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

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Akaki Tsereteli State University

Project title: Boosting the role of HEIs in the industrial transformation towards the Industry 4.0 paradigm in Georgia and Ukraine – HEIn4
609939-EPP-1-2019-1-BE-EPPKA2-CBHE-JP

Activities & Outcomes

November 9, 2023
Porto, Portugal

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Construction and energy are key areas of development of the region's economy. Therefore, we have chosen smart technologies for these areas.

A literature review was conducted on Industry 4.0, which is being used in the elective course **"Integration of Industry 4.0 in a Renewable Energy".**

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Publications

- An article entitled “Innovations and 4th industrial revolution” was prepared and published in the brochure “Best practices of Georgian and European universities”. The materials of the article are used in the elective course.

- An article “Industry 4.0: challenges and opportunities” was prepared and published in the second brochure issued within the project entitled “Experience of Georgian universities” which is being used in the elective course “Integration of Industry 4.0 in a Renewable Energy”.

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Establishment of the Laboratory

A laboratory equipped with modern technologies was established, where virtual laboratory classes can be conducted for Master students specialized in Civil Engineering and Electrical Engineering.

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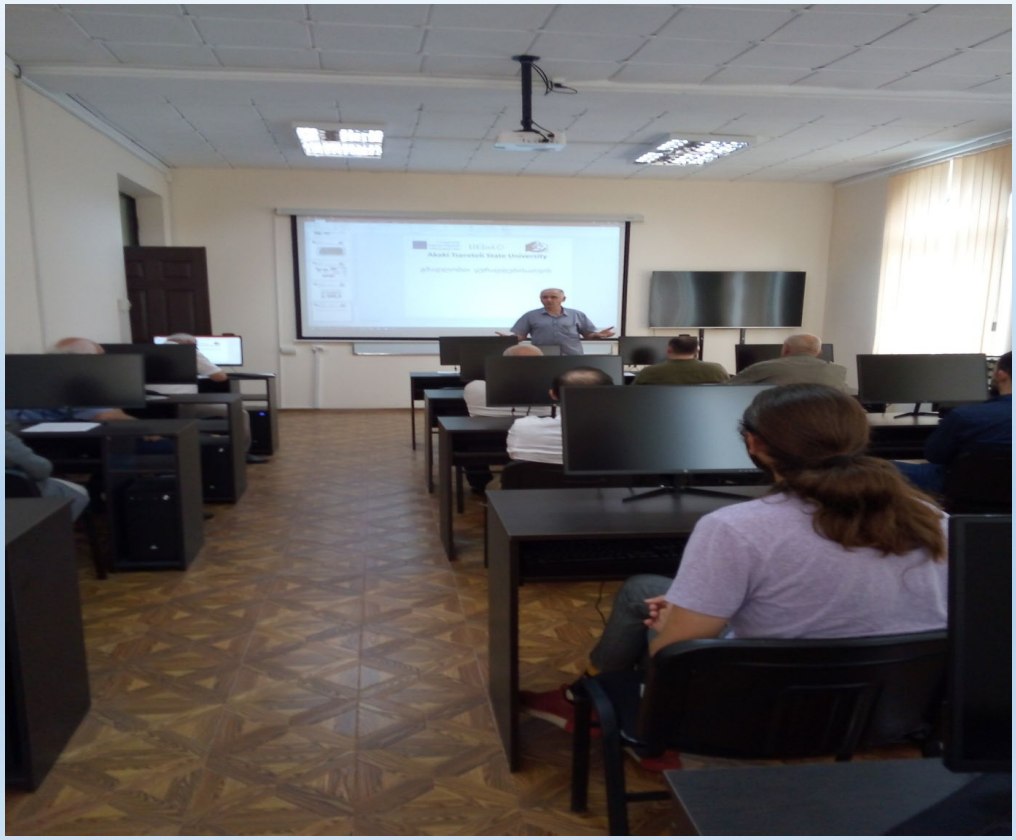

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A syllabus for the elective course was developed for Master students.

The aim of the course is to provide students with the relevant basic knowledge about industry 4.0 in the field of Alternative Energy.

Course title: Integration of Industry 4.0 in Renewable Energy".

A course of lectures was created of about 130 pages in length, which is available on the project website.

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Laboratory works - Smart Energy Systems

• Digital devices controlling the charging and discharging process of modern accumulator batteries.

•Management of joint operation of autonomous energy systems based on alternative energy sources by means of digital-pulsing devices.

•Mathematical and computer modeling of the hybrid electric power system under conditions of parallel operation with the alternating current network.

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Laboratory works implemented for the course entitled
"***Renewable energy (solar, wind) generating equipment, devices, technological schemes and bases of design***"

Educational program	**Power Industry Technology (master's)**
Course status	**Compulsory**

1. 3D printing of parts (wing, hub, multiplying gear) of the wind turbine
2. The landscape efficiency criteria. Statistics and estimated data
3. Solar panels, its nodes and components

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Strong ties were established with representatives of the construction and energy sectors, such as

LLC "Karibche", LLC "MTM", Energo-PRO Georgia", "Group Atlantic Georgia", LLC "DAGI+", LLC "Vartsikhe 2005", JSC "Silknet" Czech company ChKD, "Energy Academy".

