

Información del Plan Docente

Academic Year	2017/18
Faculty / School	175 - Escuela Universitaria Politécnica de La Almunia
Degree	424 - Bachelor's Degree in Mechatronic Engineering
ECTS	6.0
Year	3
Semester	First semester
Subject Type	Compulsory
Module	---

1.General information**1.1.Introduction****1.2.Recommendations to take this course****1.3.Context and importance of this course in the degree****1.4.Activities and key dates****2.Learning goals****2.1.Learning goals****2.2.Importance of learning goals****3.Aims of the course and competences****3.1.Aims of the course****3.2.Competences****4.Assessment (1st and 2nd call)****4.1.Assessment tasks (description of tasks, marking system and assessment criteria)****5.Methodology, learning tasks, syllabus and resources****5.1.Methodological overview**

The learning process designed for this subject is based on the following:

In a strong teacher / student interaction. This interaction is materialized through a distribution of work and responsibilities between students and teachers. However, it will have to be taken into account that to a certain extent students can mark

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their learning pace according to their needs and availability, following the guidelines set by the teacher. The present subject of Electrical Engineering is conceived as a unique set of contents, but worked under three fundamental and complementary forms as they are: the theoretical concepts of each didactic unit, the resolution of problems or questions and the laboratory practices, supported in turn For another series of activities. The organization of the teaching will be carried out following the following guidelines:

– **Theory Classes** : Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.

– **Practical Classes** : The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.

– **Laboratory Workshop** : The lecture group is divided up into various groups, according to the number of registered students, in order to make up smaller sized groups.

– **Group Tutorials** : Programmed activities of learning follow-up in which the teacher meets with a group of students to guide their work of autonomous learning and supervision of works directed or requiring a very high degree of advice by the teacher.

– **Individual Tutorials** : Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

5.2.Learning tasks

The programme offered to the student to help them achieve their target results is made up of the following activities...

Involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out, the activities are the following:

– **Face-to-face generic activities** :

• Theory Classes: The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.

• Practical Classes: Problems and practical cases are carried out, complementary to the theoretical concepts studied.

• Laboratory Workshop: This work is tutored by a teacher, in groups.

– **Generic non-class activities** :

• Study and understanding of the theory taught in the lectures.

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• Understanding and assimilation of the problems and practical cases solved in the practical classes.

• Preparation of seminars, solutions to proposed problems, etc.

• Preparation of laboratory workshops, preparation of summaries and reports.

• Preparation of the written tests for continuous assessment and final exams.

- **Tutored autonomous activities.**

Although they will have more of a face character have been taken into account in part for their idiosyncrasies, they will be primarily focused on seminars and tutorials under the supervision of the teacher.

- **Reinforcement activities.**

Non-contact marking character, through a virtual learning portal (Moodle) various activities that reinforce the basic contents of the subject be addressed. These activities can be customized or not, controlling their realization through it.

5.3.Syllabus

The subject is structured around two complementary components contents:

- Theorists.
- Practical.

THEORETICAL CONTENTS.

The theoretical contents are articulated based on eight teaching units attached relationship, indivisible blocks of treatment, given the configuration of the subject that program. These topics collect the contents needed for the acquisition of predetermined learning outcomes.

- TOPIC 1: Three phase sinusoidal alternating current.

- TOPIC 2: Direct current lines.

- TOPIC 3: Single phase alternating current lines.

- TOPIC 4: Three phase alternating current lines.

- TOPIC 5: Single phase transformers.

- TOPIC 6: Three phase transformers.

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- TOPIC 7: Direct current motors.
- TOPIC 8: Three phase asynchronous motors.

PRACTICAL CONTENTS.

Those workshop to be developed in the laboratory, which will be performed by students in sessions of one hour below.

- WORKSHOP 1: Study of voltages and currents in a three phase system.
- WORKSHOP 2: Power measurement in a three-phase system.
- WORKSHOP 3: Direct start of a Three phase asynchronous motor
- WORKSHOP 4: Reversing the direction of rotation of a three phase asynchronous motor.
- WORKSHOP 5: Star-delta starting a three-phase asynchronous motor.

5.4.Course planning and calendar

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is moderate.

Activity	Weekly school hours
Lectures	3
Laboratory	1

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Others activities	6
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Nevertheless the previous table can be shown into greater detail, taking into account the following overall distribution:

— 45 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.

— 10 hours of laboratory workshop, in 1 or 2 hour sessions.

— 5 hours of written assessment tests, one or two hour per test.

— 90 hours of personal study, divided up over the 15 weeks of the semester.

The dates of the global evaluation test will be published officially in
<http://www.eupla.unizar.es/index.php/secretaria-2/informacion-academica/distribucion-de-examenes>

Written continuous assessment tests are related to the following topics:

Las pruebas escritas de evaluación continua estarán relacionadas con los temas siguientes:

— **Written assessment test 1** : Topics 1, 2, 3, y 4.

— **Written assessment test 2** : Topics 5, 6, 7 y 8.

