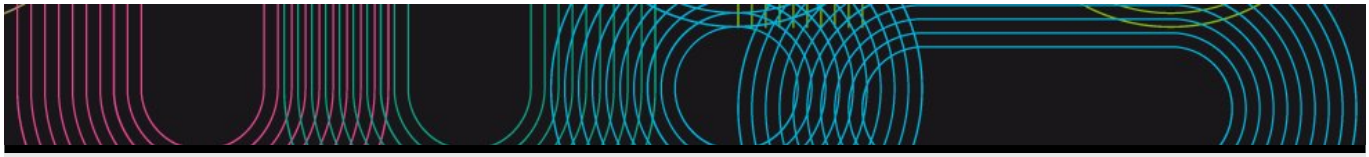

IDENTIFYING DATA				
Electrotechnology				
Subject	Electrotechnology			
Code	V09G290V01301			
Study programme	Degree in Energy Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Galician			
Department				
Coordinator	Feijóo Lorenzo, Andrés Elías			
Lecturers	Feijóo Lorenzo, Andrés Elías López Fernández, Xosé Manuel			
E-mail	afeijoo@uvigo.gal			
Web	http://faitic.uvigo.es/			
General description	Electrical technology			

Competencies	
Code	
C16	Fundamental knowledge of the electric power system: power generation, transport, delivery and distribution networks as well as types of lines and conductors. Knowledge of regulations governing low and high voltage. Knowledge of basic electronics and control systems.
D1	Capacity to interrelate all the acquired knowledge and interpret it as components in a body of knowledge with a clear structure and strong internal coherence
D3	Propose and develop practical solutions, which develop suitable strategies based on theoretical knowledge, for problem phenomena and situations that arise as everyday realities in engineering
D5	Know what sources are available for ongoing and continual updating of all the information required to undertake their work, with access to all the current and future tools for seeking information and adapting it in the light of technological and social changes
D6	Know and handle legislation applicable to the sector, know the social and business environment and know how to work together with the Administration and use acquired knowledge to draw up engineering projects and develop any of the aspects of professional work required
D7	Capacity to organise, interpret, assimilate, create and manage all the information needed to organise their work, handling the I.T., mathematical, physical and other tools required
D10	Become aware of the need for training and continual improvement in quality, developing the values associated with scientific thinking and showing a flexible, open and ethical attitude towards diverse opinions and situations, particularly in matters of non-discrimination on the grounds of gender, race or religion, respect for fundamental rights, accessibility, etc

Learning outcomes		
Expected results from this subject		Training and Learning Results
The students will learn that the atmosphere and the ocean works like an integrated system and they will understand the different temporal and spatial scales of the atmosphere and the ocean. The student will be able to analyse atmospheric and oceanographic databases and to develop skills in the treatment of the same.		
Mastery analyzing single- and three-phase electric circuits in steady state. Knowledge of the functioning of electrical power systems, generation activities, electrical energy transport and distribution. Knowledge of the elements comprising a distribution network: lines, cables and switchgear.	C16	D1 D3 D5
Knowledge of the basic principles of how electrical machines work. Knowledge of electronic control systems for electrical machines.	C16	D3 D5

Knowledge and mastery of the basic aspects of low-voltage installation design. Knowledge of the regulations applicable to high-voltage electrical systems.	D6 D7 D10

Contents	
Topic	
Single phase circuits	Two port circuits, references and Kirchoff laws. Active and passive elements. Definition of variables: voltage, current, power. Thevenin circuits. Steady-state sinusoidal circuits. Phasors. Definitions of power. Energy.
Three phase circuits.	Three phase systems: voltages, currents, power and energy. Use of per unit values.
Description of the electrical power network.	Transmission and distribution networks: devices and voltage levels. Line description and mathematical models.
Electric machines.	Synchronous and asynchronous generators: description and power balances. Electric transformers: description and power balances.

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	27	89.5	116.5
Studies excursion	3	0	3
Problem solving	20	8	28
Essay questions exam	2.5	0	2.5
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	Explanation of theory.
Studies excursion	The realization of the formative activity studies excursion will be organized by the centre, taking as a starting point the proposals of the teaching staff of the class regarding the type of installation/company to be visited.
Problem solving	Numerical resolution of exercises.