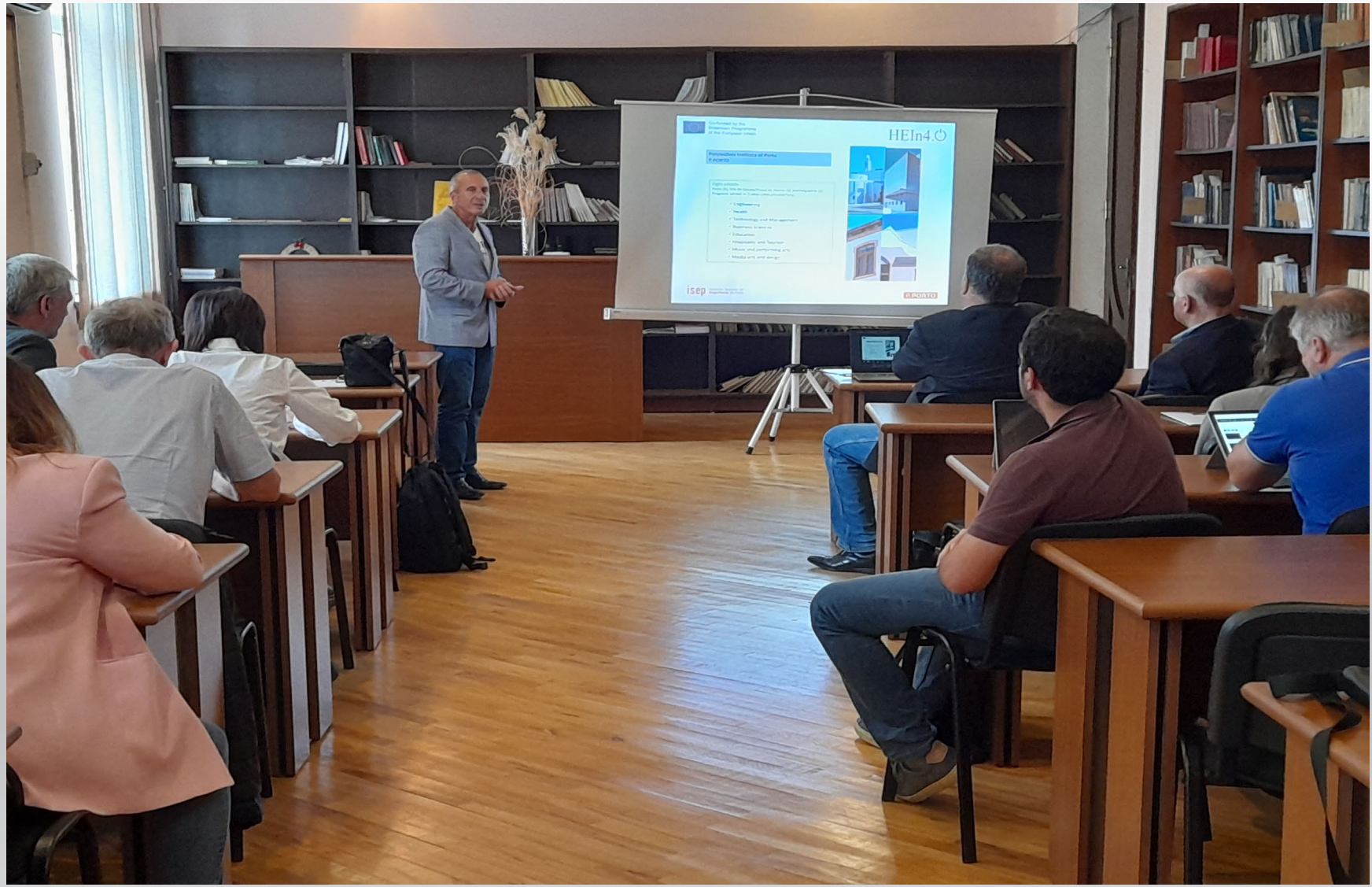
Number of courses offered to industrial partners within the framework of the HEIn4 project

1.“Integration of Industry 4.0 in a Renewable Energy” (short course)
19-21 July, 2022
LLC Karibche, LLC MTM, LLC Dagi +, LLC Iberia

