Improving the efficiency and attractiveness of vocational education/training of electricians

NEWSLETTER 2.

Project ID: KA220-VET-6ABB1E4A   31.10.2022

PROJECT CONTEXT

The EU Climate Policy Development Green Deal aims to develop a community with a smart energy program. This is to be achieved using innovative technologies, a low-carbon economy through the introduction of renewable energy systems, and an inclusive society with a strong focus on job creation to reduce poverty.

The energy turnaround as a whole cannot succeed without tapping the major energy efficiency potential, which lies primarily in the building sector.

WEB-BASED VET MODULES IN THE ENERGY EFFICIENCY OF INTELLIGENT BUILDING

MODULE 1 Checking, maintaining, and adjusting the energy-efficient modes of operation of modern automated BMS (building management systems)

Topic 1: What is a modern BMS?
1.1: About this unit
1.2: Building Management System (BMS)

Topic 2: Why to manage energy efficiency?
2.1: About this unit
2.2: Energy Management

Topic 3: Where are the potentials for an energy efficient operation of buildings
3.1: About this unit
3.2: Potentials for an energy efficient

MODULE 2 Energy efficient lighting technologies in buildings

Topic 1: Lighting fundamentals
1.1. Introduction
1.2. Electromagnetic and visible spectrum
1.3. Photobiological impact of light on human
1.4. Basic photometric quantities and dependencies

1.5. Luminous efficacy
1.6. Color Rendering Index (CRI)
1.7. Correlated Color temperature (CCT)

Topic 2: Lamps
2.1. Introduction
2.2. Principle of operation, parameters and characteristics of the lamps
2.3. Comparison of the parameters and characteristics of the lamps

Topic 3: Luminaires
3.1. Introduction
3.2. Luminaire classification

Topic 4: Lighting control and regulation equipments
4.1. Introduction
4.2. Ballasts, Starters, Capacitors for HID lamps
4.3. LED drivers
4.4. Control gears for different type of lamps. Circuits
4.5. Energy- saving equipments

Topic 5: Indoor lighting design and maintenance
5.1. Introduction
5.2. Standards on the recommendations for the level of indoor lighting
5.3. Choice of the Color characteristics of light sources

Topic 6: Photovoltaic systems for lighting
6.1. Introduction
6.2. Structure
6.3. Principle of work
6.4. Storage batteries for PV–LED system

Topic 7: Course project on lighting design
7.1. Introduction
7.2. Lighting requirements for activity areas and 3D modeling of the elements in the room
7.3. Choice of indoor luminaires
7.4. Determination of the maintenance factor and the required number of luminaires

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MODULE 3 Installation, repair, and maintenance of small-scale photovoltaic systems in buildings

Topic 1 Photovoltaic systems. – basics

1.1. Sun and solar Radiation

1.2. Photovoltaic effect and principle of solar cells operation.

1.3. Types of technologies for creating PV cells.

1.4. A brief overview of the types of photovoltaic systems and their application.

1.5. Evaluation and analysis of the terrain / building based on which the PV system must be introduced.

1.6. Main steps and activities to be planned to realise a small PV system.

Topic 2 Basic components in the structure of a photovoltaic system.

2.1. Components of photovoltaic systems - structure, types and characteristics

2.2. Junction box purpose and main elements.

2.3. Connecting elements and technology in the installation of a photovoltaic system.

2.4. The inverter's role, functional capabilities, and the different types.

2.5. The role of the DC load switch (DC main switch).

2.6. The role of the AC-side miniature circuit breakers and residual current circuit breakers.

2.7. PV system monitoring point: Integration into the power grid and Counting device.

Topic 3 Site survey and shading analysis are important elements for the proper functioning and efficiency of the PV system

3.1. Devices and methods for the numerical analysis of shading in PV system construction.

3.2. Factors on which the shading depends and how it affects the efficiency of the photovoltaic system.

Topic 4 Installation of a PV system depending on the purpose and according to the architectural features of the building.

4.1. Roof-based Photovoltaic systems / Architectural types of roofs - Introduction.

4.2. Types of installation options for PV systems for pitched roofs.

4.3. Specifics of installing photovoltaic systems on building facades.

4.4. Peculiarities when installing light roof constructions - Glass roofs PV systems.

4.5. Installation of ground-based PV systems.

4.6. Types of Solar Trackers systems and their pros & cons.

Topic 5 Installation, commissioning and operation of PV systems

5.1. Safety regulation during the installation and maintenance of PV systems.

5.2. General instructions and stages for the installation of a PV system.

5.3. Good and bad practices in installation activities – examples.

5.4. Main activities during the commissioning of a small PV system.

5.5. Basic rules and activities in the implementation of service and maintenance of a PV system.

5.6. Operational monitoring and data processing: Hardware and good practices.
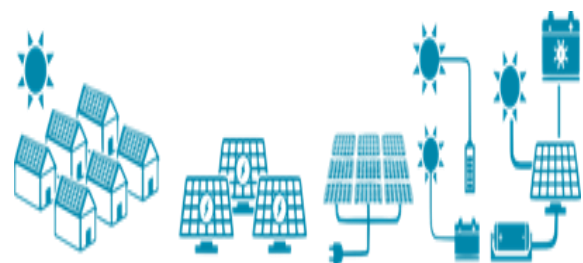
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