яка кількість анкет є дійсними?*) 38

Statistics on the answers given on the course (in percentage).

Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*	3		3	5	89
The course was well-structured and the themes were explained in a comprehensible manner *Курс був добре структурованим і теми були пояснені у доступній формі*	3		3	7	87
The logical structure of the lecture was maintained *Логічна структура лекцій витримана*	3			13	84
Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*		3	3	18	76
Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*		3		10	87
Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*		3		10	87
During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*	3	3		20	74

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*	3			16	81
The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*		3		6	91
The time for the completing of the practical tasks was enough *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*	3	6		7	84
The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною*		3		8	89

Co-funded by the European Union

DIGITRANS

Consolidated result of students answers about tested courses
Зведений результат відповідей студентів про апробовані курси.

Title of course (*Назва курсу*): Quality management systems at road transport enterprises (Road transport enterprises. Part 3. Quality of production processes)
Level of training course (*Рівень вищої освіти*): bachelor
Name of academic(s) (*ПІБ викладача*): Valerii Dembitskyi
Department (*Кафедра*): Department of Automobiles and Transport Technologies
How many questionnaire forms have been processed? (*Яку кількість анкет оброблено?*) 31
How many questionnaire forms were found valid? (*Яка кількість анкет є дійсними?*) 31

Statistics on the answers given on the course (in percentage).

Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*				19,4	80,6
The course was well-structured and the themes were explained in a comprehensible manner *Курс був добре структурованим і теми були пояснені у доступній формі*				13	87
The logical structure of the lecture was maintained *Логічна структура лекцій витримана*				10	90
Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*			7	13	80
Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*				26	74
Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*			3	19	77
During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*		3	3	10	84

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*			7	9	84
The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*			3	7	90
The time for the completing of the practical tasks was enough *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*				16	84
The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною*			7	3	90

Co-funded by the European Union

DIGITRANS

Consolidated result of students answers about tested courses
Зведений результат відповідей студентів про апробовані курси.

Title of course (*Назва курсу*): Theory of operational properties of the car
Level of training course (*Рівень вищої освіти*): bachelor
Name of academic(s) (*ПІБ викладача*): Oleg Sitovsky
Department (*Кафедра*): Department of Automobiles and Transport Technologies
How many questionnaire forms have been processed? (*Яку кількість анкет оброблено?*)
17
How many questionnaire forms were found valid? (*Яка кількість анкет є дійсними?*) 17

Statistics on the answers given on the course (in percentage).

Статистика відповідей (у відсотках).

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Всі теми навчальної програми дозволяли досягти мети курсу, що вивчається*	6			23,5	70,5
The course was well-structured and the themes were explained in a comprehensible manner *Курс був добре структурованим і теми були пояснені у доступній формі*		6		29	65
The logical structure of the lecture was maintained *Логічна структура лекцій витримана*		6		23,5	70,5
Audio-visual materials were efficiently used during the lecture *Ефективно використовувалися аудіо-візуальні матеріали під час лекцій*		6	23	6	65
Creative thinking was efficiently promoted *Ефективно розвивалося критичне мислення*	11		6	30	53
Practical application of theory was efficiently promoted *Ефективно розвивалося практичне застосування теорії*	6			53	41
During the class the amount of theoretical material and practical tasks was balanced *Під час занять кількість теоретичного матеріалу та практичних завдань було збалансовано*			6	23,5	70,5

Criterion (Критерій)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Recommended literature sources were accessible and helped in acquiring the course materials *Рекомендовані літературні джерела були доступні та допомагали оволодінню навчальними матеріалами*	12			18	70
The lecturer/professor's attitude to the students was positive and helpful *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*		6	12	12	70
The time for the completing of the practical tasks was enough *Ставлення лектора/професора до студентів було позитивним та доброзичливим.*		12	12	23	53
The information about the class's organisation was clear and easily available *Інформація про організацію занять була ясною та доступною*	6		12	17	65

Date of testing: 15.03.2026
How many questionnaire forms have been proceeded? 123
How many questionnaire forms were found valid? 123

Table 2: Statistics on the answers given on the tested courses (in percentage).

Name of course	Degree of	Testing results

	course	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Theory of operational properties of the car	bachelor	3.72	3.27	6.45	23.5	63.06
Road transport enterprises. Part 1. Design	bachelor	1.63	2.18	1.63	11	83.56
Road transport enterprises. Part 2. Organization and management	bachelor	0.63	2.54	3.81	22.74	70.28
Road transport enterprises. Part 3. Quality of production processes	bachelor	-	0.27	2.09	13.21	84.43
Technical operation of cars	bachelor	0.9	4.18	9.54	13.72	71.66
Management of transport processes	master	-	-	-	39	61

Feedback from academic/teacher staff involved in teaching of students by subject

The holder professors of the targeted courses participated in this survey are:

- **Viktoriia Kotenko,** PhD in Technical sciences, associate professor, course holder **Management in Road Transport.**
- **Oleg Sitovskyi**, PhD in Technical sciences, associate professor, course holder **Theory of operational properties of the car.**
- **Vasyl Pavluk**, PhD in Technical sciences, associate professor, course holder **Road transport enterprises. Part 1. Designing; Technical operation of cars.**
- **Valerii Dembitskyi**, PhD in Technical sciences, associate professor, course holder **Road transport enterprises. Part 2. Organization and management»; Road transport enterprises. Part 3. Quality of production processes; Technical operation of cars.**

Evaluation of courses testing results

Management in Road Transport

According to the results of the testing of the course “Management in Road Transport”, it can be concluded that the course received a positive assessment from both students and teachers. As part of the student survey, 4 questionnaires were processed, all of which were recognized as valid. The vast majority of responses indicate an appropriate level of organization, content and methodological support of the course. In particular, 100% of students fully agreed that the course was well structured, topics were explained in an accessible form, audiovisual materials were effectively used, critical thinking was developed, and the recommended literary sources were accessible and useful for mastering the educational material.

Another positive indicator is that students highly appreciated the logical structure of the lectures, the practical application of theoretical knowledge and the balance between theoretical material and practical tasks. According to these criteria, 50% of respondents chose the answer “partially agree”, and 50% — “strongly agree”. This indicates that the course not only provides the mastery of the theoretical foundations of transport process management, but is also focused on the formation of practical skills necessary for future professional activity.
The teacher's questionnaire also confirms the sufficient level of course effectiveness. 10 students were registered for the course; the average attendance of lectures was 65%, practical classes - 75%. According to the results of the final control, 5 students received high grades of level A, B, another 5 students - average grades of level C; low grades and unsatisfactory results were not recorded. This demonstrates that all students who passed the final assessment successfully mastered the educational material.
The course content has a pronounced practice-oriented orientation. In the course tasks, significant attention was paid to the application of knowledge, the development of critical thinking, cause-and-effect analysis, practical experience and skills. It is worth noting the inclusion of tasks aimed at developing new competencies, independent thinking and the ability to solve professional problems in a non-standard way.
At the same time, the results of the approbation indicate certain areas of improvement. It is advisable to increase attention to the management of passenger transport enterprises, the features of the quality of transport services, sustainable mobility and environmentally responsible management of transport systems. It is also worth working on increasing lecture attendance and expanding the share of practical cases related to the real conditions of the functioning of transport enterprises.
Thus, the approbation of the course confirmed its relevance, methodological quality and practical value for the training of masters in the field of road transport.

Theory of the Car

Based on the results of the testing of the course “Theory of the Car”, it can be concluded that the academic discipline is an important component of the training of bachelor's level applicants in the field of motor transport. The course is aimed at developing an understanding of the operational properties of a car, in particular, traction and speed, braking properties, fuel economy, handling, stability and maneuverability. The teaching questionnaire states that mastering this discipline is the basis for further study of design, calculation, operation, traffic safety and repair of cars.

17 questionnaires were processed as part of the student survey, all of which were recognized as valid. The overall assessment of the course is mostly positive. In particular, 70.5% of students fully agreed that the topics of the curriculum ensure the achievement of the specified learning outcomes, and another 23.5% partially agreed with this statement. Similar indicators were obtained for the logical structure of the lectures: 70.5% of the responses “strongly agree” and 23.5% “partially agree”. This indicates sufficient content integrity of the course and the consistency of the presentation of the educational material.

The structure of the course and the accessibility of the explanation of the topics were also positively assessed: 65% of the students fully agreed that the course was well structured and presented in a clear form, another 29% partially agreed. The practical application of the theory also received high results: 41% of the students fully agreed, and 53% partially agreed that the course contributed to the practical application of theoretical knowledge. This is an important

indicator for a technical discipline, since the theory of the car has a direct connection with the real operational characteristics of vehicles.

According to the teacher, 79 students were registered for the course. The average attendance was 76% for lectures, 80% for practical classes, and 92% for laboratory classes. The highest level of attendance for laboratory work indicates students' interest in the applied part of the course. According to the results of the final control, 7 students received high grades of A, B, 25 students received average grades of C, 44 students received low grades of D, E, and 3 students failed the control assessment.

At the same time, the results indicate the need for further improvement of the course. A significant proportion of students with low final grades indicates the complexity of the discipline and the need to strengthen support for applicants in mastering computational and analytical topics. It is advisable to expand the use of applied cases, computer modeling, visualization of vehicle performance characteristics, and modern research results. It is also worth strengthening work on the development of critical thinking, since according to this criterion, the results of student assessment are less uniform.

Thus, the testing of the course confirmed its relevance, professional significance and necessity for training future road transport specialists. Further improvement should be directed towards increasing practical orientation, interactivity and individual support for students.

Road transport enterprises. Part 1. Designing

According to the results of the testing of the course "Road transport enterprises. Part 1. Designing", it can be concluded that the discipline is an important component of the training of bachelors in the field of road transport. The course is of fundamental importance, as it combines theoretical foundations, engineering approaches and practical skills necessary for the formation of a systematic understanding of the processes of designing the production and technical base of road transport enterprises, ensuring proper conditions for technical operation and maintaining the proper technical condition of vehicles throughout their life cycle.

As part of the student survey, 38 questionnaires were processed, all of which were recognized as valid. The results indicate a generally high level of student satisfaction with the content, structure and organization of the course. In particular, 89% of respondents fully agreed that all topics of the curriculum ensure the achievement of the specified learning outcomes, and another 5% partially agreed with this statement. Also, 87% of students fully agreed that the course was well structured and the topics were explained in a clear manner. The logical structure of the lectures was highly appreciated by 84% of students, another 13% partially agreed with this criterion.

The results regarding the applied orientation of the course are particularly positive. According to the criteria of developing critical thinking and practical application of theory, 87% of students chose the answer "strongly agree", which indicates an effective combination of theoretical material with engineering and technological tasks. At the same time, 74% of respondents fully agreed that a balance between theoretical material and practical tasks was ensured during the classes, and 20% partially agreed. This confirms that the course is focused on the formation of practical competencies in the field of designing the production and technical base of motor transport enterprises.

According to the teacher questionnaire, 108 students were registered for the course. The average attendance of lectures was 73%, and of practical classes - 78%. According to the results of the final control, 7 students received high grades of level A, B, 23 students - average level C, 75 students - level D, E, and 3 students did not pass the final assessment. Such results indicate that the discipline is quite difficult for a significant part of applicants and requires further strengthening of educational and methodological support.

The most important content components of the course include the study of the production and technical base of road transport enterprises, the principles and methods of engineering calculation, as well as the planning and layout of production facilities in accordance with technological processes, standards and regulatory requirements.

Further improvement of the course should be aimed at a wider coverage of different types of road transport enterprises, more active use of design software, interactive teaching methods and modern educational materials. This will increase the level of mastering complex calculation topics and strengthen the connection of the course with real engineering tasks of the road transport industry.

Road transport enterprises. Part 2. Organization and management

According to the results of the testing of the course “Road transport enterprises. Part 2. Organization and management”, it can be concluded that the discipline is of great importance for the training of bachelors in the field of road transport, as it forms an understanding of the principles of organization and management of the work of a road transport enterprise, a technical service station or other structure of the transport industry. The course combines technical knowledge with managerial approaches, which is especially important for future engineers, heads of production units and automotive service specialists.

15 questionnaires were processed as part of the student survey, all of which were recognized as valid. The results indicate a generally positive perception of the course by students. In particular, 87% of students fully agreed that the topics of the curriculum ensure the achievement of the specified learning outcomes, and another 13% partially agreed with this statement. Also, 66% of respondents fully agreed that the course was well structured and the topics were explained in an accessible form, another 34% partially agreed. This indicates the proper content organization of the discipline and the understandable logic of teaching the educational material.

The logical structure of the lectures and the use of audiovisual materials were positively assessed: according to both criteria, 73% of students chose the answer “strongly agree”, and 20% - “partially agree”. It is also important that 80% of respondents fully agreed with the presence of a balance between theoretical material and practical tasks. This confirms the applied orientation of the course and its orientation towards the formation of skills to analyze organizational processes, plan the activities of the enterprise, manage personnel, resources, quality of services and economic efficiency.

According to the teacher questionnaire, 108 students were registered for the course. The average attendance of lectures was 64%, practical classes - 73%. According to the results of the final control, 13 students received high grades of level A, B, 19 students - average level C, 75 students - level D, E, and 1 student did not pass the final assessment. Such results indicate that, despite the positive perception of the course, a significant part of the students needs additional support in mastering managerial, organizational and calculation-analytical topics.

