

GENERAL INFORMATION

Data of the subject		
Subject name	Low and Medium Voltage Installations	
Subject code	DIE-MII-632	
Mainprogram	Official Master's Degree in Industrial Engineering	
Involved programs	Máster Universitario en Ingeniería Industrial [Second year]	
Credits	4,5 ECTS	
Туре	Compulsory	
Department	Department of Electrical Engineering	

Teacher Information		
Teacher		
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DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Course contents

Contents

Chapter1: Low Voltage and Medium Voltage Electrical Network

- 1. Electrical Network architecture. Concepts. Graphical Representation and Symbols. LV and MV design criteria. Definition and sizing of Power Transformation Centers.
- 2. MV switchgear. Smart Grids. Present MV networks.
- 3. Cables and isolated conductors: Overview. Underground networks, maximum currents, correction factors.
- 4. Single and Three Phase Power distribution lines calculations. Uniform size open distribution, variable size open distribution, twoends distribution arrangement. Ring arrangement. DC lines. Maximum installed power. Power losses.
- 5. LV overhead electrical installations. Access points. Joints and derivations. Clearence distances. Earthing system. Supports. Wall mounted installations.
- 6. LV underground networks. Access points. Joints and derivations. Earthing system. Trenches and conducts.

Chapter 2: Power Transformation Centers (PTC)

1. General Overview

2. Electrical Schemes. Standardized elecctrical company arrangements.





- 3. In door PTC arrangements. Clearing and operational distancies
- 4. PTC cooling: Concepts, air natural, air forced, nomograpgh.
- 5. Earthing system; General concepts, elements to be connected. Safty grounding, service earth system. Inteconnexions. Electrical magnitudes being involved. Step Voltage, Contact voltage, and maximum applied voltages calculations. Ground resistivity. UNESA Method calculations. Contructive details.
- 6. LV and MV earth fault calculations. Isolated network, grounded network, clearence times. Short circuit overcurrents calculations. Actual installation visit.

Chapter 3: LV Installations Design.

- 1. Installation characteristics. Nominal voltages.
- 2. Service installations. Concepts. General characteristics . CGP, CGM, LGA Schemes. Measurement devices. CGPM. Voltage drop.
- 3. ITC-BT-18 earthing system. Concepts; Ground resisitivity; Earthing resistivity.
- 4. ITC-BT-19 general prescriptions. Overview; conductors; circuit separation. Isolation.
- 5. Installation systems ITC-BT-20
- 6. Conducts and tubes ITC-BT-21; Characteristics; Installation; Overcurrent protection. LV switchgear. Basic functions. General characteristics and classification. Nominal parameters for protection, operation and control devices.

Chapter 4: Indoor Installations.

- 1. Electrical consumers. Illumination, heating, motors, transformers, reactances and capacitors.
- 2. Installed capacity. Concepts. Estimates. Simultainety factors.
- 3. Home installations. Protections. General Protectiion; circuits, connection points; installation mounting; Special installations (baths, etc.)
- 4. Electrical Vehicle charging points; definitions; type of connections; schemes. General prescriptions and standards.
- 5. Electrical network disturbances. Harmonics.
- 6. Domotics.

Chapter 5: Ilumination

- 1. Outdoor illuminations: REEA 2008; Road and rail illumination. Methods.
- 2. Illumination installations ITC-BT-09: Requisites, service connections; circuit protections; illumination networks. Earthing system.
- 3. Energy efficiency: Outdoor illimination.
- 4. New technologies for ourtdoor illumination.

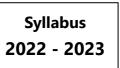
Chapter 6: Photovoltaic Installations for consumers.

- 1. General overview
- 2. Present standards and regulation. RD-15-2018
- 3. Technical conditions. Installation configuration. Protections. Operation and maintenance.

EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
Quaterly exam	Test	40 %
Electrical Installation Project	Global Qualification composed by: • Project documentation (40%)	50 %





	Tutorial checking (30%)Individual enquiry (30%)	
Test	Individual checking shoud be made along the course by quick question test	10 %

Grading

Ordinary Call

Global qualification = 40% Final Test+10% Cheking tests + 50% Group Work

Extraordinary Call

Global qualification = 75% Written test + 25% Group Work

Final course qualification is to be done weather Work Group and mean exam qualifications be both 5 as a minimum (both calls).

85% class attendance required, otherwise there is no right to be examinated. (Article 93.3 of General Regulation, articles 7.2 and 7.3 of Academic Rules.

WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Electrical Installation Project	First 12 weeks	Week 12

BIBLIOGRAPHY AND RESOURCES

Basic References	
Standards and Regulations	
Guía Técnica Aplicación REBT.pdf	
• MIE-RAT.pdf	
• RAT.pdf	
• REBT.pdf	

In compliance with current regulations on the **protection of personal data**, we would like to inform you that you may consult the aspects related to privacy and data <u>that you have accepted on your registration form</u> by entering this website and clicking on "download"

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