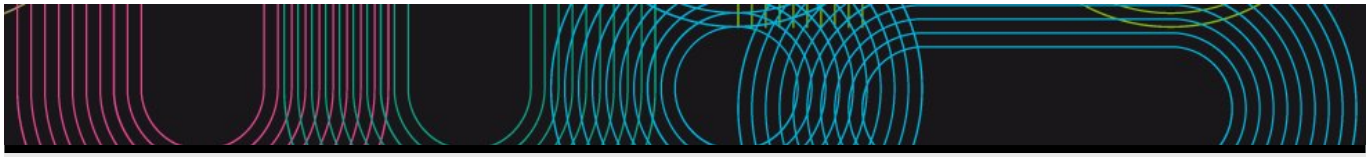

IDENTIFYING DATA				
Applied electrotechnics				
Subject	Applied electrotechnics			
Code	V12G360V01501			
Study programme	Grado en Ingeniería en Tecnologías Industriales			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish			
Department				
Coordinator	Novo Ramos, Bernardino			
Lecturers	Novo Ramos, Bernardino			
E-mail	bnovo@uvigo.es			
Web	http://moovi.uvigo.gal/			
General description	The objective of Applied Electrotechnic is to complete the training of the students of the Degree of Engineering in Industrial Technologies in what is related with Theory of Circuits and Electric Machines. This subject will provide them specific tools to analyse and evaluate the behaviour of the electric circuits in stable and transitory regime. The subject is conceived to provide the necessary knowledge and competencies to be able to be taught some subjects in the 3rd and 4rd years of the Degree. The students would have studied previously the subjects Basics of Theory of Circuits and Electric Machines and Calculus I and II because some of the information provided in these subjects will be necessary to follow, without and extra effort, Applied Electrotechnic			

Skills	
Code	
B3	CG3 Knowledge in basic and technological subjects that will enable them to learn new methods and theories, and equip them with versatility to adapt to new situations.
C22	CE22 Applied knowledge of electrical engineering
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.
D14	CT14 Creativity.
D17	CT17 Working as a team.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
To understand the behaviour of the electric circuits in case of a change of the working conditions	B3	C22	D1 D2 D6 D10 D14 D17
To master the actual techniques for the analysis of 3-phase balanced and unbalanced electric circuits	B3	C22	D1 D2 D6 D10 D14 D17

To know the measurement and data register techniques in the real electric circuits	B3	C22	D1 D2 D6 D10 D14 D17
To acquire analysis skill to evaluate the cisruits working under fault conditions. These skills will be applied to the study of the electrical transformers.	B3	C22	D1 D2 D6 D10 D14 D17

Contents

Topic	
UNIT I: 3-PHASE CIRCUITS, POWER MEASUREMENTS AND REACTIVE POWER COMPENSATION. This Unit will allow the student to understand how to analyse 3-phasecircuits under much balanced or unbalanced conditions Initially the unit covers the basic concepts for the analysis of balanced circuits. It continues covering unbalanced circuits, the different methods to measure the electrical powers and the compensation of reactive power.	Introduction: Generators, loads and 3-phase circuits Balanced 3-phase circuits. Voltages and currents. Conversion of 3-phase sources and loads. Analysis of balanced 3-phase circuits. Powers in balanced 3-phase circuits. Compensation. Analysis of unbalanced 3-phase circuits.
UNIT II: TRANSFORMERS This Unit will allow the student to learn about the constructive characteristics of the transformers, to determine his characteristic parameters and to understand the machine main properties and his utilization in the electric systems.	Analogies between electric and magnetic circuits. Introduction to the transformers: constructive aspects. The ideal transformer. Operation of the real transformer. Equivalent circuit of the single-phase transformer real: e.m.f's and voltages. No-load and in short-circuit tests of the transformer. Voltage drops , losses and performance of a transformer. Autotransformers. 3-phasetransformers: Constitution, conection diagrams and tests. Instrument transformers.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practical	9	9	18
Practices through ICT	9	9	18
Problem solving	9	18	27
Lecturing	20	60	80
Essay questions exam	7	0	7

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

Methodologies

	Description
Laboratory practical	Experimental solving of of proposed lab tests, realization of measurements and presentation of results.
Practices through ICT	Simulación by means of computer programs of 3-phase circuits and transformers.
Problem solving	Students solving of proposed exercises. Personal guidance if required
Lecturing	The usual master lessons

Personalized assistance

Methodologies	Description
Lecturing	The doubts and questions that can arise during the classes or personal assignments of the students will be solved either in situ or during the tuition hours. The tuition personal attention should be required by e-mail.
Laboratory practical	The doubts and questions that can arise during the classes or personal assignments of the students will be solved either in situ or during the tuition hours. The tuition personal attention should be required by e-mail.

Practices through ICT	The doubts and questions that can arise during the classes or personal assignments of the students will be solved either in situ or during the tuition hours. The tuition personal attention should be required by e-mail.
Problem solving	The doubts and questions that can arise during the classes or personal assignments of the students will be solved either in situ or during the tuition hours. The tuition personal attention should be required by e-mail.

Assessment

	Description	Qualification	Training and Learning Results
Essay questions exam	Continuous assessment (100%): At the end of each subject the student will perform a test that will be scored from 0 to 10 points. The passing grade is 5. The test will assess theoretical issues and practical exercises. In each test the student can reach 50% of the final grade. The passed partial tests are released from the corresponding part in the final exam. For students who pass all tests, the final grade will be the weighted average of the marks of the partial tests. Students who fail or fail to submit any or all partial tests, will take a final exam in the official exam that will be graded from 0 to 10 points. To pass the subject it is necessary to achieve a minimum grade of 3 points in each unit. The students approved by partial tests can modify the note and also present the final test. The examination will indicate the dates and places of publication of grades and revisions.	100	B3 C22 D1 D2 D6 D10 D14 D17

Other comments on the Evaluation

The student only has to take the failed partial in the July exam. The July final mark will be calculated equally as for the first final mark.

Sources of information

Basic Bibliography

Parra V.M., Ortega J., Pastor A. y Pérez-Coyto A, **Teoría de Circuitos**, UNED,

González E., Garrido C. y Cidrás J, **Ejercicios resueltos de circuitos eléctricos**, Tórculo Edicións,

Fraile Mora, Jesús, **Máquinas Eléctricas**, McGraw-Hill,

Jesús Fraile Mora y Jesús Fraile Ardanuy, **Problemas de Máquinas Eléctricas**, McGraw-Hill/InterAmericana de España,

Complementary Bibliography

Recommendations

Subjects that continue the syllabus

Electrical machines/V12G360V01605

Subjects that it is recommended to have taken before

Physics: Physics 2/V12G360V01202
Mathematics: Calculus 2 and differential equations/V12G360V01204
Basics of circuit analysis and electrical machines/V12G360V01302

Other comments

Requirements: To enrol in this subject is necessary to had surpassed or well be enrolled of all the subjects of the inferior courses to the course in the that is summoned this subject