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HEIn4.0

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

Deliverable of Erasmus+ project

Produced under Activity 2.1

HEI: *Akaki Tsereteli State University*

Short courses for the industry representatives
(short description)

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1. Short course for the industry representatives: **"Smart house".**
(short description)

„Smart house" is a fully automated living space equipped with the latest technological breakthroughs, which enables us to control and monitor all devices in the house remotely (via a mobile phone application). An energy-efficient „smart house" provides safety of residents, comfortable living environment, saving resources, a climate control.

For the technical support of a „smart home", it is necessary to select a controller (hub), various sensors and actuators or actuating mechanisms. A smart system can be built with both wired and wireless performance. It can have both centralized and decentralized control systems. To organize a smart house, different frequencies can be used, which will not interfere with the operation of other systems.

„Smart house" provides: lighting control, home appliance control, door and window control, heating and air conditioning control, temperature and humidity control, water and gas leakage control, fire safety control, security and door access control. Movement can be detected with the help of video surveylance cameras.

Issues considered within the course are as follows:
1. Creating a smart home with the help of IoT (Internet of Things) technology.
2. Classification of smart houses.
3. Centralized and decentralized control systems.
4. How IoT devices connect to the network.
5. Network types: personal, local and global networks.
6. Primary transducers (sensors) used in smart houses.
7. The control and automation of heating, ventilation, air conditioning (HVAC), lighting, security

Two laboratory works involved in course: An automatic fire extinguishing system, Virtual laboratory https://energy.concord.org/energy3d/

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2. Short course for the industry representatives: "**Integration of Industry 4.0 in a Renewable Energy"**

(short description)

The course briefly describes the stages of the revolutionary development of the industry.

„Industry 4.0" is the fourth phase of the world industrial revolution, which involves the transformation of the production process through the interconnection of devices and systems, automation and information being obtained in real time.

Actually, "Industry 4.0" is a further development of technologies introduced in the previous period and integration with modern, twenty-first century technologies. Of course, these technologies also include modern technologies for using renewable and alternative energy sources.

In the fourth phase of the industrial revolution, emphasis is placed on the so-called "Internet of Things – IOT". Through it, physical and digital tools are interconnected in manufacturing.

Today, it is becoming imperative to create the energy systems that will run completely on renewable energy sources. The compliance with the following requirements will be ensured:

Combined composition of energy sources.

Ability to work in different climatic conditions.

High level of automation.

Possibility of joint operation with the central energy system.

These requirements can only be met by "smart" energy systems, the efficiency of which has been raised to a completely new level by process automation and digitization. "Internet of Things – IOT" also plays an important role here.

Issues considered within the course:

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1. Stages of the industrial revolution. Goals of INDUSTRY 4.0. Digitalization of information. The link of the digital world with physical systems;

2. A brief overview of existing publications on Industry 4.0. The dominant technologies for INDUSTRY 4.0. SMART technologies;

3. Digital integration strategy. Toolbox Industry 4.0.

4. Renewable energies (wind, solar). Solar energy. Solar energy resources. The potential of using solar energy;

5. Smart technologies in a renewable energy;

6. Energy efficiency in construction

7. Industry 4.0: opportunities and challenges;

The laboratory works involved in course: Computer modeling of the hybrid electric power system during parallel operation with the alternating current network.