SUBJECT TEACHING GUIDE

G861 - Circuit Theory I

Degree in Electrical Engineering

Academic year 2023-2024

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	LUIS FERNANDO MANTILLA PEÑALBA JUAN ANTONIO CARDONA PARDO PEDRO BENITO GANCEDO ALBERTO LASO PEREZ TOMAS GUINDULAIN ARGANDOÑA

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. COURSE ORGANIZATION	
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. Attendance to laboratory sessions is mandatory to pass the course	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

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.
If the partial test (less than 4 out of 10) is not exceeded, the final exam will be full.
The remote evaluation of the works, practical laboratory exercises and written tests is foreseen, in the case of a new health alert by COVID-19 making it impossible to carry out the evaluation in person.

Observations for part-time students

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.

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.