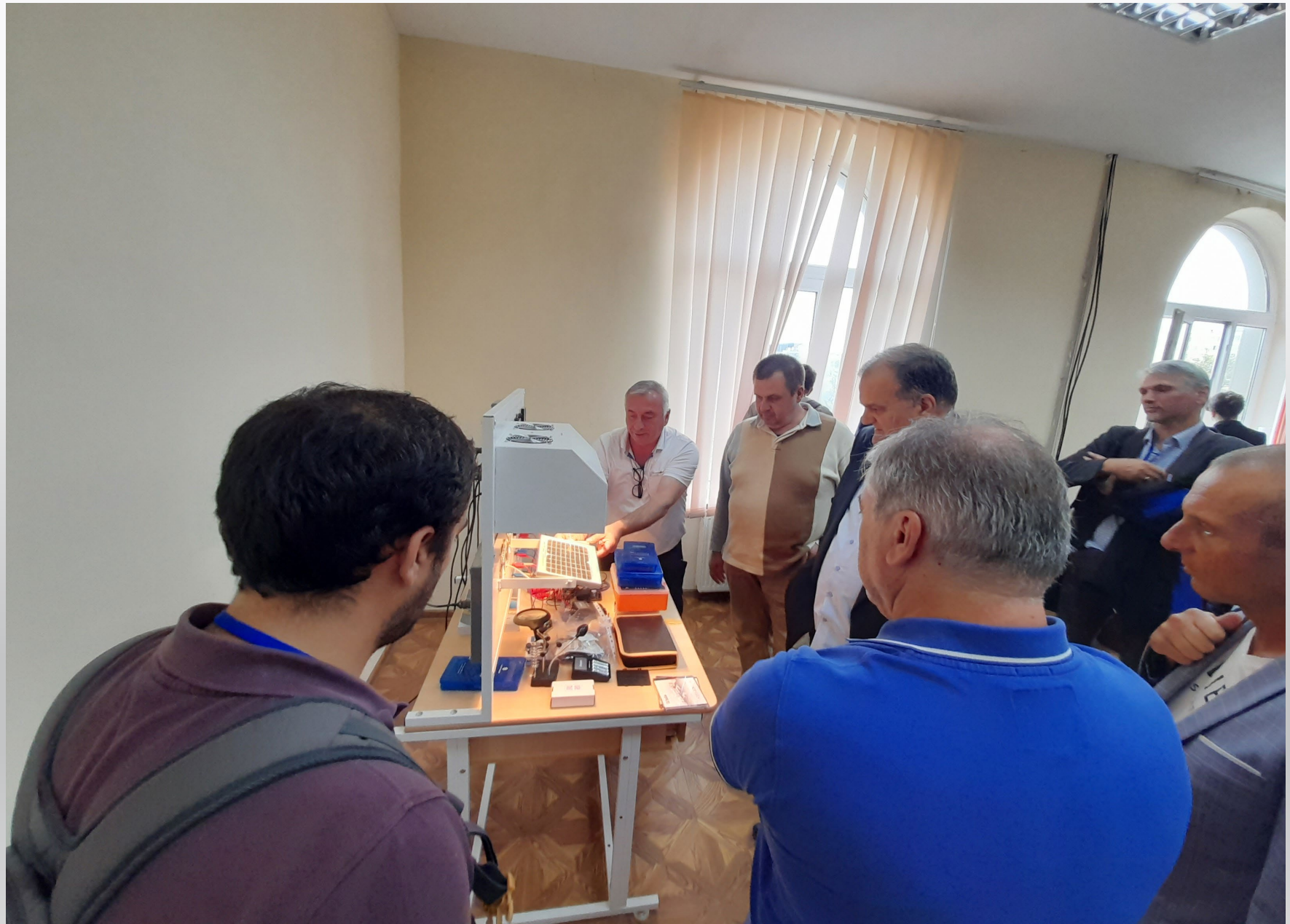
2. “Smart house” (short course)
7-8 December, 2022
LLC Karibche, LLC Iberia, “Group Atlantic Georgia”

3. „Integration of Industry 4.0 in a Renewable Energy (smart house)“ for the industry representatives
5-6 October, 2023
LLC "Karibche", LLC "MTM", Energo-PRO Georgia”, “Group Atlantic Georgia”, LLC "Vartsikhe 2005", JSC "Silknet"

Conference at Akaki Tsereteli State University, Faculty of Technical Engineering, Kutaisi, 5.10.2023



Department of Energetics, Laboratory of Renewable Energy (solar, wind)



