Ficha de Unidade Curricular (FUC)

1. Unidade curricular

CIE - Conception of Electrical Installations

2. Docente responsável e respetiva carga letiva na unidade curricular (preencher nome completo)

Constantino Vital Sopa Soares	6,0

3. Outros docentes e respetivas cargas letivas na unidade curricular

Filipe André Sousa Figueira Barata	4,5

4. Objetivos da aprendizagem (conhecimentos, aptidões e competências a desenvolver pelos estudantes)

The student will conceive the electrical installations of industrial projects.

5. Conteúdos programáticos

- Protection of Persons in Electrical Distribution Systems: Risk of electric shocks in electrical applications. Physiological effects of electric current in human body. Safety curves. TT, TN and IT systems. Earth electrodes. - Lightning protection: Lightning discharge origin and statistical analyse. Damage risk analyse. Protection measures against direct and indirect lightning discharges. Protection measures against transient overvoltages. - Low voltage electrical installations – systems TN and IT: Power balance evaluation and location of electrical loads. Structure of electrical distribution networks. Distribution networks. Distribution circuits sizing and physical implantation. Terminal circuits sizing and definition of the extreme conditions of dimensioning. Single line diagrams of electrical panels and boards. Emergency and security energy sources (diesel generator sets and UPS). - Secondary Substations (switching and transformation installations): Types and electrical components. Dimensioning of equipment. Power and control diagrams and electrical and mechanical interlocks.

6. Demonstração da coerência dos conteúdos programáticos com os objetivos da unidade curricular

The student who gets success in this curricular unit, is able to: - Design electrical installations of industrial projects supplied at high voltage level, including supplies for safety services or standby services and the lightning protection using 3D computer generated models. - Interpretation of legal electrical regulations, national and international standards for material and equipment construction, etc. - Mastery of specific software applicable on electrical design (either commercial or internally developed for specific application in the class)

7. Metodologias de ensino (avaliação incluída)

In the theoretical classes (T) are educated the concepts and legislation to be used in the UC.
In the theoretical/practical classes (TP) calculations and dimensions inherent to the different components existing in the project are made based on the theoretical concepts.
In laboratory classes (PL) group students apply the skills acquired in T and TP in the practical development of the project.
Evaluation is achieved by the elaboration of a final project, as per paragraph 2.1.5 of "The Skill Evaluation Procedures" (internal decree nr. 07/CD/2002, dated 30 December). Jury has to be composed of at least two professors. One of them must be the curricular unit responsible.
The student is successful, if he reaches ten points in a scale of zero to twenty.

8. Demonstração da coerência das metodologias de ensino com os objetivos de aprendizagem da unidade curricular

Conception and design by students of electrical installations in industrial project supplied at high voltage level, including supplies for safety services or standby services and the lightning protection.

9. Bibliografia principal

- Overvoltage Protection of Low Voltage Systems (Peter Hasse, The Institute of Electrical Engineers, 2000).
- Instalações Eléctricas de Baixa Tensão – Projecto, Execução e Exploração (Constantino Soares; DGEG & Certiel; 2006(2009)).
- Regulations and Standards for Electrical Installations and Lightning Protection.
- Other elements internally developed (Grupo Disciplinar de Instalações Eléctricas – CIE; Constantino Soares and José Veiga).