The topics on which the works will be developed will be proposed in the third week, with their delivery and exhibition being carried out before the last two teaching weeks, during the course of the signature the dates will be specified. The most significant dates of the continuous evaluation system will be published in moodle during the development of the course.

The dates of the global evaluation test will be those published officially in
<http://www.eupla.unizar.es/index.php/secretaria-2/informacion-academica/distribucion-de-examenes>

5.5. Bibliography and recommended resources

Bibliography:

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"THE UPDATED BIBLIOGRAPHY OF THE SUBJECT IS CONSULTED THROUGH THE LIBRARY'S WEB PAGE
<http://psfunizar7.unizar.es/br13/eBuscar.php?tipo=a>"

- BB** Chapman, Stephen J.. Máquinas eléctricas / Stephen J. Chapman ; revisión técnica Carlos Rodríguez Pérez, Alfredo Santana Díaz . - 5ª ed. México [etc.] : McGraw-Hill, cop. 2012
- BB** Cortes Cherta, M.. Máquinas de corriente continua/ Manuel Cortés Cherta.. - 1ª edición Barcelona: Editores Técnicos Asociados,1994.
- BB** Cortes Cherta,M.. Máquinas de corriente alterna asíncronas/Manuel Cortés Cherta.. - 1ª edición Barcelona:Editores Técnicos Asociados,1994
- BB** Fraile Mora, J.. Líneas e instalaciones eléctricas/J. Fraile Mora . - 3ª edición Madrid: Colegio de Ingenieros de Caminos, Canales y Puertos, Servicio de Publicaciones, 2002
- BB** Fraile Mora, Jesús. Máquinas eléctricas / Jesús Fraile Mora . - 5ª ed. en español Madrid : McGraw-Hill/Interamericana de España, cop. 200
- BB** Problemas de electrotecnia. 2, Circuitos trifásicos / X. Alabern Morera ...[et al.] Madrid : Paraninfo, 1991
- BB** Problemas resueltos del curso de electrotécnia. Parte 2, Máquinas eléctricas : (Se incluyen también líneas eléctricas) [Madrid] : Universidad Politécnica, E.T.S. de Ingenieros de Caminos, Canales y Puertos, Cátedra de Electrotecnia, [199?]
- BB** Sanjurjo Navarro, Rafael. Máquinas eléctricas / Rafael Sanjurjo Navarro Madrid [etc.] : García Maroto, D.L. 2011
- BB** Staff, E. E.. Circuitos magnéticos y transformadores / E.E. Staff [del M.I.T] Barcelona [etc.] : Reverté, 1965
- BC** Bayod Rújula, Ángel Antonio. Circuitos monofásicos y trifásicos en régimen estacionario senoidal / Ángel Antonio Bayod Rújula, Mariano Sanz Badía. - [1a. ed.] Zaragoza : Prensas Universitarias de Zaragoza, 1997
- BC** Cortés Cherta, Manuel. Teoría general de máquinas eléctricas : (ingeniería industrial) / Manuel Cortés Cherta, Juan Corrales Martín, Alfonso Enseñat Badía. - 3ª edición Madrid : Universidad Nacional de Educación a Distancia, 2002
- BC** Cortés Cherta,M. La máquina eléctrica en general/Manuel Cortés Cherta.. 1ª edición.

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BC	Barcelona:Editores Técnicos Asociados,1994 Fraile Mora, Jesús. Introducción a las instalaciones eléctricas / J. Jesús Fraile Mora . - 2a ed. Madrid : Colegio de Ingenieros de Caminos, Canales y Puertos, 1996
BC	Gómez Alós, Milagros. Problemas resueltos de máquinas eléctricas / Milagros Gómez Alós, Alfonso Bachiller Soler, Guillermo Ortega Gómez . - 2ª ed. Madrid : Cengage Learning Paraninfo, D. L. 2008
BC	Molero Yunta, J. C.. Problemas de corriente alterna. Tomo II, Sistemas trifásicos / J. C. Molero Yunta, R. Montoya Villena, A. Soler Botella Valencia : Editorial de la UPV, D.L. 2005
BC	Mujal Rosas, Ramón M.. Cálculo de líneas y redes eléctricas / Ramón M. Mujal Rosas . - 1ª ed., reimp. Barcelona : Edicions UPC, 2005
BC	Sanz Feito, Javier. Máquinas eléctricas / Javier Sanz Feito Madrid [etc.] : Prentice Hall, D.L. 2002

Resources and materials used in the development of the subject are reflected in the following table:

Material	Format
Topic theory notes	Paper/repository
Topic problems	
Topic theory notes	Digital/Moodle
Topic presentationso	E-Mail
Topic problems	
Related links	
Software	Pc's laboratorio
Technical manuals	Paper/repository



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	Digital/Moodle
Multimeters ammeters Voltmeters Power Meters Frequency Transformers. Rectifiers Oscilloscopes Single and three phase loads Engines Electrical switchgear	