UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: HIGH VOLTAGE ELECTRICAL INSTALLATIONS
Code: 56409
Type: CORE COURSE
ECTS credits: 6
Degree: 355 - UNDERGRADUATE DEGREE PROGRAMME IN ELECTRICAL ENGINEERING (AB)
Academic year: 2023-24
Center: 605 - SCHOOL OF INDUSTRIAL ENGINEERS. AB
Group(s): 10
Year: 3
Duration: C2
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **ANDRES HONRUBIA ESCRIBANO** - Group(s): **10**

Building/Office	Department	Phone number	Email	Office hours
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Lecturer: **RAMON IGNACIO VERGARA FERNANDEZ** - Group(s): **10**

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2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

Not established

4. Degree competences achieved in this course

Course competences

Code	Description
A15	Ability to work to specifications and comply with obligatory rules and regulations.
D03	Ability to calculate and design low and medium tension electrical plants.
D04	Ability to calculate and design high tension electrical plants.
D06	Knowledge of electrical power systems and their applications.

5. Objectives or Learning Outcomes

Course learning outcomes

Description
Analyze and calculate faults and disturbances
Analyze and model electrical power systems
Ability to design and make supporting calculations for substations and transformation centres
Ability to select switchgear, machinery and equipment used in high tension installations
Ability to use and apply mandatory legislation and regulations that regulate high tension electrical installations

6. Units / Contents

Unit 1: Electric Power Systems
Unit 2: Modeling and analysis of power systems
Unit 3: Balanced Short-circuits
Unit 4: Unbalanced Short-circuits
Unit 5: Equipment for high voltage electrical systems
Unit 6: Switches and circuit breakers for high voltage systems
Unit 7: Power transformers
Unit 8: Measurement transformers
Unit 9: Insulation coordination
Unit 10: Grounding systems
Unit 11: Primary substation design
Unit 12: Secondary substation design
Unit 13: Regulatory framework for high voltage systems

7. Activities, Units/Modules and Methodology

		Related Competences					

Training Activity	Methodology	(only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	A15 D03 D04 D06	1.28	32	Y	N	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	A15 D03 D04 D06	0.48	12	Y	N	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	A15 D03 D04 D06	0.4	10	Y	Y	
Progress test [ON-SITE]	Combination of methods	A15 D03 D04 D06	0.12	3	Y	N	
Final test [ON-SITE]	Assessment tests	A15 D03 D04 D06	0.12	3	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	A15 D03 D04 D06	1.92	48	Y	N	
Writing of reports or projects [OFF-SITE]	Cooperative / Collaborative Learning	A15 D03 D04 D06	1.68	42	Y	N	
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Laboratory sessions	15.00%	15.00%	
Projects	15.00%	15.00%	
Final test	70.00%	70.00%	
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	**hours**
Progress test [PRESENCIAL][Combination of methods]	3
Final test [PRESENCIAL][Assessment tests]	3
Unit 1 (de 13): Electric Power Systems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 2 (de 13): Modeling and analysis of power systems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	2
Unit 3 (de 13): Balanced Short-circuits	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	8
Unit 4 (de 13): Unbalanced Short-circuits	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	8
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	10
Unit 5 (de 13): Equipment for high voltage electrical systems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
Unit 6 (de 13): Switches and circuit breakers for high voltage systems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1

Unit 7 (de 13): Power transformers	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
Unit 8 (de 13): Measurement transformers	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
Unit 9 (de 13): Insulation coordination	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	5
Unit 10 (de 13): Grounding systems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	2
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	10
Unit 11 (de 13): Primary substation design	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	3
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	4
Unit 12 (de 13): Secondary substation design	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	4
Unit 13 (de 13): Regulatory framework for high voltage systems	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	4
Global activity	
Activities	**hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	32
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	12
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	10
Progress test [PRESENCIAL][Combination of methods]	3
Final test [PRESENCIAL][Assessment tests]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	48
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	42
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
	Problemas resueltos de sistemas de energía eléctrica	Thomson		978-84-9732-408-3	2007	
	Reglamento de líneas de alta tensión y sus fundamentos técni	Paraninfo		978-84-283-3034-3	2008	
	Sistemas eléctricos de potencia : problemas y ejercicios res	Prentice Hall		84-205-3558-3	2002	
	Tecnología eléctrica	McGraw-Hill		978-84-481-4807-2	2006	
	www.unesa.es					UNESA. Asociación Española de la Industria Eléctrica
	www.schneiderelectric.es					Biblioteca de Schneider Electric
	http://w3.mapya.es/dinatierra_v3/					SIG Oleícola Español.
	www.mapa.es/es/sig/pags/sigpac/intro.htm					SIGPAC (página inicio).
	http://sigpac.mapa.es/fega/visor/					SIGPAC (visor mapa).
						Colegio Oficial de Ingenieros Técnicos Industriales de Albacete

	www.coitiab.es				Fundación para el Fomento de la Innovación Industrial
	www.ffii.es				Inael (aparamenta y material diverso). www.inael.comIbérica de Aparellajes (aparamenta y material diverso).
	www.iberapa.es				PRYSMIAN Cables y Sistemas
	www.prysmian.es				General Cable (cables).
	www.generalcable.es				ABB (transformadores, aparamenta eléctrica y equipos)
	www.abb.com/es				CIRCUTOR
	www.circutor/es				Iberdrola s.a.
	www.iberdrola.es				Unión FENOSA
	www.uef.es				Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas
	www.ciemat.es				AENOR
	www.aenor.es				A.F.M.E. Asociación de Fabricantes de Material Eléctrico
	www.afme.es				
- COORDINADOR JUAN ANTONIO MARTÍNEZ VELASCO	Coordinación de Aislamiento en Redes Eléctricas de Alta Tensión	Mc Graw Hill		2008	
Barrero, Fermín	Sistemas de energía eléctrica	Thomson	84-9732-283-5	2004	
Navarro Márquez, José Antonio	Instalaciones eléctricas de alta tensión : sistemas de mani	Paraninfo	84-283-2434-4	1999	
Paulino Montané	Protección en las instalaciones eléctricas. Evolución y perspectivas	Marcombo		1988	
España. Ministerio de Industria, Energía y Turismo	Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión	BOE		2014	Real Decreto 337/2014, de 9 de mayo, por el que se aprueba el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01 a 23
	http://www.boe.es/boe/dias/2014/06/09/				
Roeper, Richard	Corrientes de cortocircuito en redes trifásicas	Siemens Aktiengesellschaft Marcombo	84-267-0592-8 (Marco	1985	
Roger Folch, José	Tecnología eléctrica	Síntesis	84-7738-767-2	2002	