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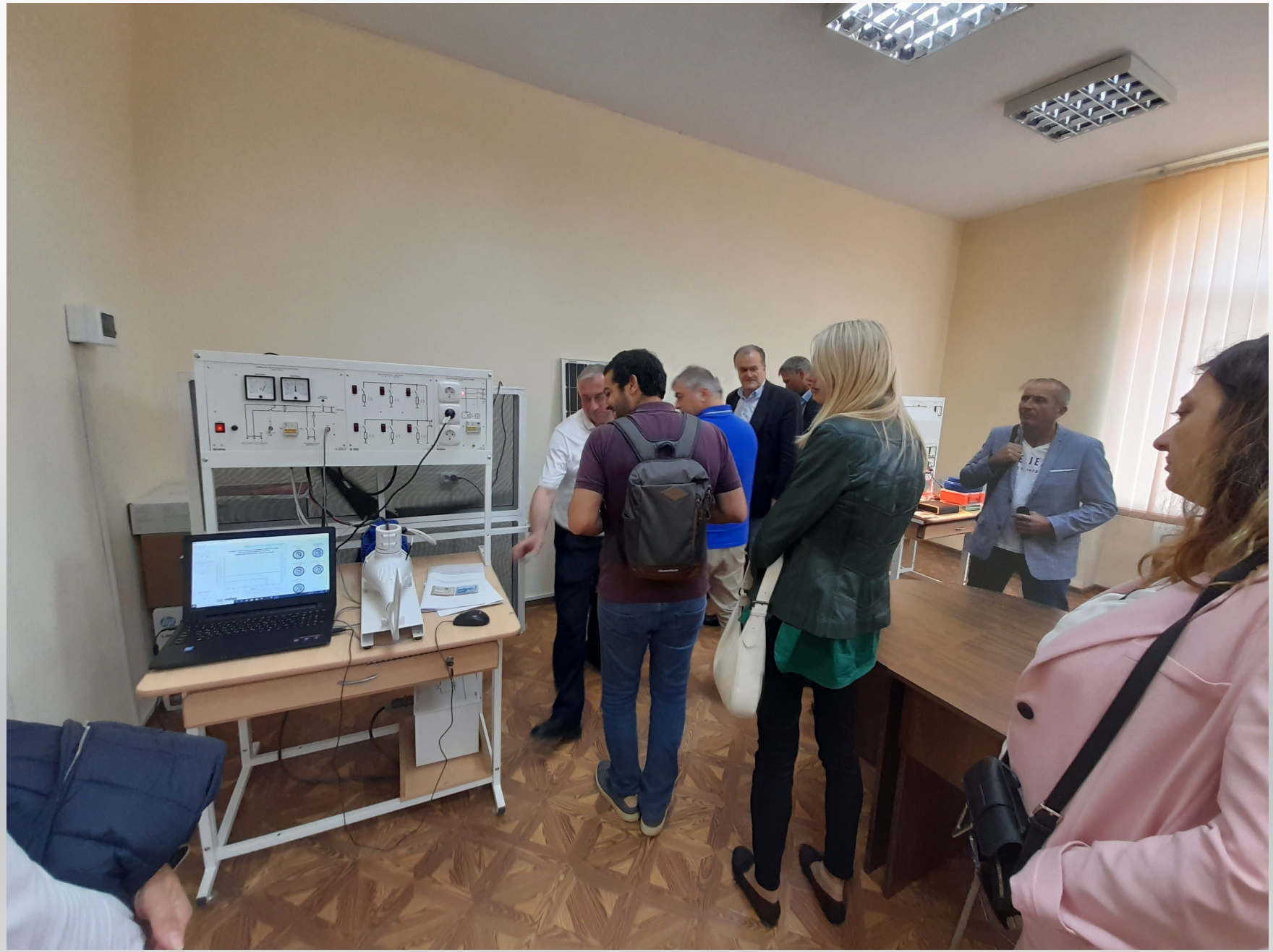
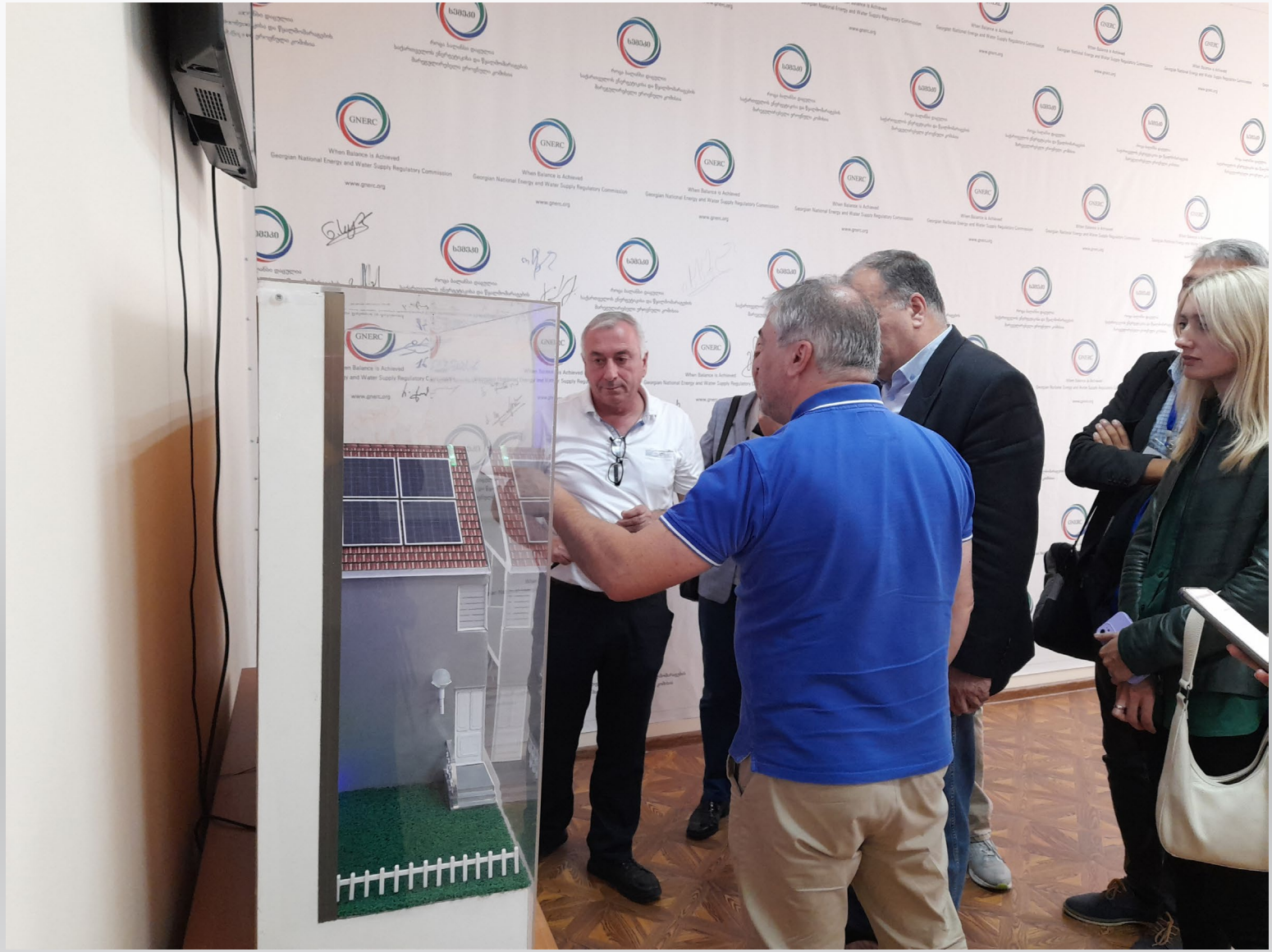