The most important results of mastering the course include understanding the structure of a motor transport enterprise, the functions of its main divisions, the principles of planning production activities, transportation organization, maintenance and repair, personnel management, quality control and process safety. Of particular importance is the formation of the ability to make managerial decisions based on the analysis of problem situations and the selection of optimal organizational solutions.
Further improvement of the course should be directed towards strengthening the practice-oriented component. It is worth using more real cases of the work of motor transport enterprises, service stations, logistics and service companies, as well as expanding the topics of digitalization of management: ERP and CRM systems, GPS monitoring, electronic document management, transportation planning systems, monitoring of the technical condition of rolling stock and analysis of enterprise performance indicators. Guest lectures by industry experts, production excursions and team project tasks are also advisable.
Thus, the testing of the course confirmed its relevance, professional significance and compliance with the needs of training road transport specialists. Further development of the discipline should be associated with practical cases, digital management tools and increased support for students in performing analytical and project tasks.

Road transport enterprises. Part 3. Quality of production processes

According to the results of the testing of the course “Road transport enterprises. Part 3. Quality of production processes”, it can be concluded that the discipline is highly relevant for training bachelors in the field of road transport. The course is aimed at developing competencies related to ensuring the quality of products and services of road transport enterprises, developing, implementing, improving and managing quality systems. The teaching questionnaire emphasizes that the importance of the course is due to the need to implement quality management systems and their elements at road transport enterprises.
31 questionnaires were processed as part of the student survey, all of which were recognized as valid. The results indicate a very positive perception of the course by students. In particular, 80.6% of students fully agreed that the topics of the curriculum ensure the achievement of the specified learning outcomes, and another 19.4% partially agreed with this statement. Also, 87% of respondents fully agreed that the course was well structured and the topics were explained in an accessible form. The logical structure of the lectures was highly appreciated by 90% of students, which indicates the consistency and clarity of the presentation of the educational material.
The results of the assessment of the practical orientation of the course are positive. According to the criterion of development of practical application of theory, 77% of students chose the answer “strongly agree”, and 19% — “partially agree”. In addition, 84% of respondents fully agreed that during the classes a balance was ensured between theoretical material and practical tasks. This confirms that the course has a pronounced applied nature and is focused not only on mastering the concepts of quality management, but also on the formation of practical skills for their application in the conditions of road transport enterprises.
According to the teacher, 105 students were registered for the course. The average attendance of lectures was 78%, practical classes — 87%, which indicates a sufficient level of student involvement, especially in the practical part of the discipline. According to the results of the final control, 2 students received high grades of level A, B, 13 students - average level C, 89 students - level D, E, and 1 student did not pass the final assessment.

At the same time, the results of the final control indicate the need to further strengthen the educational and methodological support of students, since a significant proportion of applicants received low-level grades. It is advisable to expand the number of applied tasks, production cases and training tests, which will help to better master quality management tools and methods for assessing the effectiveness of quality systems.
A promising direction for improving the course is the introduction of modern practical quality management tools, in particular PDCA, 5 Why, Ishikawa, FMEA, SPC, 8D, Pareto analysis, process audit, risk management, CAPA, as well as digital tools: electronic checklists, CRM/ERP data, digital process maps, KPI panels and Moodle tests based on production situations.
Thus, the testing of the course confirmed its relevance, practical significance, and compliance with the needs of training road transport specialists. Further improvement should be directed towards strengthening the practical component, digitalization of educational tasks, and support for students in mastering quality management tools.

Technical operation of cars

According to the results of the testing of the course “Technical operation of cars”, it can be concluded that the discipline is one of the key ones in the training of bachelors in the field of motor transport. Its significance lies in the formation of an understanding among applicants of the laws of maintaining the operability, reliability and safety of cars in real operating conditions. The course combines theoretical knowledge about the technical condition of a vehicle with practical approaches to diagnostics, maintenance, repair and organization of service processes.
18 questionnaires were processed as part of the student survey, all of which were recognized as valid. The results indicate a generally positive perception of the course by applicants. In particular, 84% of students fully agreed that the topics of the curriculum ensure the achievement of the specified learning outcomes. In addition, 78% of respondents fully agreed that the course was well structured and the topics were explained in an accessible form. The logical structure of the lectures was assessed positively by 68% of students, and the effective use of audio-visual materials by 72% of respondents.
An important result is a positive assessment of the practical orientation of the discipline. According to the criterion of practical application of theory, 67% of students chose the answer “strongly agree”, and another 22% — “partially agree”. Also, 67% of respondents fully agreed that during the classes a balance was ensured between theoretical material and practical tasks. This confirms that the course is focused not only on mastering theoretical provisions, but also on the formation of practical skills related to the technical condition of the car, diagnostics, maintenance, repair and organization of the work of a car service.
According to the teacher questionnaire, 123 students were registered for the course. The average attendance of lectures was 69%, practical classes — 82%, laboratory classes — 91%. The highest level of attendance of laboratory classes indicates the interest of students in the applied component of the discipline. According to the results of the final control, 10 students received high grades of level A, B, 42 students - average level C, 69 students - level D, E, and 2 students did not pass the final assessment.
At the same time, the results show the need for further strengthening of educational and methodological support for students, since a significant part of applicants received low-level grades. It is advisable to increase the number of practical and laboratory classes using modern

diagnostic equipment, OBD scanners, software for analysing the technical condition of the car and real cases from the work of service stations.

Further improvement of the course should aim at expanding the topics of electric vehicles, hybrid vehicles, high-voltage systems, digital diagnostics, telematics and failure prediction. It will also be useful to involve specialists from car service companies in guest lectures, master classes, excursions and joint practical tasks.

Therefore, the testing of the course confirmed its relevance, practical significance, and compliance with modern needs for training road transport specialists.

Technical University of Moldova (UTM)

Description of the courses tested during the first semester of the 2025-2026 academic year (see Table 1).

Table 1. The training programs and courses were developed and tested in autumn semester.

Course/Lab title	Updated or totally new	Level (Bachelor, Master 4-year course)	ECTS credit points	The teaching/training methodologies developed/adopted e.g. e-learning/ training modalities, practical placements in enterprises, etc.	The link to the university webpage	Date of accreditation	The status / document of accreditation
Tested							
Digital control systems	Updated	Bachelor	4	classic lessons, e-learning	https://moodle.utm.md/course/view.php?id=2054	2025	-
Electric vehicle powertrain	Updated	Bachelor	6	classic lessons, e-learning	https://moodle.utm.md/course/view.php?id=6175	2025	-
Electrical and electronic equipment	Updated	Bachelor	4	classic lessons, e-learning	https://moodle.utm.md/course/view.php?id=60	2025	-
Static power converters	Updated	Bachelor	5	classic lessons, e-learning	https://moodle.utm.md/course/view.php?id=5595	2025	-

Students' attraction

Within our faculty, in several study disciplines, course and seminar hours are held in common streams. Accordingly, this semester, students from the 3rd and 4th year of study participated in the questionnaires. Students from the following study programs were involved in the survey: Renewable energy systems engineering (3rd and 4th year); Electromechanical Systems Engineering (3rd and 4th year);

Table 1. Students enrolled at updated courses

Students' group	ISEM 221	ISEM 211 f/r	ISER 221	ISER 231
Students' number	9	5	7	18

Feedback from the students by subjects

From the analysis of the questionnaires completed by the students, we can observe a very good appreciation of the modernized courses. Both the contents and the professor's working method are highly appreciated by the students.
Date of testing: 04.05.2026 – 17.05.2026

Table 2. Students feedback sheet

Course title	How many	How many

	questionnaire forms have been proceeded	questionnaire forms were found valid
Digital control systems	14	14
Electric vehicle powertrain	6	6
Electrical and electronic equipment	14	14
Static power converters	14	14

Feedback from the students by subjects

The copies of filled in Training Evaluation Sheets of Students are presented in these links:
STUDENTS FEEDBACK SHEET - for **Digital control systems**
https://docs.google.com/forms/d/1Z0kXiFnTqECnIJFwA5Oj5rn0kCQ441mNJfj1bR_TtkA/edit#responses
STUDENTS FEEDBACK SHEET – for **Electric vehicle powertrain**
https://docs.google.com/forms/d/1q9orQAUf8YLjo2Z-9RBGYs0BAgyWJ8dYha0yiyMMqNw/edit
STUDENTS FEEDBACK SHEET - for **Electrical and electronic equipment**
https://docs.google.com/forms/d/1pAZnbvYxWSlIquMdVESeIu1mhE5ooHoKBVUt3sWO2Y0/edit
STUDENTS FEEDBACK SHEET - for Static power converters
https://docs.google.com/forms/d/1bXSAf9AeVVJCAXHmbwcBBpvt_5ALt2sRnWAxJ6ratCE/edit#responses

From the analysis of the questionnaires completed by the students, we can observe a very good appreciation of the modernized courses. Both the contents and the professor's working method are highly appreciated by the students.

Table 3. Statistics on the answers given on the tested courses (in percentage).

Name of course	Degree of course	Testing results				
		Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Digital control systems	0.0	0.0	7.1	14.3	21.4	57.2
Electric vehicle powertrain	0.0	0.0	0.0	16.7	16.7	66.6
Electrical and electronic equipment	0.0	0.0	0.0	7.1	21.4	71.5
Static power converters	0.0	0.0	0.0	14.3	21.4	64.3

The evaluation results demonstrate a very high level of student satisfaction with all tested courses included in the analysis. Among the evaluated disciplines, the highest appreciation level was registered for “Electrical and Electronic Equipment” (92.9%), followed by “Electric Vehicle Powertrain” (83.3%), “Static Power Converters” (85.7%), and “Digital Control Systems” (78.6%).

Overall, the average evaluation results indicate that 64.9% of respondents selected the “strongly agree” option, while 20.2% selected “partially agree”. Only 13.1% of responses were neutral, whereas negative evaluations were practically absent.

These findings confirm the high quality, relevance, and practical value of the modernized courses developed within the DIGITRANS project, highlighting the effective integration of modern teaching methods, practical engineering applications, and digital educational tools in the study process.

The consolidated result of students answers about tested courses are presented below.

Consolidated result of students answers about tested courses

Title of course: **Digital control systems**
Level of training course: **Bachelor**
Name of academic(s):
Department: Electrical Enginering
How many questionnaire forms have been processed? **14**
How many questionnaire forms were found valid? **14**
Statistics on the answers given on the course (in percentage).

Criterion	**Testing results**				
	Strongly disagree %	**Partially disagree %**	**Neutral assessment %**	**Partially agree %**	**Strongly agree %**
All study program themes required to achieve the defined learning outcomes were covered			7.1	21.4	71.5
The course was well-structured and the themes were explained in a comprehensible manner			7.1	28.6	64.3
The logical structure of the lecture was maintained			7.1	21.4	71.5
Audio-visual materials were efficiently used during the lecture		7.1	14.3	21.4	57.2
Creative thinking was efficiently			14.3	28.6	57.1

promoted					
Practical application of theory was efficiently promoted			7.1	28.6	64.3
During the class the amount of theoretical material and practical tasks was balanced			7.1	21.4	71.5
Recommended literature sources were accessible and helped in acquiring the course materials			7.1	21.4	71.5
The lecturer/professor's attitude to the students was positive and helpful				14.3	85.7
The time for the completing of the practical tasks was enough			14.3	21.4	64.3
The information about the class's organisation was clear and easily available			7.1	14.3	78.6

Analysis of Open-Ended Responses

What did students like in the course?

- Clear explanation of digital control principles and algorithms;
- Interactive lectures and practical exercises;
- Use of simulations and modern software tools;
- Good balance between theory and practical applications;
- Supportive and communicative lecturer.

Key knowledge gained in the class

- Fundamentals of digital and numerical control systems;
- Implementation of control algorithms;
- Practical skills in system modelling and analysis;
- Understanding of automation and control applications;
- Improved analytical and programming competences.

Suggestions for improvement

- More laboratory activities and practical projects;
- Additional industrial case studies;
- Increased use of simulation software;
- More examples related to real automation systems.

Demographics Analysis

Gender

- Male: 78.6 %
- Female: 21.4 %

Age

- 16–21 years: 71.4 %
- 22–30 years: 21.4 %
- 31–40 years: 7.2 %

Status

- Home students: 92.8 %

- International students: 7.2 %

The demographic analysis shows that the majority of respondents were male home students aged between 16 and 21 years, which corresponds to the typical profile of bachelor students enrolled in electrical engineering and electric mobility related study programs.

Title of course: **Electric vehicle powertrain**
Level of training course: **Bachelor**
Name of academic(s): NUCA Ilie
Department : Electrical Enginering
How many questionnaire forms have been processed? **6**
How many questionnaire forms were found valid? **6**
Statistics on the answers given on the course (in percentage).

