ELECTRICAL INSTALLATIONS

Code: 322158

Main Scientific Area: Automation, energy and cyber-physical systems

Lecturer: Ricardo Jorge Pires Cortinhas

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

Objectives

Design, plan, program and coordinate the execution and maintenance of electrical installations and industrial equipment, for the optimization of the installation and compliance with quality requirements, safety standards and regulations.

Learning Outcomes

The course presupposes that the development takes place in a framework of interactivity and complementarity with the other subjects of the course. In this sense, in addition to the consolidation of learning carried out in the context of training, this component must also ensure the acquisition of new learning, translated into learning outcomes that effectively contribute to the fulfillment of the profile associated with this professional output. .

- Identify, classify and choose materials for electrical applications.

- Identify the main conductive and insulating materials.

- Characterize and reference electrical conductors and cables.

- Properly apply rules and regulations when using electrical conductors and cables.

- Establish the techniques of installation of protections and earthing.

- Measure the protective earth resistance of an installation

Course Contents

1. LOW VOLTAGE ELECTRICAL APPLIANCE

1.1. Characteristics of materials and equipment used in electrical installations

1.2. Equipment classification according to insulation classes

1.3. IP and IK protection indices

2. ELECTRICAL CHANNELS

2.1. Modes of installation of an electrical conduit

2.2. Conductor and Cable Nomenclature

2.3. Pipe Nomenclature

3. SAFETY PROTECTIONS

3.1. Overload and overcurrent protections

3.2. Short circuit protections

3.3. Electric shock protections

3.3.1 Direct Contacts

3.3.2. Indirect Contacts

3.4. Protective measures and devices

3.5 Grounding Schemes

3.6. Building ground systems

3.7. Effects of electric current on the human body

3.8. Protection against atmospheric overvoltages

4. ELECTRICAL INSTALLATIONS

4.1. Design of an electrical installation

4.2. Classification regarding external influences

4.3. Power balance

4.4. Protections

4.5. Electrical switchboards

4.6. Plumbing

4.7. Installations in special places

5. COLLECTIVE FACILITIES OF BUILDINGS AND ENTRY

5.1. Conception

5.2. Column board

5.3. Amount column and entries

5.4. Speaker boxes

5.5. Common services framework

5.6. Counting and protection equipment

5.7. Scaling an Amount Column

6. Reactive energy in an industrial installation

6.1 Concepts

6.2 Sizing of Condenser Batteries

Recommended Bibliography

- Pereira, J. e Morais, J. (2006). Guia Técnico das Instalações Elétricas. Porto: Certiel

- Pinto, L. (2004). InstalExpress - Instalações Elétricas em Locais de Habitação. Porto: Certiel

- Nogueira, H. e Morais, J. (2008). Tabelas Técnicas das Instalações Elétricas. Lisboa: Certiel

- N/A, N. (2000). RTIEBT (Regras Técnicas das Instalações Elétricas de Baixa Tensão). (Vol. 1, 2 e 3).

Learning and Teaching Methods

The syllabus of this course will enable the student to acquire a set of skills in the area of electrical installations.

Thus, this course will enable students to know and understand the different methods of analysis and concession of existing systems in electrical installations.

After this theoretical foray, the student will be confronted with a set of real and specific problems of the different types of electrical installations, and will be stimulated to find solutions for their resolution. Through discussion of them, will be presented to the student, elements normally present in an electrical system, which will allow him to reach its resolution.

Assessment Methods

Students' final grade is based on the following assessment elements:

– Home Work- (0 to 20 points) - 20%

– Test - (0 to 20 points) - minimal 8 points, 40%

–Assessment in class - (0 to 20 points) - 20%

The student will pass the course when the final grade is greater than or equal to 9.5