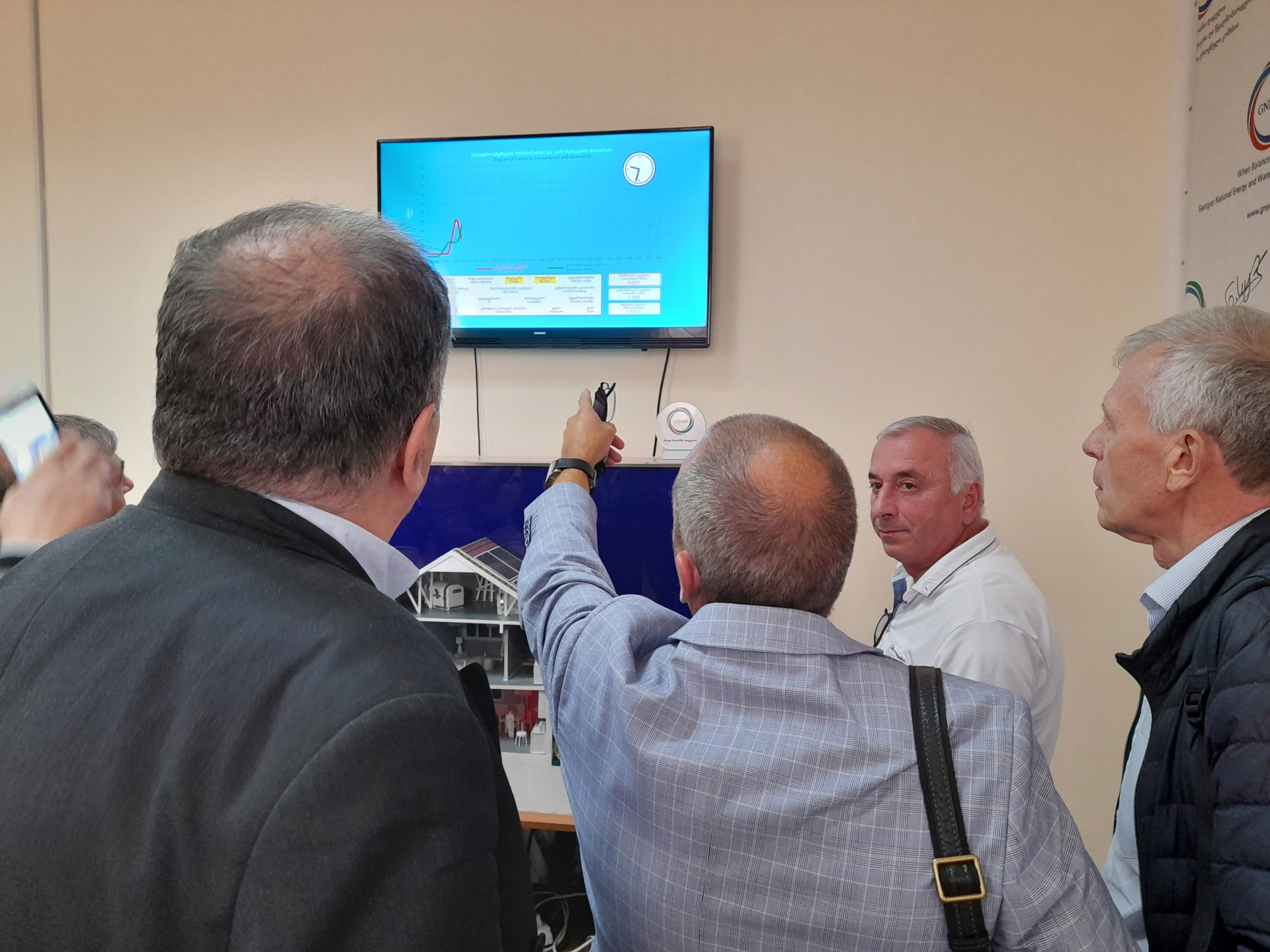
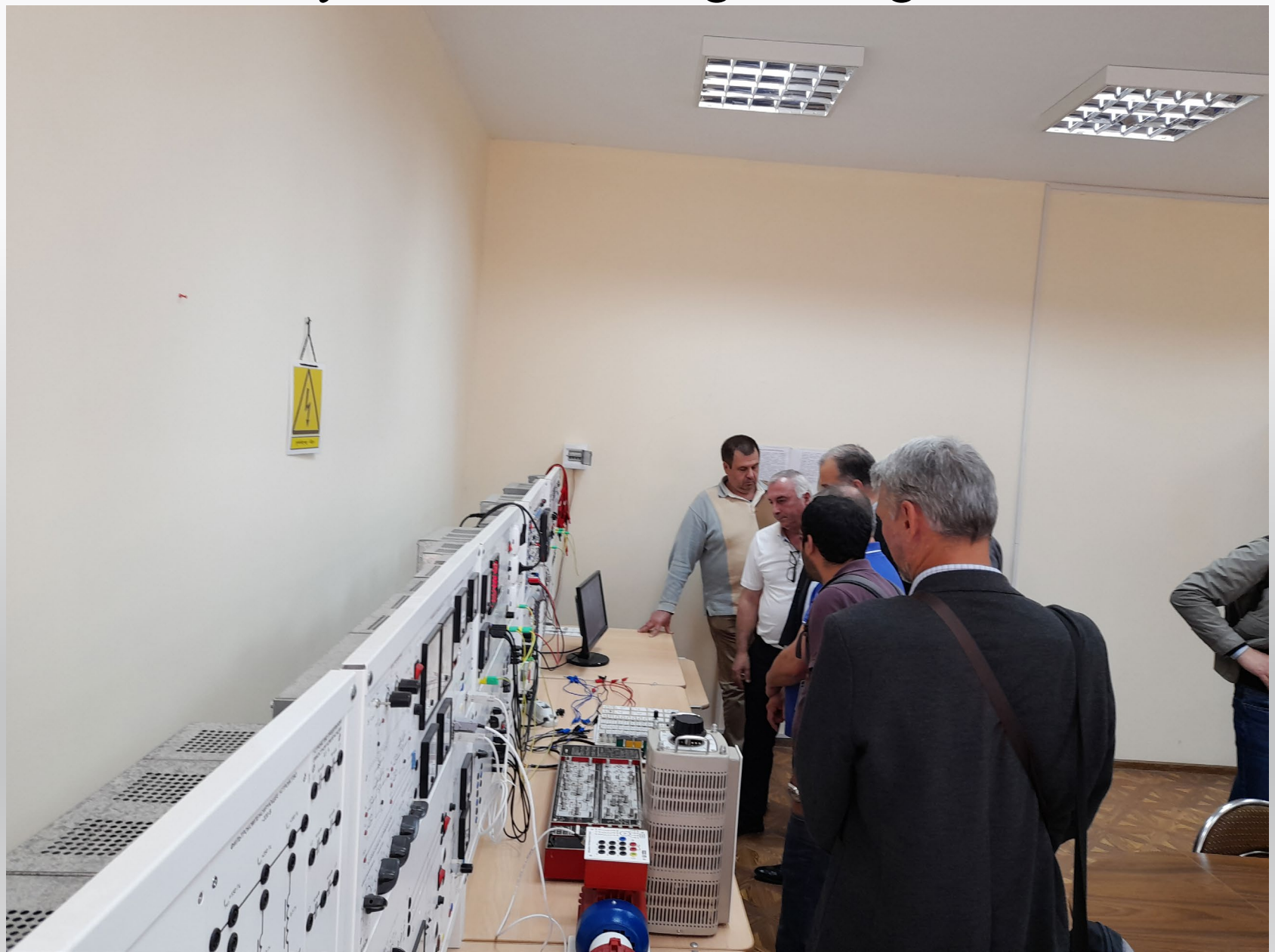


