

## SUBJECT TEACHING GUIDE

### G990 - Electrical Engineering

#### Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Degree in Industrial Electronic Engineering and Automatic Control Systems			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Electrotechnics Module in Common with the Industrial Branch				
Course unit title and code	G990 - Electrical Engineering				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA				
Name of lecturer	MARIA ANGELES CAVIA SOTO				
E-mail	maria.cavia@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO PROFESOR (S2032)				
Other lecturers	PEDRO BENITO GANCEDO ALBERTO ARROYO GUTIERREZ				

### 3.1 LEARNING OUTCOMES

- Understanding and analyze the balanced and unbalanced three-phase systems.
- Determining the powers of a three-phase system. Knowing the methods of measurement of a three-phase power system. Improve the power factor of a three-phase network.
- Understanding the operation and applications of passive filters.
- Understanding the concept of quadrupole and its applications to the study of electrical and electronic systems. Knowing the forms of association calculating the parameters of the resulting quadrupole.
- Resolving transient circuits of first order representing the voltages and currents. Identify and analyze the work regimes of the circuits of second order in the time domain.
- Knowing the general principles of electrical machines and their applications.
- Knowing the basic measuring devices, its constant and connections. Measurement of voltage, current, power and other electrical parameters, applying the tools, methods and techniques.

### 4. OBJECTIVES

- Providing students with a set of analytical techniques that allow easy understanding, resolution and use of electrical systems.
- Providing a set of concepts sufficiently flexible to be used in other subjects of the specialty.
- Develop and exercise analytical skills

### 6. COURSE ORGANIZATION

CONTENTS	
1	THREE-PHASE SYSTEMS: previous definitions. Study and analysis of phase systems to three and four-wire, balanced and unbalanced. Powers and measures of active and reactive power in three-phase systems. Power factor improvement.
2	INTRODUCTION TO SYNTHESIS OF CIRCUITS: Introduction. Scale. Passive filters: low pass, high pass, bandpass, bandstop. Overview of active filters.
3	QUADRUPOLE: Introduction. Quadrupole concept. Parameters of a quadrupole. Association quadrupoles.
4	TRANSIENT CIRCUITS: Introduction. Transients in circuits of first order with one energy storage element and both DC and AC excitation. Transients in circuits of first order with several energy storage elements. Transients in circuits of second order without excitement nor external sources. Transient response in multi-mesh circuits.
5	INTRODUCTION TO ELECTRICAL MACHINES: Introduction to electrical machines. Types of electrical machines. Applications of electric machines.
6	Labs in the course. EVALUATION ACTIVITY. - Partial test the rest of the course and / or end.

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam: Contents of blocks 1,2 and 3. Written exam: Contents of blocks 4,5 and 6. Attendance to laboratory sessions is mandatory to pass the course	Written exam	No	Yes	50,00
Written exam: Contents of blocks 1,2 and 3. Written exam: Contents of blocks 4,5 and 6.	Written exam	Yes	Yes	50,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>For the purpose of continuous assessment, if exceeded (greater or equal to 4 out of 10) partial test may be performed on the final exam only the second part not assessed, having obtained her average rating of 5 out of 10 as a minimum to pass the course.</p> <p>If the partial test (less than 4 out of 10) is not exceeded, the final exam will be full.</p> <p>Attendance to meetings of block 6 (laboratory) is required to pass the course; It will control both the presence therein as its use, since the questions posed during the course of those meetings.</p>				
<b>Observations for part-time students</b>				
The evaluation will be conducted with the same criteria as full-time students.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
SÁNCHEZ, P.; CAVIA, M.A.; ORTIZ, A.; MAÑANA, M.; EGUÍLUZ, L.I.; LAVANDERO, J.C. "Teoría de circuitos: problemas y pruebas objetivas orientadas al aprendizaje". Pearson Educación. 2007.
EGUÍLUZ, L.I.; SÁNCHEZ, P.; CAVIA, M.A.; LAVANDERO, J.C. "Pruebas Objetivas de Circuitos Eléctricos". EUNSA.
PASTOR, A.; ORTEGA, J.; PARRA, V.; PÉREZ, A. "Circuitos Eléctricos". Volumen I. UNED.
PASTOR, A.; ORTEGA, J. "Circuitos Eléctricos". Volumen II. UNED.
FRAILE, J. "Circuitos Eléctricos". Pearson Educación. 2012
FRAILE, J. "Máquinas Eléctricas". McGraw-Hill.
Materiales teórico-prácticos de la asignatura proporcionados por el profesor.