Criterion	**Testing results**				
	Strongly disagree %	**Partially disagree %**	**Neutral assessment %**	**Partially agree %**	**Strongly agree %**
All study program themes required to achieve the defined learning outcomes were covered			7.1	21.4	71.5
The course was well-structured and the themes were explained in a comprehensible manner			7.1	21.4	71.5
The logical structure of the lecture was maintained			7.1	14.3	78.6
Audio-visual materials were efficiently used during the lecture			14.3	21.4	64.3
Creative thinking was efficiently promoted			14.3	28.6	57.1
Practical application of theory was efficiently promoted			7.1	21.4	71.5
During the class the amount of theoretical material and practical tasks was balanced			7.1	21.4	71.5
Recommended literature sources were accessible and helped in acquiring the course materials			7.1	28.6	64.3
The lecturer/professor's attitude to the students was positive and helpful				14.3	85.7
The time for the completing of the practical tasks was enough			14.3	21.4	64.3
The information about the class's			7.1	14.3	78.6

organisation was clear and easily available					

Analysis of Open-Ended Responses

What did students like in the course?

- Modern topics related to electric vehicles and e-mobility;
- Practical examples of electric propulsion systems;
- Clear presentation of EV architectures and components;
- Interactive discussions and engineering applications;
- Connection between theory and real vehicle systems.

Key knowledge gained in the class

- Electric vehicle powertrain architectures;
- Operation of traction motors and converters;
- Energy management in electric vehicles;
- Battery systems and propulsion technologies;
- Fundamentals of electric mobility systems.

Suggestions for improvement

- More experimental demonstrations and laboratory work;
- Inclusion of additional industrial examples;
- More simulations related to EV operation;
- Visits to companies or laboratories working with EV technologies.

Demographics Analysis

Gender

- Male: 78.6 %
- Female: 21.4 %

Age

- 16–21 years: 71.4 %
- 22–30 years: 21.4 %
- 31–40 years: 7.2 %

Status

- Home students: 92.8 %
- International students: 7.2 %

Title of course : **Electrical and electronic equipment**
Level of training course: **Bachelor**
Name of academic(s): RACHIER Vasile
Department : Electrical Enginering
How many questionnaire forms have been processed? **14**
How many questionnaire forms were found valid? **14**

Statistics on the answers given on the course (in percentage).

Criterion	Testing results

	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered			7.1	14.3	78.6
The course was well-structured and the themes were explained in a comprehensible manner			7.1	21.4	71.5
The logical structure of the lecture was maintained			0.0	21.4	78.6
Audio-visual materials were efficiently used during the lecture			14.3	21.4	64.3
Creative thinking was efficiently promoted			14.3	28.6	57.1
Practical application of theory was efficiently promoted			7.1	21.4	71.5
During the class the amount of theoretical material and practical tasks was balanced			7.1	21.4	71.5
Recommended literature sources were accessible and helped in acquiring the course materials			7.1	28.6	64.3
The lecturer/professor's attitude to the students was positive and helpful				7.1	92.9
The time for the completing of the practical tasks was enough			14.3	21.4	64.3
The information about the class's organisation was clear and easily available			7.1	14.3	78.6

Analysis of Open-Ended Responses

What did students like in the course?

- Practical orientation of the discipline;
- Detailed explanation of electrical and electronic equipment;
- Use of real engineering examples;
- Well-structured lectures and laboratory tasks;
- Helpful and positive interaction with the lecturer.

Key knowledge gained in the class

- Structure and operation of electrical equipment;
- Electronic devices and industrial applications;
- Diagnostic and operating principles;
- Practical engineering problem-solving skills;

- Knowledge related to electrical safety and equipment operation.

Suggestions for improvement

- More hands-on laboratory activities;
- Additional practical demonstrations;
- More case studies from industry;
- Increased access to modern laboratory equipment.

Demographics Analysis

Gender

- Male: 78.6 %
- Female: 21.4 %

Age

- 16–21 years: 71.4 %
- 22–30 years: 21.4 %
- 31–40 years: 7.2 %

Status

- Home students: 92.8 %
- International students: 7.2 %

The demographic analysis shows that the majority of respondents were male home students aged between 16 and 21 years, which corresponds to the typical profile of bachelor students enrolled in electrical engineering and electric mobility related study programs.

Title of course: **Static power converters**
Level of training course: **Bachelor**
Name of academic(s): BLAJA Valeriu
Department: Electrical Enginering
How many questionnaire forms have been processed? **14**
How many questionnaire forms were found valid? **14**

Statistics on the answers given on the course (in percentage).

Criterion	**Testing results**				
	Strongly disagree %	**Partially disagree %**	**Neutral assessment %**	**Partially agree %**	**Strongly agree %**
All study program themes required to achieve the defined learning outcomes were covered			14.3	21.4	64.3
The course was well-structured and the themes were explained in a comprehensible manner			7.1	28.6	64.3
The logical structure of the lecture was maintained			7.1	21.4	71.5
Audio-visual materials were efficiently used during the lecture		7.1	14.3	21.4	57.2
Creative thinking was efficiently			14.3	28.6	57.1

promoted					
Practical application of theory was efficiently promoted			7.1	28.6	64.3
During the class the amount of theoretical material and practical tasks was balanced			7.1	21.4	71.5
Recommended literature sources were accessible and helped in acquiring the course materials			14.3	21.4	64.3
The lecturer/professor's attitude to the students was positive and helpful				14.3	85.7
The time for the completing of the practical tasks was enough			14.3	21.4	64.3
The information about the class's organisation was clear and easily available			7.1	14.3	78.6

Analysis of Open-Ended Responses

What did students like in the course?

- Interesting and акtyal topics in power electronics;
- Practical examples of converter applications;
- Clear explanations of converter operation principles;
- Laboratory and simulation activities;
- Logical structure of the course.

Key knowledge gained in the class

- Principles of static power converters;
- Power electronics and switching devices;
- Converter control methods;
- Analysis of rectifiers and inverters;
- Application of converters in modern electrical systems.

Suggestions for improvement

- More practical laboratory sessions;
- Additional simulation examples;
- More industrial application case studies;
- More time allocated for practical assignments.

Demographics Analysis

Gender

- Male: 78.6 %
- Female: 21.4 %

Age

- 16–21 years: 71.4 %
- 22–30 years: 21.4 %
- 31–40 years: 7.2 %

Status

- Home students: 92.8 %
- International students: 7.2 %

The demographic profile indicates that the majority of respondents enrolled in the Static Power Converters course were male bachelor students aged between 16 and 21 years, representing the typical target group for electrical engineering and power electronics related disciplines.

Feedback from academic/teacher staff involved in teaching of students by subject

The full professors for the targeted courses participated in this survey.

- **CAZAC Vadim,** PhD, associate professor, course holder **Digital control systems.**
- **NUCA Ilie,** PhD, associate professor, course holder - **Electric vehicle powertrain.**
- **RACHIER Vasile,** PhD, associate professor, course holder **Electrical and electronic equipment.**
- **BLAJĂ Valeriu, PhD**, associate professor, course holder **Static power converters.**

The analysis of the questionnaires completed by academic staff indicates a well-balanced distribution of teaching activities, with a strong emphasis on practical skills and critical thinking development.

On average, the proportion of tasks is oriented towards:

- application of knowledge (approximately 30–50%),
- development of critical thinking and practical skills (around 30–45%),
- development of new competences and independent thinking (about 20–30%).

The results also show that a significant proportion of students achieve the highest grades in tasks related to direct application of knowledge, while more complex tasks involving critical thinking and innovative problem-solving have lower, but still consistent performance levels.

Overall, the questionnaires highlight a clear trend towards practice-oriented and competence-based education, aligned with modern requirements in engineering and the objectives of the DIGITRANS project.

Why do you think this course is important? (De ce credeți că acest curs este important?)

The analyzed courses are considered important because they provide fundamental and applied knowledge essential for electrical engineering. They ensure the understanding of the operation, design, and control of electrical and electromechanical systems used in real industrial applications.

At the same time, these courses contribute to the development of practical skills, analytical thinking, and the ability to apply modern technologies, supporting the training of specialists adapted to current industry requirements and technological trends.

Point out a few basic things that you consider most important in mastering from this course. (Evidențiați câteva lucruri de bază pe care le considerați cele mai importante pentru stăpânirea acestui curs?)

The most important aspects to master include understanding the fundamental principles of operation of electrical and electromechanical systems, as well as the ability to analyze, model, and interpret their behavior.

It is also essential to develop practical skills related to the selection, operation, and diagnosis of equipment, along with the ability to apply theoretical knowledge in real engineering situations. Additionally, the use of modern tools for simulation and analysis plays an important role in mastering the course.

Do you have any suggestions for further improvement of the course? (Aveți sugestii pentru îmbunătățirea în continuare a cursului?)

Further improvement of the course could include strengthening the practical component through the use of modern laboratory equipment and real industrial systems.

It is also recommended to integrate advanced simulation tools and digital technologies, as well as to include more industry-oriented case studies and project-based activities. Additionally, enhancing collaboration with industry partners through guest lectures and site visits would further improve the relevance of the course.

Evaluation of courses testing results

The present report provides an overview of the results obtained from student questionnaires applied to several courses within the Electrical Engineering study program, based on data collected through Google Forms.

The evaluated courses include:

- **Static power converters:** 14 respondents;
- **Electrical and electronic equipment:** 14 respondents;
- **Digital control systems:** 14 respondents;
- **Electric vehicle powertrain:** 6 respondents.

These disciplines cover key areas of electrical engineering, including power electronics, electrical equipment, control systems, and electric traction, aiming to develop both theoretical knowledge and practical competencies aligned with modern engineering requirements.

The respondents represent students who attended and completed the evaluated courses, ensuring the relevance of the collected feedback. Overall, the results indicate a predominantly positive perception of the teaching and learning process across all analyzed disciplines.

From the analysis of closed-ended questions, it can be observed that students generally appreciated the structure and organization of the courses. Most respondents agreed that the courses were well structured, with logically presented topics and content aligned with the intended learning outcomes. Teaching materials were considered accessible and relevant, while the explanations provided during lectures and practical activities were perceived as clear and effective.

Students also emphasized the appropriate balance between theoretical and practical components, noting that practical activities and examples significantly contributed to a better understanding of concepts. The workload associated with assignments was generally considered appropriate, and the organization of the courses was described as clear and predictable.

At the same time, some responses suggest opportunities for further improvement, particularly in increasing the level of interactivity during classes, expanding the use of modern teaching tools and audio-visual materials, and further stimulating student engagement and creative thinking.

The analysis of open-ended questions reinforces these findings. Students highlighted as main strengths the clarity of explanations, the structured presentation of content, the relevance of the subjects to real engineering applications, and the inclusion of practical examples. These aspects contributed to a positive overall learning experience.

Regarding learning outcomes, students reported acquiring essential knowledge and skills specific to the field of electrical engineering, including understanding of core concepts, the ability to apply theoretical knowledge in practice, and the development of analytical and technical thinking. This confirms that the courses effectively support the formation of professional competencies.

Most students indicated that no major improvements are necessary, reflecting a high level of satisfaction. However, some general suggestions include increasing interactivity, integrating more real-life case studies, and further using digital tools in the teaching process.

In conclusion, the evaluated courses Digital control systems, Electric vehicle powertrain, Electrical and electronic equipment, Static power converters- are perceived as relevant, well structured, and effectively delivered. The results confirm the quality of the educational process within the Electrical Engineering study program, while also outlining directions for continuous improvement in teaching methods and student engagement.

Alecu Russo Balti State University (USARB)

The Report on students trained in new programs and courses, including feedback from traineeships, provides a description of the progress in the development and implementation of the study program "Engineering and Management in Automotive Transport" at Alecu Russo State University of Bălți (USARB) during the **autumn semester of 2025**. The program includes 6 courses at bachelor's level. Description of the courses tested during the first semester of the 2025-2026 academic year is given in Table 1.

Table 1. The training programs and courses were developed and tested in autumn semester, 2025-2026 academic year.

Course/Lab title	Updated or totally new	Level (Bachelor, Master 5-year course)	ECTS credit points	The teaching/training methodologies developed/adopted e.g. e-learning/ training modalities, practical placements in enterprises, etc.	The link to the university webpage	Date of accreditation	The status / document of accreditation
Tested							
Automatic control engineering	Updated	Bachelor	4	Classic lessons, e-learning Moodle	https://elearning.usarb.md/moodle/enrol/index.php?id=810	19.12.2025	Certificate of accreditation, seria ÎS no. 0001-26
Engineering bionics	New	Bachelor	4	Classic lessons, e-learning	https://usarb.md/wp-content/uploads/2025/05/Manual-pr.IM-2025-1.pdf	19.12.2025	Certificate of accreditation, seria ÎS no. 0001-26

Automotive electrical and electronic equipment	Updated	Bachelor	4	Classic lessons, e-learning Moodle	https://usarb.md/wp-content/uploads/2025/05/Manual-pr.IM-2025-1.pdf https://elearning.usarb.md/moodle/enrol/index.php https://usarb.md/wp-content/uploads/2025/05/Manual-pr.IM-2025-1.pdf?id=811	19.12.2025	Certificate of accreditation, seria ÎS no. 0001-26
Automation in production	Updated	Bachelor	5	Classic lessons, e-learning Moodle	https://usarb.md/wp-content/uploads/2025/05/Manual-pr.IM-2025-1.pdf https://elearning.usarb.md/moodle/course/view.php?id=78	19.12.2025	Certificate of accreditation, seria ÎS no. 0001-26
Autonomous vehicles	New	Bachelor	4	Classic lessons, e-learning	https://usarb.md/wp-content/uploads/2025/05/Manual-pr.IM-2025-1.pdf	19.12.2025	Certificate of accreditation, seria ÎS no. 0001-26
Hybrid vehicles	New	Bachelor	4	Classic lessons, e-learning	https://usarb.md/wp-content/uploads/2025/05/Manual-pr.IM-2025-1.pdf	19.12.2025	Certificate of accreditation, seria ÎS no. 0001-26

Students' attraction

Bachelor's students studying at Alecu Russo Balti State University within the study program "Engineering and Management in Automotive Transport", groups IM31Z, IM41Z, IM41R, and IM51R, took part in the survey.

