

Academic Year: ( 2023 / 2024 )

Review date: 28-03-2023

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: BURGOS DIAZ, JUAN CARLOS

Type: Electives ECTS Credits : 6.0

Year : Semester :

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Electrical Power Engineering Fundamentals  
Transformers and Magnetic Circuits  
Transmission Lines and Switchgear

**SKILLS AND LEARNING OUTCOMES**

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study

CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.

CB3. Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.

CB5. Students will have developed the learning skills necessary to undertake further study with a high degree of autonomy.

CG1. Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.

CG3. Ability to design a system, component or process in the field of Industrial Technologies to meet the required specifications

CG4. Knowledge and ability to apply current legislation as well as the specifications, regulations and mandatory standards in the field of Industrial Engineering.

CG5. Adequate knowledge of the concept of company, institutional and legal framework of the company. Organisation and management of companies.

CG6. Applied knowledge of company organisation.

CG8. Knowledge and ability to apply quality principles and methods.

CG9. Knowledge and ability to apply computational and experimental tools for the analysis and quantification of Industrial Engineering problems.

RA1. Knowledge and understanding: Have basic knowledge and understanding of science, mathematics and engineering within the industrial field, as well as knowledge and understanding of Mechanics, Solid and Structural Mechanics, Thermal Engineering, Fluid Mechanics, Production Systems, Electronics and Automation, Industrial Organisation and Electrical Engineering.

RA2. Engineering Analysis: To be able to identify engineering problems within the industrial field, recognise specifications, establish different resolution methods and select the most appropriate one for their solution

RA3. Engineering Design: To be able to design industrial products that comply with the required specifications, collaborating with professionals in related technologies within multidisciplinary teams.

RA4. Research and Innovation: To be able to use appropriate methods to carry out research and make innovative contributions in the field of Industrial Engineering.

RA5. Engineering Applications: To be able to apply their knowledge and understanding to solve problems and design devices or processes in the field of industrial engineering in accordance with criteria of cost, quality, safety, efficiency and respect for the environment.

RA6. Transversal Skills: To have the necessary skills for the practice of engineering in today's society.

**OBJECTIVES**

This subject enables the student to acquire the following competences and skills.

- Designing a L.V. installations and select its components properly.
- Analyzing electromagnetic transients in electrical systems.
- Knowing the origin of the main overvoltages in an electrical system (classified according their

duration) and how to protect equipment against those overvoltages.

- Selecting properly the switchgear of a médium and high voltaje substations.
- Acquiring skills in the use of sftware for electrical system analysis.
- Modelling and simulatin a power plant to obtain both, the steady state and the transient.

#### DESCRIPTION OF CONTENTS: PROGRAMME

H.V. and M.V. Installations. Circuit breaker selection. Overvoltages (temporary, switching transientes, lighthning overvoltages). Surge arresters.

L.V. Installations. Conductor selection. Fuse selection. Breaker selection.

#### ASSESSMENT SYSTEM

Theory exams

Problem exams

Laboratory sessions.

<b>% end-of-term-examination:</b>	60
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<b>% of continuous assessment (assigments, laboratory, practicals...):</b>	40
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