Personalized assistance	
Methodologies	**Description**
Lecturing	The sessions of titorización will be able to be by telematic means (e-mail, videoconference, forums of FAITIC), being previously concerted.
Problem solving	The sessions of titorización will be able to be by telematic means (e-mail, videoconference, forums of FAITIC), being previously concerted.

Assessment		
Description	Qualification	Training and Learning Results

Lecturing	Written proof (final exam). Results: Mastering the analysis of electric circuits in steady-state. Knowing the operation principles of electrical power systems: generation, transmission and distribution. Knowing the elements of a distribution network: lines, cables and other devices. Knowing the basic operation fundamentals of electric machines and their electronic devices. Mastering the principels of low voltage installations. Knowing standards associated with high voltage system operation.	100	C16	D1 D3 D5 D6 D7 D10

Other comments on the Evaluation

The class can be passed getting a mark equal or greater than 5 in the final exam, or even with a mark equal or greater than 4, when the difference with respect to 5 is obtained by means of the continuous assessment test.

The date of the final exam can be consulted through the web page of the centre.

http://minaseenerxia.uvigo.es/es/docencia/examenes

Sources of information

Basic Bibliography

Complementary Bibliography

José Fernández Moreno, **Teoría de circuitos**, 1ª ed., Paraninfo, 2011

Fermín Barrero González, **Sistemas de energia eléctrica**, 1ª ed., Paraninfo, 2002

Charles K. Alexander, Mathew N. O. Sadiku, **Fundamentals of electric circuits**, 4th ed., McGraw Hill, 2009

John Grainger, **Power system analysis**, Mc Graw Hlill,

Recommendations

Contingency plan

Description

Considering the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University establishes an extraordinary planning that will be activated when the administrations and the institution determine it. It is based on safety, health and responsibility, and it guarantees teaching in an online or semi-presential modalities. These already planned measures will guarantee, at the required time, the development of teaching in a more agile and effective way, because they will be known in advance by students and teachers through the standardized tool for teaching guides DOCNET.

1. Semi-presential modality

Once the semi-presential teaching is required, it would mean a reduction of the capacity of the teaching spaces used in the face-to-face modality. Therefore, as the first measure of the centre, the capacity of the teaching spaces would be reformulated and informed to the teachers, in order to proceed to reorganize the formative activities for the rest of the semester. It should be noted that the reorganization will depend on the moment throughout the semester in which this semi-presential modality is activated. For the reorganization of the teaching activities, the following guidelines would be followed:

Through the FaiTIC platform, all the students will be informed about the new conditions under which the formative activities and assessment tests will be carried out at the end of the semester.

The tutorial sessions will be carried out by telematic means (email, videoconference, FAITIC forums, ...) with prior agreement.

Once some of the students have carried out experimental or computer laboratory practices in the face-to-face modality, if it is possible, the rest of the students will have the possibility to perform the same or equivalent activities in the same

modality.

For the rest of the activities until the end of the semester, it should be done a proper identification of those formative activities which can be done under face-to-face modality and those which will be carried out remotely.

Regarding the potential tools to be applied for the formative activities during the online mode, CampusRemoto and the FaiTIC platform will be used.

2. Online modality
In the event that the non-face-to-face teaching modality is required (suspension of all face-to-face formative and assessment activities), the tools currently available at the University of Vigo, CampusRemoto and the FaiTIC platform will be used. The reorganization will depend on the moment throughout the semester in which this online modality is activated. In the reorganization of the teaching activities, the following guidelines would be followed:

2.1. Communication
Through the FaiTIC platform, all the students will be informed about the new conditions under which the formative activities and assessment tests will be carried out at the end of the semester.

2.2. Adaptation and / or modification of teaching methodologies
As the teaching methodologies have been conceived for the face-to-face teaching modality, the teaching methodologies that would be kept and those which would be modified or replaced in the online modality are indicated below.

The teaching methodologies that would be kept, since they can be used in face-to-face and online teaching mode

Campus remoto will be used for imparting as much hours as possible.

2.3. Adaptation of tutorial sessions and personalized attention
The tutorial sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) with prior agreement.

2.4. Evaluation
In case this circumstance has to be activated, the exam would be an online test.

2.5. Bibliography or additional material to facilitate self-learning
The bibliography proposed and the documentation uploaded to the FAITIC system are enough.