Attracted students:

Number of students	**Students' group**			
	IM-31Z	IM-41Z	IM-41R	IM-51R
	9	10	12	21

Students of USARB from the "Engineering and Management in Automotive Transport" were involved in the survey:

- Engineering and management in automotive transport (Bachelor, 3rd year), group IM-31Z (9 students);
- Engineering and management in automotive transport (Bachelor, 4th year), groups IM-41Z (10 students), IM-41R (12 students);
- Engineering and management in automotive transport (Bachelor, 5th year), groups IM-51R (21 students).

Course title	**No. of enrolled students**
Automatic control engineering	52
Engineering bionics	52
Automotive electrical and electronic equipment	31
Automation in production	31
Autonomous vehicles	31
Hybrid vehicles	31
Total	**228**

Feedback from the students by subjects

The students evaluated the new and updated courses within the DIGITRANS project during the period 26.03.2026–05.04.2026 using the ***Questionnaire for students' assessment of the courses they have completed in the framework of the ERASMUS+ Project DIGITRANS / Chestionar pentru evaluarea de către studenți a cursurilor finalizate în cadrul proiectului ERASMUS+ DIGITRANS,*** administered through the Google Forms application, and the results are presented in Section 2.1.

STUDENTS FEEDBACK SHEET
https://docs.google.com/forms/d/11qA3m2aWpXDUXG7EHJTzVF0vbtnYu7dijYcJ19Jbqe4/preview

Course title	**How many questionnaire forms**	**How many questionnaire forms**

	have been proceeded	were found valid
Automotive electrical and electronic equipment	25	25
Automatic control engineering	25	25
Automation in production	25	25
Hybrid vehicles	25	25
Engineering bionics	25	25
Autonomous vehicles	25	25
Total	25 responses were collected for each course unit	

Table 2: Statistics on the answers given on the tested courses (in percentage).

Name of course	Degree of course	Testing results				
		Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
Automotive electrical and electronic equipment	0.0	0.0	0.0	0.0	5.09	94.91
Automatic control engineering	0.0	0.0	0.0	0.0	7.64	92.36
Automation in production	0.0	0.0	0.0	0.0	6.91	93.09
Hybrid vehicles	0.0	0.0	0.0	0.0	6.18	93.82
Engineering bionics	0.0	0.0	0.0	0.0	7.27	92.73
Autonomous vehicles	0.0	0.0	0.0	0.0	5.82	94.18
Total	**0.0**	**0.0**	**0.0**	**0.0**	**6.49**	**93.51**

The evaluation results demonstrate a very high level of student satisfaction with all tested courses. Among the courses, the highest appreciation levels were registered for “Automotive Electrical and Electronic Equipment” (94.91%) and “Autonomous Vehicles” (94.18%), followed closely by “Hybrid Vehicles” (93.82%), “Automation in Production” (93.09%), “Engineering Bionics” (92.73%), and “Automatic Control Engineering” (92.36%).

Overall, the average evaluation score shows that 93.51% of respondents strongly agreed with the positive statements regarding the courses, while 6.49% selected the “partially agree” option. These findings confirm the high quality, relevance, and practical value of the modernized courses implemented within the DIGITRANS project.

The consolidated result of students answers about tested courses are presented below:

Co-funded by the Erasmus+ Programme of the European Union

Consolidated result of students answers about tested courses

Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

- Title of course (*Denumirea cursului*): **Automotive electrical and electronic equipment/ Echipamentul electric și electronic auto**
- Level of training course (*Nivelul unității de curs*): **First Cycle, Bachelor's Degree (Ciclul I, Licență)**
- Name of academic(s) (*Numele, prenumele profesorului*): **RUSNAC Vladislav, PhD, Assoc. Prof.**
- Department (*Catedra*): **Physical and engineering sciences**
- How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **25**
- How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*) **25**

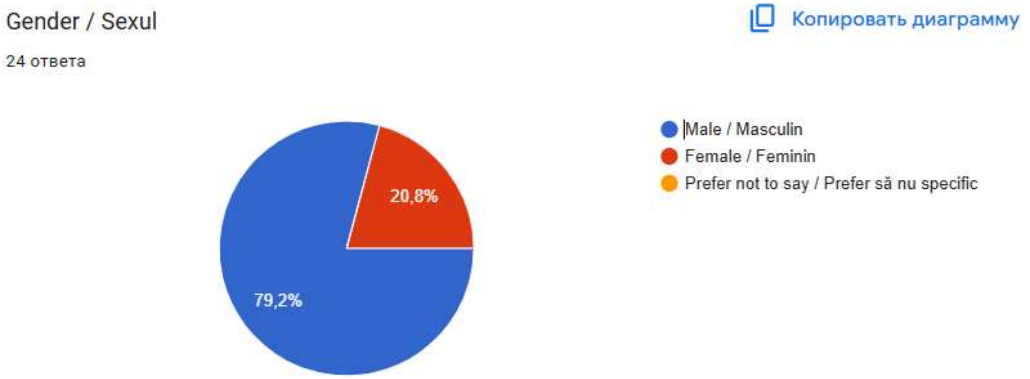
Statistics on the answers given on the course (in percentage).
Statistica privind răspunsurile completate despre cursul (în procente)

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	0	0	0	8	92
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	0	0	0	0	100
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	0	0	0	8	92
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	0	0	0	8	92
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	0	0	0	4	96
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	0	0	0	8	92
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	0	0	0	4	96
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	0	0	0	8	92
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți*	0	0	0	4	96

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
a fost pozitivă și de ajutor					
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	0	0	0	0	100
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	0	0	0	4	96

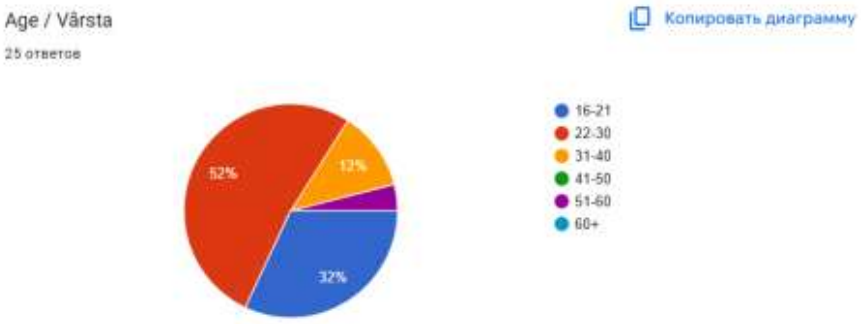
Socio-demographic profile of respondents
Gender / Sexul:

- Male / Masculin: 19 (79.2%)
- Female / Feminin: 5 (20.8%)



Age / Vârsta:

- 16–21 years / ani: 8 (32%)
- 22–30 years / ani: 13 (52%)
- 31–40 years / ani: 3 (12%)
- 51–60 years / ani: 1 (4%)



Status / Statut : 100% USARB students

Co-funded by the Erasmus+ Programme of the European Union

Consolidated result of students answers about tested courses
Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

- Title of course (*Denumirea cursului*): **Automatic Control Engineering/Ingineria reglării automate**
- Level of training course (*Nivelul unității de curs*): **First Cycle, Bachelor's Degree (Ciclul I, Licență)**
- Name of academic(s) (*Numele, prenumele profesorului*): **RUSNAC Vladislav, PhD, Assoc. Prof.**
- Department (*Catedra*): **Physical and engineering sciences**
- How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **25**
- How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*) **25**

Statistics on the answers given on the course (in percentage).
Statistica privind răspunsurile completate despre cursul (în procente)

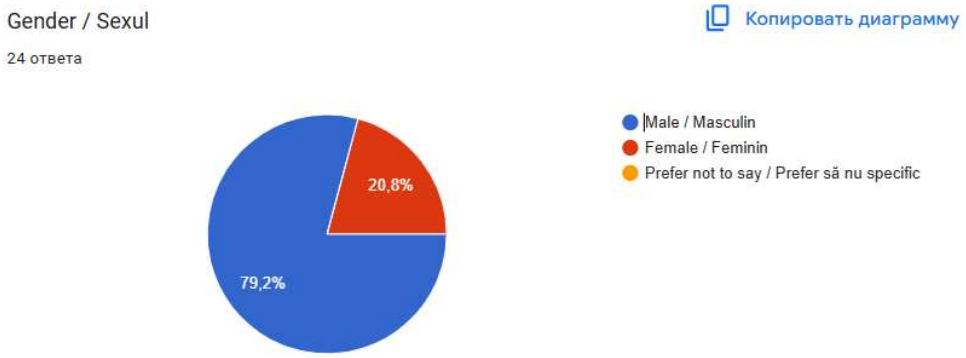
Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	0	0	0	8	92
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	0	0	0	12	88
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	0	0	0	8	92
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	0	0	0	8	92
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	0	0	0	12	88
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	0	0	0	8	92
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	0	0	0	4	96
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	0	0	0	12	88
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	0	0	0	4	96

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	0	0	0	4	96
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	0	0	0	4	96

Socio-demographic profile of respondents

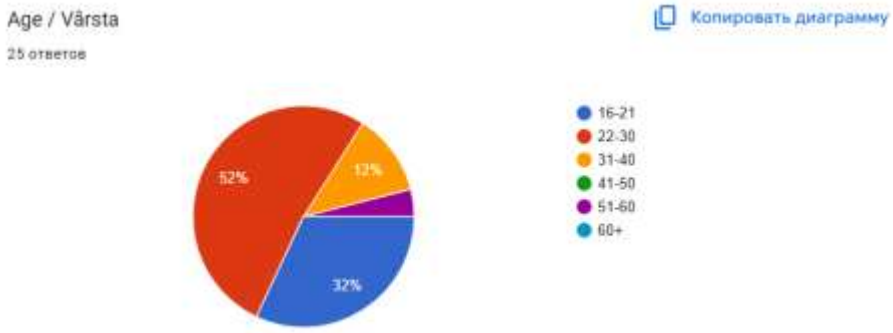
Gender / Sexul:

- Male / Masculin: 19 (79.2%)
- Female / Feminin: 5 (20.8%)



Age / Vârsta:

- 16–21 years / ani: 8 (32%)
- 22–30 years / ani: 13 (52%)
- 31–40 years / ani: 3 (12%)
- 51–60 years / ani: 1 (4%)



Status / Statut : 100% USARB students

Co-funded by the Erasmus+ Programme of the European Union

Consolidated result of students answers about tested courses

Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

- Title of course (*Denumirea cursului*): **Automation in Production/Automatizare în producție**
- Level of training course (*Nivelul unității de curs*): **First Cycle, Bachelor's Degree (Ciclul I, Licență)**
- Name of academic(s) (*Numele, prenumele profesorului*): **OJEGOV Alexandr, PhD, Assoc. Prof.**
- Department (*Catedra*): **Physical and engineering sciences**
- How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **25**
- How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*) **25**

Statistics on the answers given on the course (in percentage).
Statistica privind răspunsurile completate despre cursul (în procente)

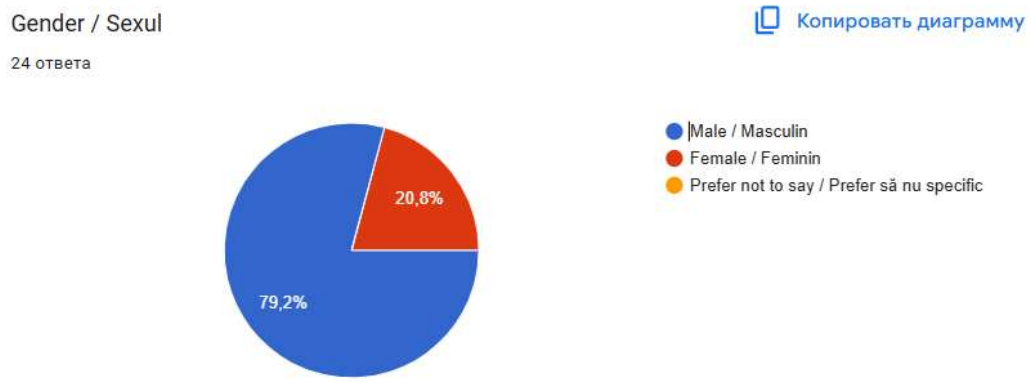
Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	0	0	0	8	92
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	0	0	0	4	96
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	0	0	0	8	92
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	0	0	0	4	96
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	0	0	0	8	92
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	0	0	0	4	96
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	0	0	0	8	92
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea*	0	0	0	8	92

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
materialelor cursului					
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	**0**	**0**	**0**	**12**	**88**
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	**0**	**0**	**0**	**4**	**96**
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	**0**	**0**	**0**	**8**	**92**