Solar panel-based energy system of a smart house and inclusion of net metering in this system





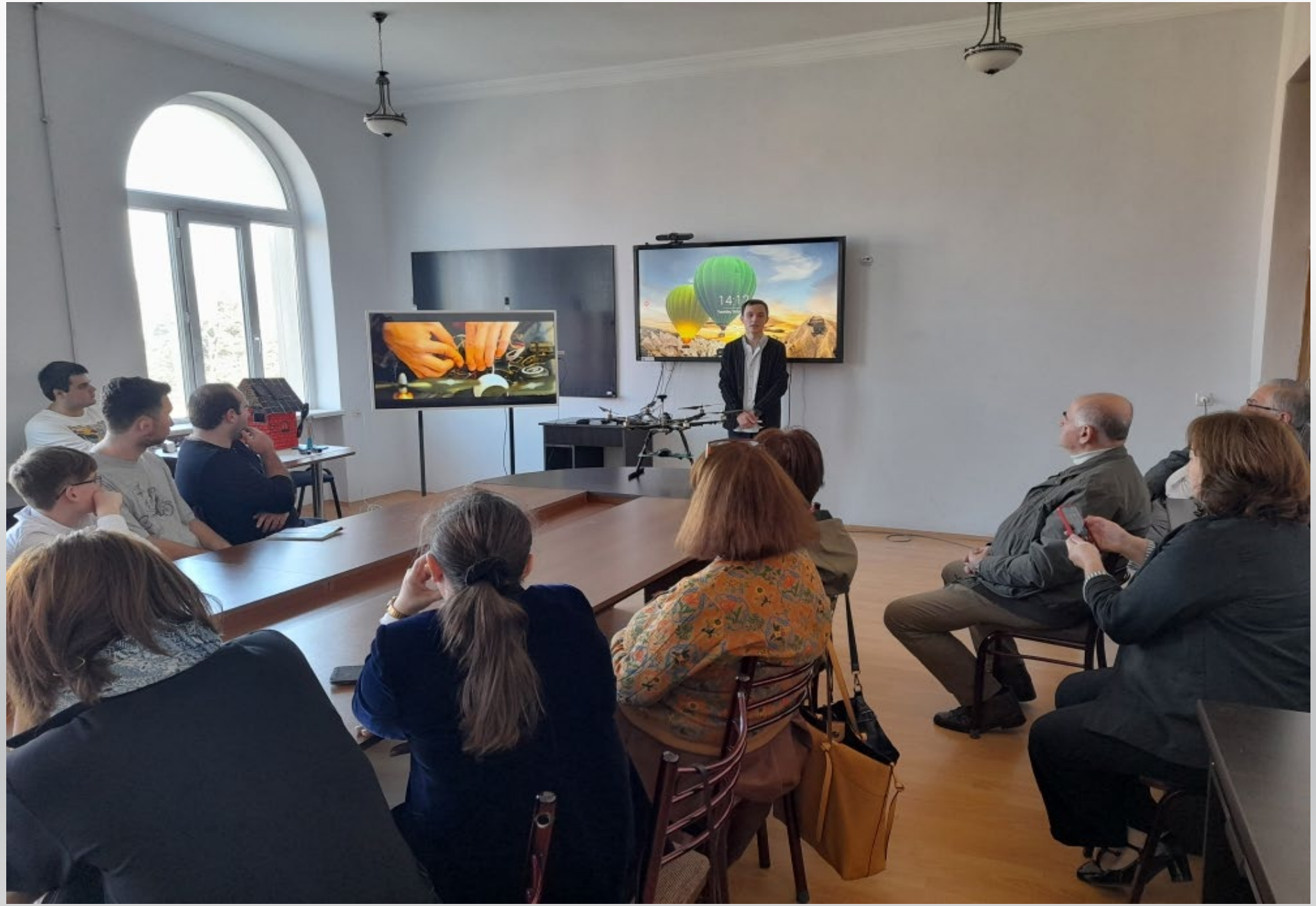
Laboratory of Electrical engineering and electronics

