

SUBJECT TEACHING GUIDE

G867 - Circuit Theory II

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: Further Circuit Theory Further Module in Common with the Industrial Branch | | | | |
| Course unit title and code | G867 - Circuit Theory II | | | | |
| Number of ECTS credits allocated | 6 | Term | Semester based (2) | | |
| Web | | | | | |
| Language of instruction | Spanish | English Friendly | No | Mode of delivery | Face-to-face |

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|------------------|---|--|--|--|--|
| Department | DPTO. INGENIERIA ELECTRICA Y ENERGETICA | | | | |
| Name of lecturer | CARMELA ORIA ALONSO | | | | |
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| Office | E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO PROFESORES (S3066) | | | | |
| Other lecturers | ALFREDO ORTIZ FERNANDEZ ALBERTO ARROYO GUTIERREZ | | | | |

| 3.1 LEARNING OUTCOMES |
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| - Resolve transient circuits of first order representing the voltages and currents. |
| - Identify and analyze the work regimes of circuits of second order in the time domain. |
| - Applying the Laplace transform to analyze transient circuits |
| - Understand 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. Determine the parameters image. |
| - Apply Fourier series analysis of circuits with non-sinusoidal periodic excitations. |
| - LTspice. know how to use the tool for circuit simulation and resolution in any scheme of work. |

4. OBJECTIVES

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| Resolution of electrical circuits, in any regime of work, using the most appropriate method |
| Providing students with a set of analytical techniques that allow easy understanding, resolution and use of electrical systems. |
| Providing a set of concepts, methods and tools flexible enough to use them in other subjects of the specialty. |

6. COURSE ORGANIZATION

| CONTENTS | |
|----------|--|
| 1 | TRANSIENT CIRCUITS I: Introduction. Transients in circuits of first order with one energy storage element and continuous excitement. Transients in circuits of first order with one energy storage element and alternating sinusoidal excitation. Transients in circuits of first order with several energy storage elements |
| 2 | TRANSIENT CIRCUITS II: Transient regimes in second order circuits without excitement nor external sources . Transient response in circuits with multiple meshes . Application of the Laplace Transform for analysis of transient circuit . |
| 3 | QUADRUPOLE: Introduction. Quadrupole concept. Parameters of a quadrupole. Association of quadrupoles. Parameters image. |
| 4 | CIRCUIT ANALYSIS UNDER NO SINUSOIDAL: Introduction. Values associated with non-sinusoidal periodic functions. Network analysis with nonsinusoidal periodic excitation. Power and theorems. |
| 5 | Practices and Practice LTSpice simulation laboratory of the subject. |

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 and 5. | 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.