Socio-demographic profile of respondents

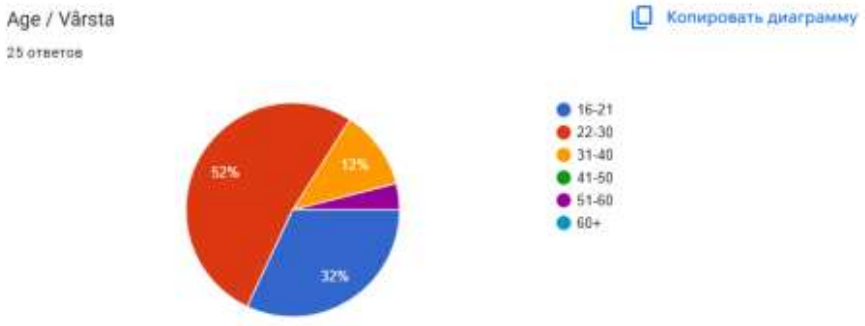
Gender / Sexul:

- Male / Masculin: 19 (79.2%)
- Female / Feminin: 5 (20.8%)



Age / Vârsta:

- 16–21 years / ani: 8 (32%)
- 22–30 years / ani: 13 (52%)
- 31–40 years / ani: 3 (12%)
- 51–60 years / ani: 1 (4%)



Status / Statut : 100% USARB students

Co-funded by the Erasmus+ Programme of the European Union

Consolidated result of students answers about tested courses
Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

- Title of course (*Denumirea cursului*): **Hybrid Vehicles"/„Vehicule hibride**
- Level of training course (*Nivelul unității de curs*): **First Cycle, Bachelor's Degree (Ciclul I, Licență)**
- Name of academic(s) (*Numele, prenumele profesorului*): **RUSNAC Vladislav, PhD, Assoc. Prof.**
- Department (*Catedra*): **Physical and engineering sciences**
- How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **25**
- How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*) **25**

Statistics on the answers given on the course (in percentage).
Statistica privind răspunsurile completate despre cursul (în procente)

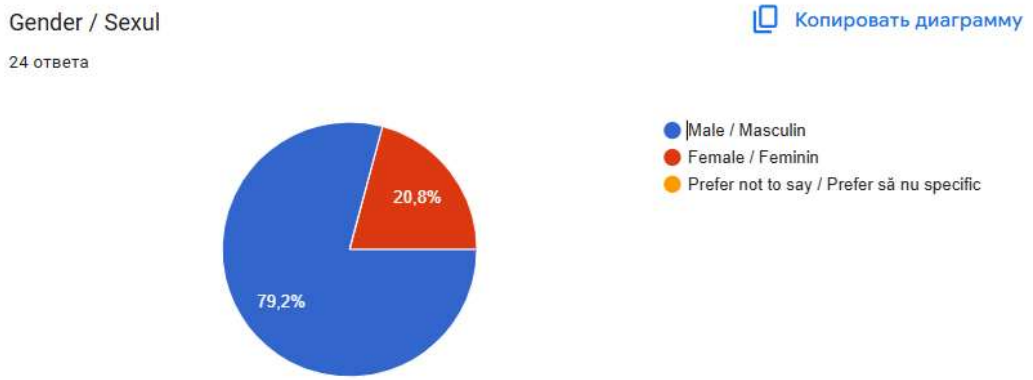
Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	0	0	0	4	96
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	0	0	0	8	92
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	0	0	0	8	92
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	0	0	0	4	96
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	0	0	0	4	96
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	0	0	0	8	92
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost*	0	0	0	8	92

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
echilibrată					
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	**0**	**0**	**0**	**8**	**92**
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	**0**	**0**	**0**	**8**	**92**
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	**0**	**0**	**0**	**4**	**96**
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	**0**	**0**	**0**	**4**	**96**

Socio-demographic profile of respondents

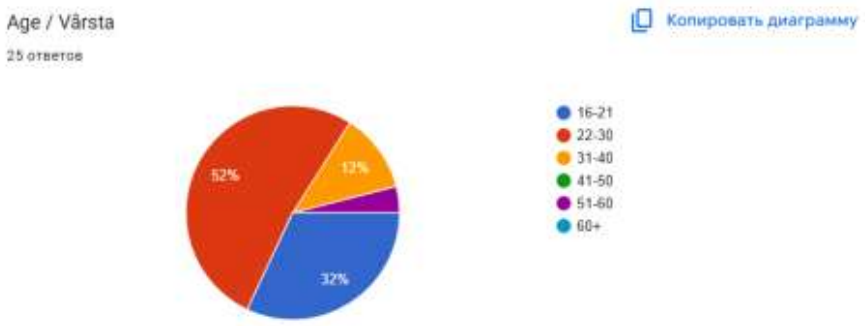
Gender / Sexul:

- Male / Masculin: 19 (79.2%)
- Female / Feminin: 5 (20.8%)



Age / Vârsta:

- 16–21 years / ani: 8 (32%)
- 22–30 years / ani: 13 (52%)
- 31–40 years / ani: 3 (12%)
- 51–60 years / ani: 1 (4%)



Status / Statut : 100% USARB students

Co-funded by the Erasmus+ Programme of the European Union

Consolidated result of students answers about tested courses
Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

- Title of course (*Denumirea cursului*): **Engineering Bionics/Bionica inginerească**
- Level of training course (*Nivelul unității de curs*): **First Cycle, Bachelor's Degree (Ciclul I, Licență)**
- Name of academic(s) (*Numele, prenumele profesorului*): **OJEGOV Alexandr, PhD, Assoc. Prof.**
- Department (*Catedra*): **Physical and engineering sciences**
- How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **25**
- How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*) **25**

Statistics on the answers given on the course (in percentage).
Statistica privind răspunsurile completate despre cursul (în procente)

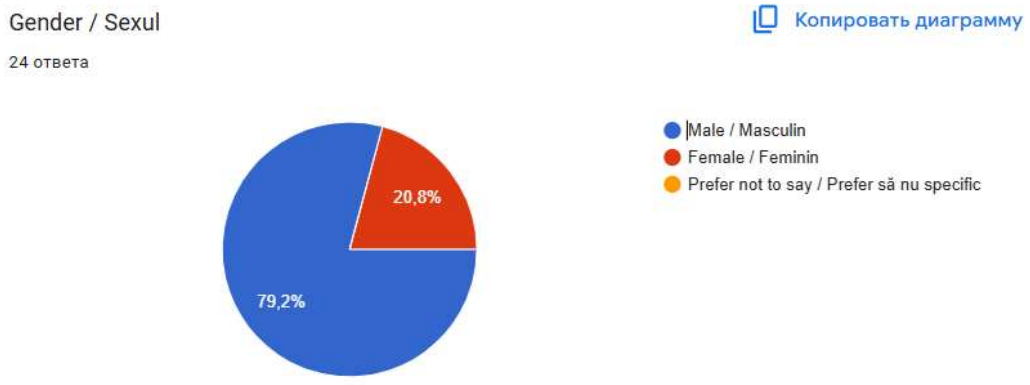
Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	0	0	0	8	92
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	0	0	0	4	96
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	0	0	0	4	96
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	0	0	0	8	92

Criterion (Criteriu)	Testing results				
	Strongly disagree %	**Partially disagree %**	**Neutral assessment %**	**Partially agree %**	**Strongly agree %**
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	0	0	0	8	92
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	0	0	0	12	88
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	0	0	0	8	92
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	0	0	0	8	92
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	0	0	0	8	92
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	0	0	0	4	96
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	0	0	0	8	92

Socio-demographic profile of respondents

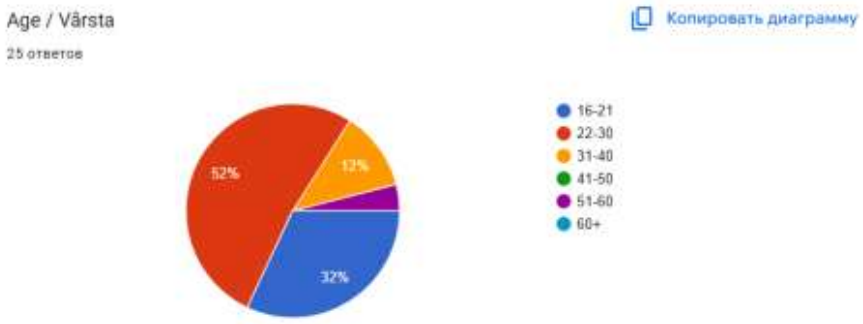
Gender / Sexul:

- Male / Masculin: 19 (79.2%)
- Female / Feminin: 5 (20.8%)



Age / Vârsta:

- 16–21 years / ani: 8 (32%)
- 22–30 years / ani: 13 (52%)
- 31–40 years / ani: 3 (12%)
- 51–60 years / ani: 1 (4%)



Status / Statut : 100% USARB students

Co-funded by the Erasmus+ Programme of the European Union

Consolidated result of students answers about tested courses
Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

- Title of course (*Denumirea cursului*): **Autonomous Vehicles/Vehicule autonome**
- Level of training course (*Nivelul unității de curs*): **First Cycle, Bachelor's Degree (Ciclul I, Licență)**
- Name of academic(s) (*Numele, prenumele profesorului*): **RUSNAC Vladislav, PhD, Assoc. Prof.**
- Department (*Catedra*): **Physical and engineering sciences**
- How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **25**
- How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*) **25**

Statistics on the answers given on the course (in percentage).
Statistica privind răspunsurile completate despre cursul (în procente)

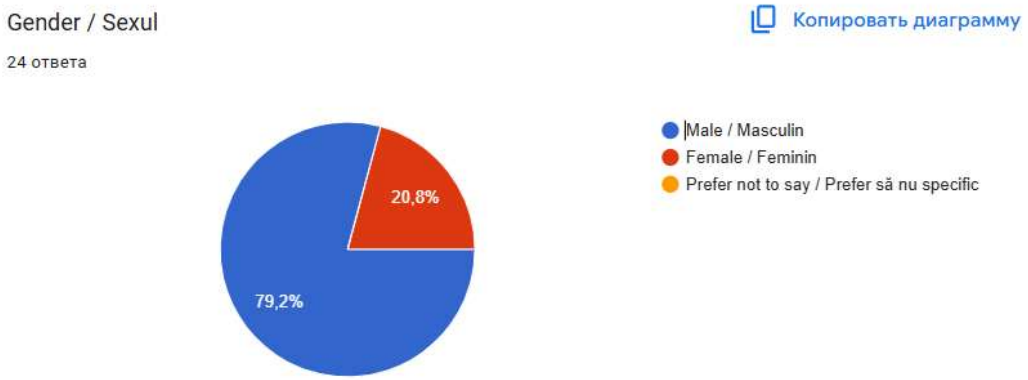
Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	0	0	0	8	92
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	0	0	0	8	92
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	0	0	0	8	92
Audio-visual materials were efficiently used during the lecture	0	0	0	4	96

Criterion (Criteriu)	Testing results				
	Strongly disagree %	**Partially disagree %**	**Neutral assessment %**	**Partially agree %**	**Strongly agree %**
Materialele audiovizuale au fost utilizate eficient în timpul cursului					
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	0	0	0	4	96
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	0	0	0	4	96
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	0	0	0	8	92
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	0	0	0	8	92
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	0	0	0	4	96
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	0	0	0	4	96
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	0	0	0	4	96

Socio-demographic profile of respondents

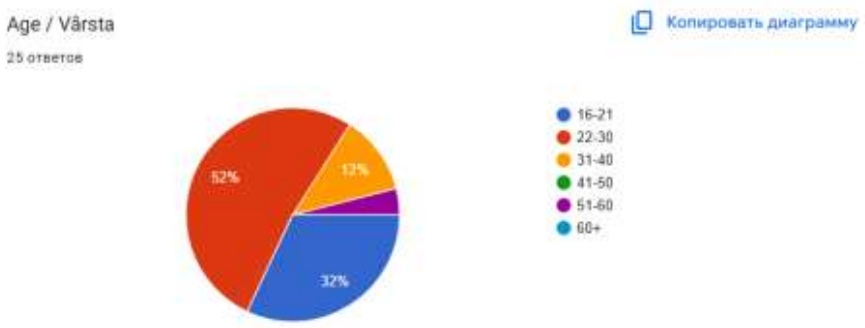
Gender / Sexul:

- Male / Masculin: 19 (79.2%)
- Female / Feminin: 5 (20.8%)



Age / Vârsta:

- 16–21 years / ani: 8 (32%)
- 22–30 years / ani: 13 (52%)
- 31–40 years / ani: 3 (12%)
- 51–60 years / ani: 1 (4%)



Status / Statut : 100% USARB students

Feedback from academic/teacher staff involved in teaching of students by subject

Five teachers were involved in the survey:

- Besliu Vitalie
- Ojegov Alexandr
- Pereteatcu Pavel
- Pînzaru Natalia
- Vladislav Rusnac

ACADEMIC STAFF FEEDBACK SHEET
https://docs.google.com/forms/d/1lTsAf6u6bFw4DegUvvfrLR2Bxu9KgUQeGfyfPadGxRw/edit?chromeless=1#responses

The academic staff evaluated 7 course units within the specialty 0710.1 “Engineering and Management in Automotive Transport”, of which 6 courses were delivered during the autumn semester of the 2026–2027 academic year.

The result of Questionnaire for testing procedure of academic staff about tested courses answers are presented in Annex 1.