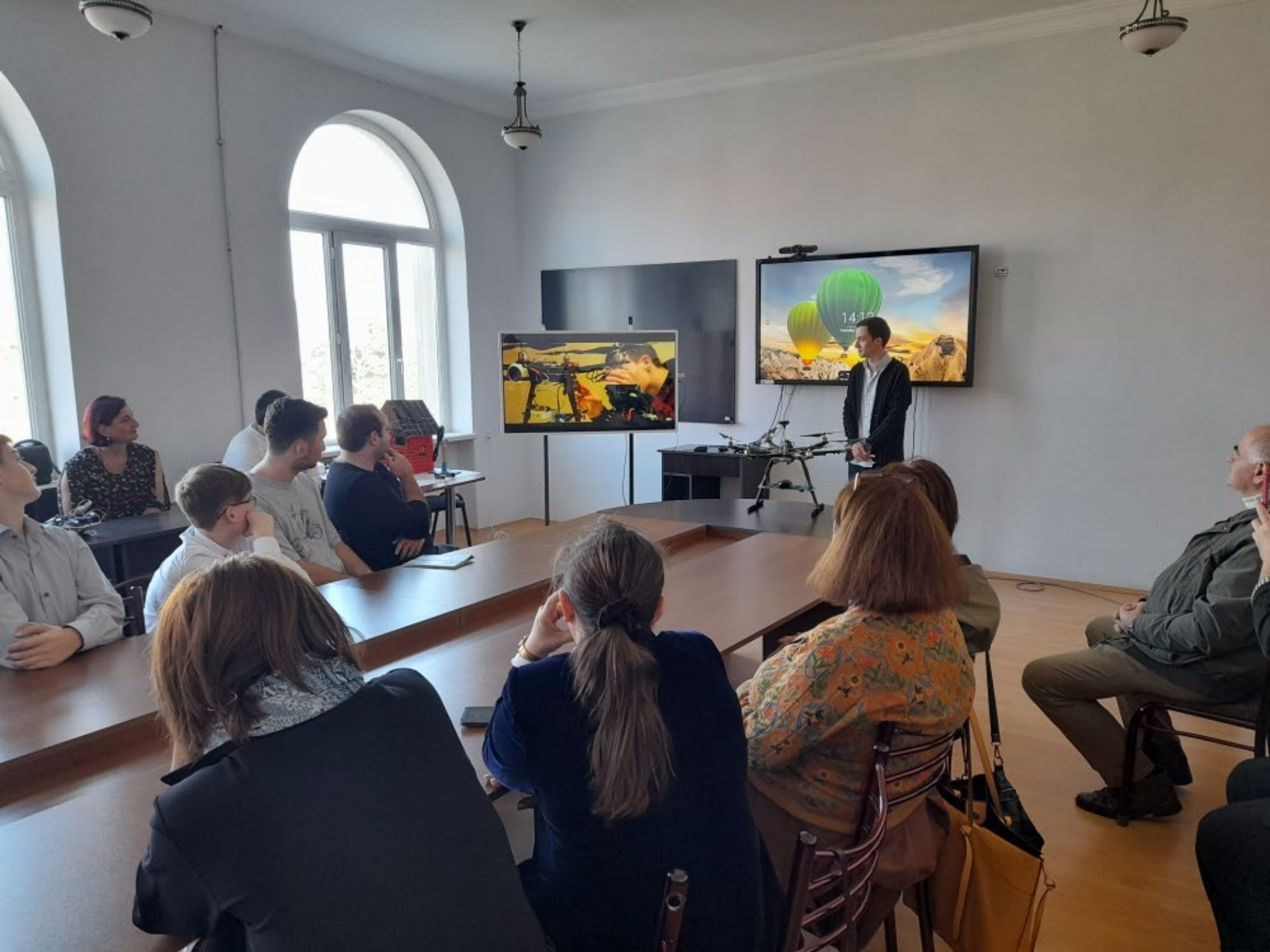


Involvement of the students in the Smart Technologies activity

On October 31, 2023, a presentation on the topic “The Technologies of the Future” was made at the Department of Energy and Telecommunications by Erekle Kirkitadze, a second-year BA student majoring in Electrical Engineering. He has presented the presentations on the following topics:

A Smart House with various functions; An automatic fire extinguishing system; A fire and rescue drone; A robot for automated obstacle avoidance.





SUSTAINABILITY

- Four states, such as Azerbaijan, Georgia, Hungary and Romania have signed an agreement on the supply of electricity to Europe, which requires the maximum use of the potential of renewable energy sources. This is a new opportunity for the economic development of the country, and accordingly the need of the specialists for the development of the field will be increased;
- The number of representatives of the region's industry in the field of construction and energy, who are interested in cooperation with the university in the field of smart technology, has expanded;
- Increasing interest in the smart technology of BA and MA students.

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What are the benefits for the students?

- Development of computer simulation skills
- Innovative lessons on core topics of the Industry 4.0
- Enhanced employment opportunities

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What are the benefits for the industry?

Availability of high-skilled specialists having a common body of knowledge and skills on Industry 4.0 required for companies acting in the region

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What are the benefits for the teaching staff

- The enhanced opportunities for training high-skilled specialists
- The enhanced opportunities for self-development.

HEIn4 Sustainability Strategy for the next year

- Elective course “Smart House” for students specialized in Civil Engineering (Syllabus development is planned in April, 2024; the course will be conducting in pilot mode in the spring semester of the 2024-2025 academic year);
- Elective course „Smart logistics systems for urban passenger transport“ (Syllabus development is planned in July, 2024)

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Thank you for your attention