



IDENTIFYING DATA

Power lines and electric energy transmission

Subject	Power lines and electric energy transmission			
Code	V12G320V01703			
Study programme	Grado en Ingeniería Eléctrica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	4th	1st
Teaching language	Spanish			
Department				
Coordinator	Fernández Otero, Antonio			
Lecturers	Fernández Otero, Antonio			
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General description	<p>(*O obxectivo desta materia é proporcionar ao alumno os coñecementos necesarios para ser capaz de planificar, xestionar, deseñar e calcular as instalacións eléctricas de alta tensión que constitúen a estrutura básica das redes de transporte e distribución da enerxía eléctrica.</p> <p>Nunha primeira parte da materia, desenvólvese o cálculo e deseño das devanditas instalacións de alta tensión, empezando polas liñas eléctricas de alta tensión, tanto aéreas como subterráneas para a continuación, abordar a descrición das instalacións de transformación e/ou *interconexión coñecidas como subestacións eléctricas.</p> <p>Unha segunda parte do programa dedícase á análise das redes eléctricas de alta tensión en condicións de falta e a tratar os conceptos básicos de coordinación de illamento ligados cos problemas de *sobretensiones que se producen neste tipo de sistemas.</p> <p>Finalmente, nun último tema introdúcense os aspectos básicos do transporte da enerxía eléctrica mediante sistemas de corrente continua.</p>			

Skills

Code	
B3	CG3 Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.
C23	CE23 Ability to calculate and design of power lines and electricity transmission.
D1	CT1 Analysis and synthesis.
D2	CT2 Problems resolution.
D6	CT6 Application of computer science in the field of study.
D10	CT10 Self learning and work.
D16	CT16 Critical thinking.
D17	CT17 Working as a team.

Learning outcomes

Expected results from this subject	Training and Learning Results		
New	B3	C23	D1 D2 D6 D10 D16 D17
New	B3	C23	D1 D2 D6 D10 D16 D17

Contents	
Topic	
1. Introduction to the electric power systems	1) Structure and description of an electric power system b) Models of the fundamental elements of an electric power system - Electric lines, transformers, generators, motor and generic loads
2. Analysis of faults in electric systems	a) Balanced faults b) Unbalanced faults - symmetrical Components - sequence networks
3. High Voltage electric lines	a) Electrical models of lines - Parameters - Equivalent Circuits - Steady-state - Transient state b) Mechanical calculation of overhead lines - Conductors - Supports - Insulators
4. Overvoltages and insulation coordination	a) Types of overvoltages b) Insulations coordination c) Overvoltage protection devices
5. Substations	a) Configuration types b) Substation components c) Grounding systems in high voltage installations

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	18	36	54
Problem solving	12.5	25	37.5
Practices through ICT	18	36	54
Lecturing	18	54	72
Essay questions exam	4.5	0	4.5

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Lecturing	(*)Exposición por parte do profesor dos conceptos teóricos de cada tema a todo o grupo no horario de aula establecida polo centro. Fomentarse a participación activa dos alumnos en forma de preguntas e respostas en ambos os sentidos.
Problem solving	(*)Formulación e resolución por parte do profesor de exercicios tipo básicos de aplicación práctica dos contidos teóricos previamente desenvolvidos.
Practices through ICT	(*)Proporanse casos prácticos de maior dimensión e complexidade como aplicación dos contidos da materia e que deben ser resoltos polos alumnos na aula informática coa utilización de ferramentas de software comercial e/ou de desenvolvemento propio. Este tipo de exercicios normalmente son expostos e iniciados na aula informática e finalizados polo alumno de forma autónoma. Serán entregados antes da seguinte práctica.
Lecturing	

Personalized assistance

Methodologies	Description
Problem solving	
Practices through ICT	

Assessment

Description	Qualification	Training and Learning Results
Problem solving It Will evaluate the correct resolution and delivery in time and form of diverse exercises of practical type proposed in the kinds of problems and in the practices of laboratory.	30	B3 C23 D1 D2 D6 D10 D16 D17

Essay questions exam	Examination of theoretical type-práctico with resolution of exercises of application of the concepts of the subject. Minimum note of 4 on 10 in this part to approve the subject.	70	B3	C23	D1 D2 D6 D10 D16 D17
	In this *examen, any part of the subject will be able to be freed stop the student in function of the evaluation obtained in the "Resolution of problems"				

Other comments on the Evaluation

In the announcement of July the *examen of developmental questions *contarÃ a 100%.

Commitment *Ãtico: *EspÃrase that the present student a behaviour *Ãtico suitable. In the case to detect a behaviour no *Ãtico (copy, *plaxio, *utilizaciÃn of devices *electrÃnicos unlicensed, and others) will consider that the student no *reÃne the necessary requirements to surpass the subject. In this case to *cualificaciÃn global in the present course *acadÃcat *serÃ of *suspensio (0.0).

No *permitirÃ to *utilizaciÃn of *ningÃn device *electrÃnico during them test of *avaliaciÃn except *autorizaciÃn expresses. The fact to enter a device *electrÃnico unlicensed in the classroom of examination *serÃ considered reason of no *superaciÃn of the subject in the present course *acadÃcat and the *cualificaciÃn global *serÃ of *suspensio (0.0)

Sources of information

Basic Bibliography

Pascual Simón Comín y otros, **Cálculo y Diseño de Líneas Eléctricas de Alta Tensión**, Garceta,
A. G. Exposito, **Análisis y Operación de Sistemas de Energía Eléctrica**, McGraw Hill,
J. Moreno Mohino y otros, **Reglamento de Líneas de Alta Tensión y sus fundamentos**, Paraninfo,
J. A. Martínez Velasco, **Coordinación de aislamiento en redes eléctricas de alta tensión**, McGraw Hill,

Complementary Bibliography

Recommendations

Subjects that continue the syllabus

Electric power systems/V12G320V01802

Subjects that it is recommended to have taken before

Electrical engineering/V12G320V01401
Basics of circuit analysis and electrical machines/V12G320V01304
Electrical machines/V12G320V01504