Evaluation of courses testing results

Elaboration of courses testing results was done based on the consolidated results of students answers about tested courses and Feedback from academic/teacher staff involved in teaching of students.

Bachelor’s Course „Automotive electrical and electronic equipment”

The results of processing the questionnaires of students

The qualitative analysis of the students' responses highlights a high level of satisfaction with the evaluated course. To the question "What did you like about the course?", most respondents offered positive assessments, such as "Everything", "It's great" and "I liked everything", highlighting the efficient organization of the course, the professionalism of the teaching staff and the practical relevance of the contents. Students also appreciated the structure of the teaching material and the practical component of the activities.

To the question "List 3 aspects that you learned in this course", respondents mentioned knowledge related to electric vehicles, engineering technologies and programming, emphasizing the practical usefulness and modern nature of the information presented.
Regarding the question "Do you have any suggestions for improving the course?", most students did not make recommendations, which indicates a high degree of satisfaction with the course. However, one respondent suggested introducing additional topics related to transport management and logistics, highlighting the interest in developing interdisciplinary skills.
Overall, the results demonstrate that students appreciate the quality of the course, the practical relevance of the contents, and its contribution to the development of professional skills in the field of engineering and automotive transportation.

The results of processing the questionnaires of teachers

Vladislav RUSNAC:

4. Why do you think this course is important?

- It is a specialized course unit that contributes to the development of the necessary skills in the field of motor transport. The course applies and integrates the knowledge and competences acquired in previously studied subjects and provides the foundation for further study in advanced years.
- It is an important course because it develops students' practical skills related to the maintenance of the electrical systems of automobiles.
- It is a specialized course unit in the field of automotive engineering.
- The course "Automotive Electrical and Electronic Equipment" is important because it provides the knowledge necessary for understanding, diagnosing, and maintaining the electrical and electronic systems of automobiles.

5. Point out a few basic things that you consider most important in mastering from this course.

- Competences acquired in Applied Physics, Electrical Engineering, and Applied Electronics.
- Knowledge of the structure and electrical diagrams of the automobile.
- Competences in the field of electricity and automotive electrical systems.
- Knowledge of the main components of the automotive electrical system, understanding of electrical circuits and the operation of electric current, the role of the battery, alternator, and starter, the ability to read electrical схемatics, and the proper use of measuring instruments for fault diagnosis.
- Rapid development of technologies in the construction of contemporary vehicles.

6. Do you have any suggestions for further improvement of the course?

- Updating information resources.
- More practical training activities should be introduced within the course, including practical work on the maintenance of the electrical and electronic equipment of automobiles and electric vehicles.
- A more in-depth study of electric drives would be beneficial.
- I would suggest including more practical activities and real examples of fault diagnostics.

The responses highlight the significant importance of the course "Automotive Electrical and Electronic Equipment" for the professional training of students in the field of automotive engineering. Respondents emphasized that the course contributes to the development of specialized competences related to automotive electrical and electronic systems, while also

integrating knowledge acquired in Applied Physics, Electrical Engineering, and Applied Electronics. Students appreciated the practical relevance of the discipline, particularly its role in understanding, diagnosing, and maintaining automotive electrical systems.

Among the most important learning outcomes, respondents mentioned knowledge of the structure and electrical diagrams of automobiles, understanding the operation of electrical circuits and key components such as the battery, alternator, and starter, as well as the ability to use measuring instruments for fault diagnostics. The course was also appreciated for addressing modern technologies and the rapid technological development of contemporary vehicles.

Regarding suggestions for improvement, students recommended updating information resources, increasing the number of practical training activities, and introducing more real examples of fault diagnostics and maintenance of electrical and electronic systems, including those related to electric vehicles. Respondents also highlighted the need for a more in-depth study of electric drives and a stronger practical orientation of the course.

Bachelor's Course „Automatic Control Engineering"

The results of processing the questionnaires of students

The qualitative analysis of the students' responses highlights a positive appreciation of the evaluated course. To the question "What did you like about the course?", the respondents appreciated the organization and usefulness of the course, offering answers such as "Everything", "Everything was ok" and "Everything was good and useful". The students particularly highlighted the combination of theoretical material and practical examples, as well as the clarity of the explanations provided by the teacher and the accessible way of presenting technical terms.

To the question "List 3 aspects that you learned in this course", the respondents emphasized the complexity and interest in the field of automatic regulation, noting that the information accumulated is not limited to just a few aspects. The students also highlighted the importance of data knowledge and the relevance of the technical and digital skills acquired.

Regarding the question "Do you have any suggestions for improving the course?", the majority of the respondents did not make recommendations, which indicates a high degree of satisfaction with the structure and content of the course. However, some students suggested expanding the practical component and introducing additional topics related to transport management and logistics, highlighting the interest in developing interdisciplinary skills. Overall, the analysis of the responses demonstrates that students perceive the course as relevant, well-organized and useful for developing professional and technical skills.

The results of processing the questionnaires of teachers

Vladislav RUSNAC:

1. Why do you think this course is important?

- It connects the competences acquired in specialized course units and develops the skills necessary for an engineer in automotive transport.
- It is a course that provides the foundation for subsequent courses in automation and electromobility.

- It contributes to familiarization with technical and technological progress, as well as with social aspects related to modern engineering systems.
- The course “Automatic Control Engineering” is important because it helps students understand how technical processes and systems are automatically controlled and stabilized.
- Rapid development of automated technologies

2. Point out a few basic things that you consider most important in mastering from this course.

- Applications of sensors in automatic control engineering for the automotive industry.
- Understanding the concept of an automatic system and control loop, mathematical modeling of processes through differential equations and transfer functions, the practical application of P, PI, PD, and PID controllers, and the connection between theoretical concepts and real industrial applications.
- Elements that generate signals for controlling automatic systems and the structure of active elements.
- The most important fundamental aspects include understanding the mathematical modeling of systems, the concept of feedback, system stability, transfer functions and block diagrams, as well as the interpretation of system time response.
- Development of students’ practical and theoretical competences.

3. Do you have any suggestions for further improvement of the course?

- Creation by students of their own projects within practical assignments and individual work.
- Use of equipment for signal testing and verification.
- I would suggest including more practical examples, computer simulations, industrial applications, step-by-step explanations of more difficult concepts, and more solved exercises.

The responses emphasize the importance of the course “Automatic Control Engineering” for the professional training of students in automotive transport engineering. Respondents highlighted that the course integrates competences acquired in previous specialized disciplines and provides the foundation for further studies in automation and electromobility. The course was appreciated for its relevance to modern technological progress and for helping students understand the principles of automatic control and stabilization of technical systems.

Among the most important learning outcomes, students mentioned understanding automatic systems and control loops, mathematical modeling through differential equations and transfer functions, applications of sensors in the automotive industry, and the practical use of P, PI, PD, and PID controllers. Respondents also emphasized the importance of concepts such as feedback, system stability, block diagrams, and interpretation of system responses, which contribute to the development of both theoretical and practical competences.

Regarding suggestions for improvement, students recommended increasing the practical component of the course through individual projects, computer simulations, industrial applications, and the use of equipment for signal testing and verification. Respondents also suggested including more solved exercises and step-by-step explanations for complex concepts in order to strengthen practical understanding and application of the topics studied.

Bachelor’s Course „ Automation in Production”

The results of processing the questionnaires of students

The qualitative analysis of the students' responses highlights a very positive assessment of the evaluated course. To the question "What did you like about the course?", the respondents appreciated the content, organization and practical relevance of the subject, considering it one of the most valuable subjects in the study program.
To the question "List 3 aspects that you learned in this course", the students highlighted knowledge regarding the modernization of enterprises and the essential aspects of the processes of organizational development and management. These responses reflect the development of analytical and applied skills relevant to the technical and managerial field.
Regarding the question "Do you have any suggestions for improving the course?", the respondents did not formulate additional recommendations, which indicates a high degree of satisfaction with the structure and teaching methods used.
The responses demonstrate that the students appreciate the practical relevance of the course and its contribution to the development of professional and managerial skills.

The results of processing the questionnaires of teachers
OJEGOV Alexandr:

1. Why do you think this course is important?

- Knowledge of the principles of automation of various technological processes similar to industrial ones.
- Direct connection with industry and the training of specialists in the field.
- It is important because it provides the foundation for understanding and applying modern technologies that make industrial processes more efficient, safer, and more competitive.
- The course “Automation in Production” is important because it helps students understand how automated technologies can be used to increase efficiency, quality, and safety.
- Automation is widely applied in all production processes.

2. Point out a few basic things that you consider most important in mastering from this course.
- Automatic production lines, industrial robots, and sensor systems.
- Robotization of industrial processes.
- Mastering the concepts of safety and reliability in automated systems. Integration of modern technologies such as robotics, IoT, and artificial intelligence into industrial production. The connection between automation theory and practical industrial applications that lead to the optimization of manufacturing processes.
- The most important fundamental aspects include understanding the operating principles of automated systems, knowledge of sensors, command and control logic, reading technological and electrical diagrams, as well as the ability to apply this knowledge in practice for optimizing production processes.
- Development of students’ practical competences in the field of automation in production.

3. Do you have any suggestions for further improvement of the course?
- Control systems and maintenance of automation elements.
- Design and development of automated systems (models) by students during practical classes and individual work.
- The course could be improved by including more practical applications and real industrial case studies, as well as by using simulations and modern equipment.

The responses underline the importance of the course “Automation in Production” for developing students’ competences in the field of industrial automation and modern manufacturing technologies. Respondents emphasized that the course provides essential knowledge regarding the

automation of technological processes, strengthens the connection between academic training and industrial practice, and contributes to understanding how automated technologies improve efficiency, quality, safety, and competitiveness in production systems.
Among the most important learning outcomes, students mentioned knowledge related to automatic production lines, industrial robots, sensor systems, and robotization of industrial processes. Particular importance was attributed to understanding the principles of automated systems, command and control logic, safety and reliability concepts, as well as the integration of robotics, IoT, and artificial intelligence into industrial production. Respondents also highlighted the development of practical competences necessary for optimizing manufacturing processes.
Regarding suggestions for improvement, students recommended increasing the practical dimension of the course through the design and development of automated systems during practical classes and individual work. They also suggested including more real industrial case studies, practical applications, simulations, and modern equipment to strengthen the connection between theoretical knowledge and industrial practice.

Bachelor's Course „Hybrid Vehicles"

The results of processing the questionnaires of students

The qualitative analysis of the students' responses highlights a positive assessment of the evaluated course. To the question "What did you like about the course?", the respondents appreciated the organization and usefulness of the teaching activities, highlighting in particular the integration of information technologies and the modern nature of the contents presented.
To the question "List 3 aspects that you learned in this course", the students mentioned knowledge regarding hybrid vehicles, their construction and how they function, which reflects the practical relevance and topicality of the topics addressed in the discipline.
Regarding the question "Do you have any suggestions for improving the course?", the respondents did not formulate additional recommendations, which indicates a high degree of satisfaction with the organization and delivery of the course.
The analysis of the responses demonstrates that the students appreciate the modern and applied nature of the course, as well as its contribution to the development of technical and digital skills relevant to the field of motor transport.

The results of processing the questionnaires of teachers
RUSNAC Vladislav:

1. **Why do you think this course is important?**

- Combines the classical construction of a vehicle with modern electric propulsion systems.
- Study of vehicles with energy-efficient power sources.
- It is important because it addresses an essential stage in the transition from classical mobility based on fossil fuels to sustainable mobility.
- The course "Hybrid Vehicles" is important because it provides essential knowledge about modern propulsion technologies, energy efficiency, and the reduction of environmental impact in the automotive field.
- Rapid development of technologies in the construction of hybrid vehicles.

2. **Point out a few basic things that you consider most important in mastering from this course.**

- Combination of propulsion mechanisms, the sequence and timing of engine start-up.
- Interface between the internal combustion engine and the electric motor.
- Understanding the operating principles and operating modes (series, parallel, and mixed), as well as the main components – internal combustion engine, electric motor, batteries, and the energy management system.
- Analysis of the advantages and limitations of hybrid vehicles, with emphasis on energy efficiency, emission reduction, and their role as a transitional solution toward sustainable mobility.
- The most important fundamental aspects include understanding the operation of internal combustion and electric motors, knowledge of the main components of the hybrid system (battery, inverter, electric motor, transmission), understanding the energy flow in different driving modes, as well as concepts related to energy efficiency, regenerative braking, and the advantages of hybrid vehicles for the environment and fuel consumption.
- Development of students' theoretical and practical competences in the field of hybrid vehicles.

3. **Do you have any suggestions for further improvement of the course?**

- Possibility of simulating different structures.
- The course could be improved by including more practical examples and real case studies, using interactive schemes and simulations for understanding energy flow, updating the content with the latest technologies in the automotive industry, and allocating more time for practical applications, diagnostics, and maintenance of hybrid systems.

The responses highlight the importance of the course "Hybrid Vehicles" in preparing students for the transition from conventional mobility based on fossil fuels to sustainable and energy-efficient transportation systems. Respondents emphasized that the course combines knowledge of classical vehicle construction with modern electric propulsion technologies and provides essential competences related to energy efficiency, environmental protection, and modern automotive engineering.

