

## TITLE

Holistic Approach, Study and Analysis of Electrical Circuits of PV Systems

## COURSE OVERVIEW

Electrical Circuits of Photovoltaic Systems

Introduction to electrical circuits

Design of PV systems

DC - AC cables and electrical panels

Grounding and lightning protection

Indicative cable, dimensioning study and single line diagram

Professional benefits - Advantages

## COURSE DURATION

6 hours

## DELIVERY FORMAT

Classroom & Online

## LOCATION

Classroom: 188 Syngrou Andrea Avenue, 17671 Kallithea Attica & e-class platform

## COURSE OUTCOME

You will receive an ARKIAS ACADEMY Certificate.

## COURSE CONTENT

### INTRODUCTION TO ELECTRICAL CIRCUITS

- General information
- Introduction to electrical circuits
- Basic electrical quantities (electrical elements, Analysis of voltage, current, active, reactive, apparent power, single-phase-three-phase system)
- Power generation
- Types of Currents | DC vs AC (Tesla vs Edison)
- Transformers
- Electricity transmission and networks
- Electricity Transmission (DC vs AC)
- PV General Info
- Photovoltaic effect
- Explaining electron movement
- Power Electronics
- Inverter operating principle (DC to AC)
- Operating principle of DC/DC converters
- AC to DC operation (rectification)

### DESIGN OF PV SYSTEMS

- Study of Basics at PV design
- Types of PV panels and inverters
- Choice of converter/inverter
- Shadowing effect
- PV system dimensioning
- Energy efficiency assessment
- Brief explanation of the Net-Metering & Zero-Feed-In solution

## **DC-AC CABLES AND ELECTRICAL PANELS**

- DC and AC (DC/AC) Cables
- Selection of DC cable cross-sections
- AC cable cross-section selection
- Choice of rack/pipe sizes
- PV system electrical panel
- Direct Current (DC) panel
- Alternating Current (AC) panel
- One-line drawing of PV installation
- Characteristics of Measuring Instruments

## **GROUNDING AND LIGHTNING PROTECTION**

- Earthing and Grounding definitions
- Perimeter Grounding – Ground electrode – Expectations and methods of grounding connections
- Grounding VS earthing
- PV grounding – examples
- Grounding Standards
- Lightning protection

## **INDICATIVE CABLE DIMENSIONING STUDY AND SINGLE LINE DIAGRAM**

- Energy study using specific software and design of a Single Line Diagram (SLD)
- DC cable sizing
- Dimensioning of AC cables
- evaluation of O&M

### **Professional benefits - Advantages:**

- Familiarization with the electrical circuits and electrical components of PV systems.
- Ability to properly calculate and evaluate equipment and understand all potential problems that may occur during design and installation.
- Ability to submit correct & comprehensive quotations
- Minimize power losses in the installation and increase its safety level.
- Optimize performance and quality of the delivered projects