

## SUBJECT TEACHING GUIDE

### G861 - Circuit Theory I

### Degree in Electrical Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Electrical Engineering			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Circuit Theory Module in Common with the Industrial Branch				
Course unit title and code	G861 - Circuit Theory I				
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	ALBERTO ARROYO GUTIERREZ
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Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO PROFESOR (S2026)
Other lecturers	SERGIO BUSTAMANTE SANCHEZ EUGENIO SAINZ ORTIZ

**3.1 LEARNING OUTCOMES**

- Understand and analyze the polyphase systems in general. Specializing the study and analysis of balanced and unbalanced three-phase systems.
- Determine the powers of a polyphase system. Knowing the methods of measurement of a three-phase power system. Improve the power factor of a three-phase network.
- Calculating symmetrical components of a three-phase system according to the original system and the inverse transformation. Determine the symmetrical components of the line voltages and currents.
- Knowing the nature of the magnetically coupled coils and their applications, resolving magnetic coupling circuits in sinusoidal steady state. Solve simple circuits with transformers.
- Understanding the operation and applications of passive filters.
- Knowing the basic measuring devices, its constant and connections. Measure voltage, current, power and other electrical parameters, applying the tools, methods and techniques.

**4. OBJECTIVES**

- To provide 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. SUBJECT PROGRAM**

**CONTENTS**

1	POLYPHASE SYSTEMS I: previous definitions. Study and analysis of multiphase systems. Study and analysis of phase systems to three and four wires.
2	POLYPHASE SYSTEMS II: Powers in multiphase systems. Powers and measures of active and reactive power in balanced and unbalanced three-phase systems. Power factor improvement.
3	POLYPHASE SYSTEMS III: Analysis of unbalanced three-phase circuits using the method of symmetrical components. Determining an unbalanced three-phase system from their symmetrical components and vice versa. Symmetrical components of voltages and currents.
4	COIL MAGNETICALLY COUPLED: characterization of terminals and circuit analysis in sinusoidal magnetic drive steady state. Equivalent circuits. The transformer as a circuit element.
5	INTRODUCTION TO SUMMARY OF CIRCUITS Introduction. Scale. Passive filters: low pass, high pass, bandpass, bandstop. Overview of active filters.
6	MEASUREMENT INSTRUMENTS AND METHODS: Overview of measuring and patterns elements. Measuring various electrical parameters.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Written exam: Contents of blocks 1 and 2. Written exam: Contents of blocks 3,4,5 and 6.	Written exam	No	Yes	50,00
Written exam: Contents of blocks 1 and 2. Written exam: Contents of blocks 3,4,5 and 6.	Written exam	Yes	Yes	50,00
TOTAL				100,00
Observations				
<p>For the purposes of continuous assessment, if the partial exam is passed (equal to or greater than 4 points out of 10), only the second part not evaluated will be taken in the final exam. A minimum average score of 5 points out of 10 must be obtained to pass the course. Additionally, a minimum of 4 points out of 10 is required in the second part.</p> <p>If the partial exam is not passed (less than 4 points out of 10), the entire final exam will be taken. This exam will consist of two parts, with a minimum of 4 points out of 10 required in each part to pass the course, as well as an overall average of 5 points out of 10.</p>				
Observations for part-time students				
The evaluation will be carried out with the same criteria as for 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.
BOYLESTAD, R.L. "Análisis Introductorio de Circuitos". Pearson Educación.
IRWIN, D.J. "Análisis Básico de Circuitos en Ingeniería". Prentice Hall.
Materiales teórico-prácticos de la asignatura proporcionados por el profesor.