Among the most important learning outcomes, students mentioned understanding the operating principles and modes of hybrid vehicles, the interaction between internal combustion engines and electric motors, and knowledge of the main hybrid system components, including batteries, inverters, electric motors, and energy management systems. Importance was also attributed to concepts such as energy flow, regenerative breaking, energy efficiency, and the environmental advantages of hybrid vehicles. Respondents noted that the course contributes to the development of both theoretical and practical competencies in the field of hybrid technologies.

Regarding suggestions for improvement, students recommended increasing the use of simulations, interactive schemes, and real case studies to better understand energy flow and hybrid system operation. They also suggested updating the course content with the latest automotive technologies and allocating more time for practical applications, diagnostics, and maintenance of hybrid systems.

Bachelor's Course „Engineering Bionics"

The results of processing the questionnaires of students

The qualitative analysis of the students' responses highlights a positive appreciation of the evaluated course. To the question "What did you like about the course?", the respondents

appreciated the clarity and accessibility of the information presented, considering the content useful and easy to understand. The students also expressed general satisfaction with the organization and conduct of the teaching activities.

To the question "List 3 aspects that you learned in this course", the respondents highlighted the coherent and integrated nature of the course, mentioning that the topics addressed were well correlated and contributed to a complex understanding of the discipline. These opinions reflect the appreciation for the logical structure of the course and for the continuity between the theoretical and practical components.

Regarding the question "Do you have any suggestions for improving the course?", the students did not formulate additional recommendations, which indicates a high degree of satisfaction with the content and organization of the course.

Overall, the analysis of the responses demonstrates that students appreciate the clarity of information, thematic coherence, and practical relevance of the course for the development of professional skills.

The results of processing the questionnaires of teachers
OJEGOV Alexandr:

1. **Why do you think this course is important?**

- Develops creative thinking for solving engineering problems through analogies with the surrounding biological environment.
- An interdisciplinary course that addresses the application of biological laws and principles in modern technologies.
- It opens perspectives for applying biological principles in engineering, offering innovative solutions for the design of systems and technologies inspired by nature.
- Creation of new technologies and improvement of existing systems.

2. **Point out a few basic things that you consider most important in mastering from this course.**

- Biology, automation, and programming of engineering systems.
- Study of the structure of living organisms and their application in mechanical engineering practice.
- For the course “Engineering Bionics”, the most important fundamental aspects include understanding biological principles that can be transferred into engineering solutions and becoming familiar with their practical applications, such as bio-inspired robots and smart materials. In addition, interdisciplinary analysis between biology, engineering, and materials science is essential for developing innovative and sustainable technologies.
- The fundamental aspects include understanding the operating principles of biological systems, the ability to establish connections between nature and engineering applications, and knowledge of the basic concepts of mechanics, materials, sensors, and control systems.
- Development of students’ practical competences.

3. **Do you have any suggestions for further improvement of the course?**

- Creation of research centers.

- Introduction of more practical examples, implementation of laboratory activities or applied projects, and the use of simulations and interactive visual materials.

The responses emphasize the importance of the course “Engineering Bionics” as an interdisciplinary discipline that develops creative thinking and promotes the application of biological principles in engineering and modern technologies. Respondents highlighted the role of the course in generating innovative solutions inspired by nature and in improving existing technological systems through the integration of concepts from biology, engineering, automation, and materials science.

Among the most important learning outcomes, students mentioned understanding the operating principles of biological systems and their application in engineering practice, knowledge related to bio-inspired robots, smart materials, sensors, and control systems, as well as the ability to establish connections between natural models and engineering solutions. The course was also appreciated for contributing to the development of practical competences and interdisciplinary analytical skills.

Regarding suggestions for improvement, respondents recommended the creation of research centers and the inclusion of more practical examples, laboratory activities, applied projects, simulations, and interactive visual materials in order to strengthen the practical and innovative dimension of the course.

Bachelor’s Course “Autonomous Vehicles”

The results of processing the questionnaires of students

The qualitative analysis of the students' responses highlights a positive appreciation of the evaluated course. To the question "What did you like about the course?", the respondents appreciated the clarity and accessibility of the information presented, considering the content useful and easy to understand. The students also expressed general satisfaction with the organization and conduct of the teaching activities.

To the question "List 3 aspects that you learned in this course", the respondents highlighted the coherent and integrated nature of the course, mentioning that the topics addressed were well correlated and contributed to a complex understanding of the discipline. These opinions reflect the appreciation for the logical structure of the course and for the continuity between the theoretical and practical components.

Regarding the question "Do you have any suggestions for improving the course?", the students did not formulate additional recommendations, which indicates a high degree of satisfaction with the content and organization of the course.

The responses demonstrate that students appreciate the clarity of information, thematic coherence, and practical relevance of the course for developing professional skills.

The results of processing the questionnaires of teachers
RUSNAC Vladislav:

1. **Why do you think this course is important?**

- Studies the construction, operating principles, and fields of application of modern vehicles.
- Study of environmentally friendly vehicles.

- It is important because it prepares students for one of the most dynamic and revolutionary directions in engineering and transportation.
- The course “Autonomous Vehicles” is important because it provides essential knowledge about the technologies that will transform transportation by increasing safety, efficiency, and automation.
- The emergence of contemporary autonomous vehicles.

2. Point out a few basic things that you consider most important in mastering from this course.

- Renewable energy sources for autonomous vehicles.
- Renewable energy sources and autonomous traffic management systems.
- Analysis of autonomy levels (from partial assistance to fully autonomous driving). The connection between autonomous vehicles and sustainable mobility, as well as integration with intelligent infrastructure. Understanding the operating principles of autonomous vehicles and the differences compared to conventional vehicles.
- The fundamental aspects include understanding sensors and the way the vehicle perceives the environment, concepts of control and trajectory planning, elements of artificial intelligence and data processing, as well as knowledge of safety and testing requirements.
- Development of students’ competences in the field of autonomous vehicles.

3. Do you have any suggestions for further improvement of the course?

- Field research activities.
- The course could be improved by including more practical examples, introducing simulations or applied projects, and continuously updating the content according to new technologies in the field.

The responses underline the importance of the course “Autonomous Vehicles” in preparing students for modern and innovative developments in engineering and transportation. Respondents emphasized that the course provides essential knowledge about the construction, operating principles, and applications of autonomous and environmentally friendly vehicles, while contributing to understanding the transformation of transportation through automation, safety, and efficiency improvements.

Among the most important learning outcomes, students mentioned knowledge related to renewable energy sources, autonomous traffic management systems, levels of vehicle autonomy, and the integration of autonomous vehicles with intelligent infrastructure and sustainable mobility. Importance was also attributed to understanding sensors, trajectory planning, artificial intelligence, data processing, and safety and testing requirements. The course was appreciated for developing both theoretical knowledge and professional competence in the field of autonomous vehicles.

Regarding suggestions for improvement, respondents recommended including more field research activities, practical examples, simulations, and applied projects, as well as continuously updating the course content in accordance with new technologies and developments in the field.

Cahul State University Bogdan Petriceicu Hasdeu (USC)

Description of the courses tested during the first semester of the 2025-2026 academic year is given in the following table.

Table 1. The training programs and courses were developed and tested in autumn semester.

Course/Lab title	Updated or totally new	Level (Bachelor, Master 5-year course)	ECTS credit points	The teaching/training methodologies developed/adopted e.g. e-learning/ training modalities, practical placements in enterprises, etc.	The link to the university webpage	Date of accreditation	The status / document of accreditation
Tested							
Tools of ecological production	Updated	Bachelor	4	classic lessons, e-learning	https://www.usch.md/	2025	Authorised
Production management	Updated	Bachelor	6	classic lessons, e-learning	https://www.usch.md/	2025	Authorised
Computer-aided design of technological processes and CALS technologies	Updated	Bachelor	4	classic lessons, e-learning	https://www.usch.md/	2025	Authorised

Students' attraction

Within our faculty, in several study disciplines, course and seminar classes are held in common streams. Accordingly, this semester, students from the 2nd and 4th year of study participated in the questionnaires.

Students from the following study programs were involved in the survey:

- Business and Administration (BA) (2nd year);
- Engineering and Management in Food Industry (EMFI) (4th year);
- Engineering and Management in Machine Construction (Automotive) (EMMC) (4th year).

Attracted students

	Students' group		
	BA2401	IMIA(EMFI)2201	IMCM(EMMC)2201
Number of students	10	6	6

Structure of students attracted:

Course title	No. of enrolled students
Tools of ecological production	12
Production management	21
Computer-aided design of technological processes and CALS technologies	6

For the data in this table, we come with a brief explanation. The *Production Management* course is conducted in torrent in three groups (Business and Administration (10 people), Engineering and Management in the Food Industry (6 people), Engineering and Management in Machine Construction (6 people)). The course *Tools of ecological production* was conducted in torrent in 2 groups (Engineering and Management in the Food Industry (6 people), Engineering and Management in Machine Construction (6 people)). The *Computer - aided design of technological processes and CALS technologies* course is a specific course for the Machine Construction Management study program, respectively it was conducted in only one group of students, where in the 3rd year of studies there were 6 people left.

Date of testing: 18-22 march.

These courses were conducted in the first semester of the 2025-2026 academic year, which ended on January 23. The survey was conducted between March 18-22, an opportune period, as theoretical and practical classes were completed, and the examination and re-examination session was completed.

Course title	How many questionnaire forms have been proceeded?	How many questionnaire forms were found valid?
Tools of ecological production	12	11
Production management	21	17
Computer-aided design of technological processes and CALS technologies	6	6

Table 2: Statistics on the answers given on the tested courses (in percentage).

Name of course	**Degree of course**	**Testing results**				
		Strongly disagree %	**Partially disagree %**	**Neutral assessment %**	**Partially agree %**	**Strongly agree %**
Tools of ecological production	0	0	0	0	33.09	66.91
Production management	0	0	0	0	5.37	94.63
Computer-aided design of technological processes and CALS technologies	0	0	0	0	31.76	68.24

Based on the centralized results, we observe a positive appreciation of the courses by the students. This fact demonstrates a compliance of the course structure and teaching methods with international requirements. At the same time, we note that the courses are accessible to students, and the teaching methods are positively appreciated.

Feedback from the students by subjects

The copies of Training Evaluation Sheets of Students are presented in these links:

STUDENTS FEEDBACK SHEET - for **Tools of ecological production** https://docs.google.com/forms/d/15d60MBV___LuG7jI2eed-XHWp1nJYqVdAqFlNBeSJiI/edit

STUDENTS FEEDBACK SHEET – for **Production management** https://docs.google.com/forms/d/1kpxMJd341-r_CJKQlTS3iYVh3vjDh6fMuYH1jWt8RfU/edit;

STUDENTS FEEDBACK SHEET– for **Computer - aided design of technological processes and CALS technologies**

https://docs.google.com/forms/d/1qe9eT65uvfcHZIk6HJGmNZbX58KgiMB3fh7NqiRItO4/edit?ts=69c19adc

The consolidated result of students answers about tested courses are presented below.

Consolidated result of students answers about tested courses
Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

Title of course (*Denumirea cursului*): **TOOLS OF ECOLOGICAL PRODUCTION (INSTRUMENTE ALE PRODUCERII ECOLOGIC)**
Level of training course (*Nivelul unității de curs*): **First Cycle Bachelor's Degree (Ciclul I Licență)**
Name of academic(s) (*Numele, prenumele profesorului*): **CECLU LILIANA**
Department (*Catedra*): **Department of Engineering and Applied Sciences/ Catedra de Inginerie și Științe Aplicate**
How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **the questionnaire was developed and completed in online format/google forms**
How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*)_____

Statistics on the answers given on the course (in percentage).

Statistica privind răspunsurile completate despre cursul (în procente)

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	**0**	**0**	**0**	**27,3**	**72,7**
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	**0**	**0**	**0**	**36,4**	**63,6**
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	**0**	**0**	**0**	**45,5**	**54,5**
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	**0**	**0**	**0**	**27,3**	**72,7**
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	**0**	**0**	**0**	**27,3**	**72,7**
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	**0**	**0**	**0**	**27,3**	**72,7**

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	**0**	**0**	**0**	**45,5**	**54,5**
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	**0**	**0**	**0**	**27,3**	**72,7**
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	**0**	**0**	**0**	**27,3**	**72,7**
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	**0**	**0**	**0**	**27,3**	**72,7**
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	**0**	**0**	**0**	**45,5**	**54,5**

Co-funded by the European Union

IGI TRANS

Consolidated result of students answers about tested courses
Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

Title of course (*Denumirea cursului*): **PRODUCTION MANAGEMENT/ MANAGEMENTUL PRODUCȚIEI**
Level of training course (*Nivelul unității de curs*): **First Cycle Bachelor's Degree (Ciclul I Licență)**
Name of academic(s) (*Numele, prenumele profesorului*): **POPA ANDREI**
Department (*Catedra*): ***Department of Economic Sciences/ Catedra de Științe Economice***
How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **the questionnaire was developed and completed in online format/google forms**
How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*)_____

Statistics on the answers given on the course (in percentage).

Statistica privind răspunsurile completate despre cursul (în procente)

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	**0**	**0**	**0**	**11,8**	**88,2**
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	**0**	**0**	**0**	**0**	**100**
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	**0**	**0**	**0**	**0**	**100**
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	**0**	**0**	**0**	**11,8**	**88,2**
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	**0**	**0**	**0**	**5,9**	**94,1**
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	**0**	**0**	**0**	**5,9**	**94,1**
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	**0**	**0**	**0**	**11,8**	**88,2**
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	**0**	**0**	**0**	**5,9**	**94,1**
The lecturer/professor's attitude to the students was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*	**0**	**0**	**0**	**5,9**	**94,1**
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	**0**	**0**	**0**	**0**	**100**
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	**0**	**0**	**0**	**0**	**100**

Co-funded by the European Union

DIGITRANS

Consolidated result of students answers about tested courses

Rezultatul consolidat al răspunsurilor studenților despre cursurile studiate

Title of course (*Denumirea cursului*): *COMPUTER-AIDED DESIGN OF TECHNOLOGICAL PROCESSES AND CALS TECHNOLOGIES (**PROIECTAREA ASISTATĂ DE CALCULATOR A PROCESELOR TEHNOLOGICE ȘI CALS TEHNOLOGII**)*
Level of training course (*Nivelul unității de curs*): **First Cycle Bachelor's Degree (Ciclul I Licență)**
Name of academic(s) (*Numele, prenumele profesorului*): **BUNEA MARINA**
Department (*Catedra*): ***Department of Engineering and Applied Sciences/ Catedra de Inginerie și Științe Aplicate***
How many questionnaire forms have been processed? (*Câte formulare de chestionar au fost procesate?*) **the questionnaire was developed and completed in online format/google forms**
How many questionnaire forms were found valid? (*Câte formulare de chestionar au fost considerate valide?*)_____

Statistics on the answers given on the course (in percentage).

Statistica privind răspunsurile completate despre curs (în procente)

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
All study program themes required to achieve the defined learning outcomes were covered *Toate temele programului de studiu necesare pentru atingerea obiectivelor de învățare definite au fost acoperite*	**0**	**0**	**0**	**33,3**	**66,7**
The course was well-structured and the themes were explained in a comprehensive manner *Cursul a fost bine structurat, iar temele au fost explicate într-un mod cuprinzător*	**0**	**0**	**0**	**33,3**	**66,7**
The logical structure of the lecture was maintained *Structura logică a cursului a fost menținută*	**0**	**0**	**0**	**33,3**	**66,7**
Audio-visual materials were efficiently used during the lecture *Materialele audiovizuale au fost utilizate eficient în timpul cursului*	**0**	**0**	**0**	**33,3**	**66,7**
Creative thinking was efficiently promoted *Gândirea creativă a fost promovată eficient*	**0**	**0**	**0**	**33,3**	**66,7**
Practical application of theory was efficiently promoted *Aplicarea practică a teoriei a fost promovată eficient*	**0**	**0**	**0**	**33,3**	**66,7**
During the class the amount of theoretical material and practical tasks was balanced *În timpul orelor de curs, cantitatea de material teoretic și cea de sarcini practice a fost echilibrată*	**0**	**0**	**0**	**33,3**	**66,7**
Recommended literature sources were accessible and helped in acquiring the course materials *Sursele de literatură recomandate au fost accesibile și au ajutat la achiziționarea materialelor cursului*	**0**	**0**	**0**	**33,3**	**66,7**
The lecturer/professor's attitude to the students	**0**	**0**	**0**	**16,7**	**83,3**

Criterion (Criteriu)	Testing results				
	Strongly disagree %	Partially disagree %	Neutral assessment %	Partially agree %	Strongly agree %
was positive and helpful *Atitudinea lectorului/profesorului față de studenți a fost pozitivă și de ajutor*					
The time for the completing of the practical tasks was enough *Timpul pentru finalizarea sarcinilor practice a fost suficient*	**0**	**0**	**0**	**33,3**	**66,7**
The information about the class's organisation was clear and easily available *Informațiile despre organizarea orelor au fost clare și ușor accesibile*	**0**	**0**	**0**	**33,3**	**66,7**

From the analysis of the questionnaires completed by the students, we can observe a very good appreciation of the modernized courses. Both the contents and the professor's working method are highly appreciated by the students.

Feedback from academic/teacher staff involved in teaching of students by subject

The holder professors of the targeted courses participated in this survey are:

- **Ceclu Liliana,** PhD in Technical sciences, associate professor, course holder **Tools of ecological production.**
- **Popa Andrei,** PhD habilitated in Economic sciences, university professor - **Production management.**
- **Bunea Marina,** PhD in Technical sciences, associate professor, course holder **Computer - aided design of technological processes and CALS technologies.**

Evaluation of courses testing results

Elaboration of courses testing results was done based on the consolidated results of students answers about tested courses (Annex) and Feedback from academic/teacher staff involved in teaching for students.

1. *Tools of ecological production (Ceclu Liliana, associate professor)*

The results of processing the questionnaires of students

This course is taught in the fourth (final) year and introduces students to ecological production methods, types of emissions, and other environmental effects of production processes. This course is taught concurrently to two groups (Engineering and Management in Food Industry and the group for Engineering and Management in Machine Construction (Automotive)). The evaluation of this course involved 11 students, of whom 54.5% were female and 45.5% were male.

Based on the survey results, we observe that students partially agree or strongly agree with the updates made to the course, the accessibility of the course materials, the time required to

complete assignments, the recommended literature, and the updated content. We will focus more on the recommendations proposed by the students in the open-ended questions section.

In response to the question **'What did you like about the course?'**, students mentioned: the course in its entirety, group work, practical exercises, real-life examples, the teaching and explanation style, and individual work.

Regarding the question **'List 3 aspects you would like to take with you/that you have learned in this course'**, the most frequent responses were:

- Creating new products within the context of a circular economy;
- Regulatory acts in the field;
- The principles of a circular economy, their application, and their benefits;
- Practical elements and exemplification;
- Real-life examples;
- Defining elements of industrial ecology, circular economy principles, and their integration with engineering.

The results of processing the questionnaires of teachers

1. *Why do you think this course is important? (De ce credeți că acest curs este important?)*

- Yes. I believe this course is very important because it helps students develop a modern vision of sustainable, responsible, and future-oriented production. Today, an engineer must not only understand conventional technological processes, but also know how these processes can be designed, managed, and optimized in accordance with environmental protection requirements, resource efficiency, and circular economy principles.
- For students in Engineering and Management in Machine Building (Automotive), this course provides an essential interdisciplinary foundation, as it connects technology, management, sustainability, and innovation. The modernization of the course within the DIGITRANS project adds an important contemporary dimension by integrating digital tools, modern analytical approaches, and the competencies required for both green and digital transition.
- In essence, this course is important because it prepares future specialists not only to understand sustainable development principles theoretically, but also to design and implement ecological solutions applicable in industry.

2. *Point out a few basic things that you consider most important in mastering from this course. (Evidențiați câteva lucruri de bază pe care le considerați cele mai importante pentru stăpânirea acestui curs?)*

Among the basic elements that I consider essential for mastering this course are the following:

1. Understanding the principles of ecological production
2. Ability to analyze technological processes from an ecological perspective
3. Application of modern monitoring and optimization tools
4. Interdisciplinary thinking and solution-oriented approach
5. Development of professional responsibility

3. Do you have any suggestions for further improvement of the course? (Aveți sugestii pentru îmbunătățirea în continuare a cursului?)

Yes, I believe that any modern course should be continuously improved, especially in such a dynamic field. For the further development of this course, I would suggest several directions:

1. Expanding the practical and application-oriented component
2. Deeper integration of digital tools
3. Strengthening collaboration with industry
4. Continuous updating of the content with emerging topics
5. Development of interdisciplinary student projects.

2. ***<u>Production management</u>*** ***(Popa Andrei,*** *doctor habilitated in Economic sciences, university professor).*

The results of processing the questionnaires of students

This course is taught in the same semester and with the same number of hours to both 4th-year engineering programs and the 2nd-year Business and Administration program. Regarding the demographics of the respondents, the female gender predominates, accounting for 52.9%.

What did you like about the course?

Students highlighted the following aspects:

- Overall experience: "Everything."
- Practical skills: Calculating time required for activities, creating a work plan, and learning how to organize and plan production.
- Teaching methodology: The teaching style, the professor's approach, the didactic materials, and the in-depth explanation of each topic.
- Applied learning: The opportunity to apply course theory into practice by developing a startup project.

1. *List 3 aspects you would like to take with you/have learned in this course:*

The most frequent responses included:

- Production and Operations Management: Calculating time for activities, creating work plans, efficient production planning, and organizing/coordinating production processes.
- Financial and Strategic Management: Calculating costs, profitability, and profit; understanding salary structures; and strategies for time and human resource management.
- Professional Development: Critical thinking, problem-solving ("problem tree"), how to better organize work, increasing efficiency, employee motivation, and the implementation of theoretical knowledge into practice.
- General feedback: Students expressed that all aspects were beneficial and will be integrated into their professional toolkit.

The results of processing the questionnaires of teachers.

1. Why do you think this course is important? (De ce credeți că acest curs este important?)

Yes. The issue of Sustainable development and Circular economy is important for the course of „Industrial management".

2. Point out a few basic things that you consider most important in mastering from this course. (Evidențiați câteva lucruri de bază pe care le considerați cele mai importante pentru stăpânirea acestui curs?)

- Sustainable development and the efficient use of resources.
- Environment and responsibility of enterprises to protect it.
- Industry 4.0 as a strategy for eco-friendly development.

3. Do you have any suggestions for further improvement of the course? (Aveți sugestii pentru îmbunătățirea în continuare a cursului?)

More students' involving in discussions of real enterprises problems.

2. ***<u>Computer - aided design of technological processes and cals technologies</u>*** ***(Bunea Marina****, associate professor).*

The results of processing the questionnaires of students

This course is delivered exclusively to students in the **Engineering and Management in Mechanical Engineering** program. The evaluation involved 6 out of the 7 students enrolled in the course. The group is predominantly male (66.7%), with female students representing 33.3% (2 students).

What did you like about the course?

Students appreciated the following aspects:

- Clarity and Quality: The course was described as clear, containing a high volume of useful information.
- Resources: The didactic materials provided.

- Applied Learning: The practical laboratory sessions.

List 3 aspects you would like to take with you/have learned in this course:

The students highlighted the development of specific technical competencies:

- Design Software Proficiency: Deepening knowledge in design software and 3D modeling of parts and assemblies.
- Data Management: Working with PDM (Product Data Management) databases for project management.
- Advanced Engineering Tools: The application of CAD tools and simulation in the design of technological processes.

Suggestions for improvement:

- Students indicated that the course was conducted at a high level and provided no additional suggestions for improvement.

The results of processing the questionnaires of teachers.

1. *Why do you think this course is important? (De ce credeți că acest curs este important?)*

This course is essential because it develops students' ability to design, model, and optimize technological processes using computer-aided tools. lt integrates theoretical knowledge with practical applications in CAD/CAIWCAE and CALS technologies, which are fundamental for modern manufacturing systems. The course also supports understanding of the full product life cycle, from design to production and management, which is critical for engineers working in Industry 4.0 environments.

2. Point out a few basic things that you consider most important in mastering from this course. (Evidențiați câteva lucruri de bază pe care le considerați cele mai importante pentru stăpânirea acestui curs?)

- Understanding the principles of technological process design and modelling.
- Ability to create and use information models of parts in CAD systems
- Knowledge of technological routes and optimization algorithms
- Practical skills in PDM systems and finite element analysis
- Understanding CALS technologies and their role in product life cycle management.
- Ability to integrate multiple digital tools (CAD, CAM, PLM etc.) in engineering workflows.

3. Do you have any suggestions for further improvement of the course? (Aveți sugestii pentru imbunătățirea în continuare a cursului?)

- Increase the number of practical laboratory sessions focused on real industrial case studies
- Introduce more advanced simulation tools and digital twins concepts
- Include interdisciplinary projects combining mechanical design and data-driven optimization
- Strengthen collaboration with industry partners for applied projects.

3. Conclusions

Deliverable D4.1 demonstrates the successful implementation of new and modernised courses by partner universities from Ukraine and Moldova, within the DIGITRANS project. The primary objective of modern courses is to produce industry-ready, adaptable problem solvers who can seamlessly integrate fundamental science with cutting-edge technologies. This requires shifting from strictly theoretical instruction to interdisciplinary, hands-on learning that directly meets the needs of today's tech-driven workforce. The new and modernised engineering courses will equip the students with foundational hard skills while heavily emphasizing human-centric soft skills like teamwork, adaptability, and lifelong learning, boosts global competitiveness, and prepares them to tackle complex modern challenges.

For students, the evaluation report highlights that the new and modernized courses met their intended goals, showing very good ratings on organization of learning objectives, and assignments, and high satisfaction on content relevance **(**helpful, accurate, and engaging materials), teaching methods, and overall course design.

Getting a professor's feedback on new and modernised courses is vital for quality control, curriculum alignment, and student success. Because new courses are essentially untested prototypes, faculty input ensures the material is accurate, academically rigorous, and practically paced. The teachers' report shows a very good alignment of teachers' objectives with students' perceptions and very good assessments of student response and engagement.

The total number **972** students were enrolled at new and modernised courses for the fall and spring semesters.

	University					
	CPNU	**KhNAHU**	**LNTU**	**UTM**	**USARB**	**USC**
No. of new and modernised courses in autumn semester	6	7	6	4	6	3
No. of trained students in autumn semester	181	353	123	48	228	39