



1. General information

Course: ELECTRICAL TECHNOLOGY**Type:** CORE COURSE**Degree:** 412 - UNDERGRADUATE DEGREE PROGRAMME IN ELECTRICAL ENGINEERING**Center:** 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING**Year:** 2**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 56312**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 55**Duration:** First semester**Second language:****English Friendly:** Y**Bilingual:** N**Lecturer:** JOSE MANUEL DE LA CRUZ GOMEZ - Group(s): 55

| Building/Office | Department | Phone number | Email | Office hours |
|--|--|--------------|-------------------------|---|
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Lecturer: RAQUEL JURADO MERCHAN - Group(s): 55

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2. Pre-Requisites

It is recommended that students have acquired the specific competences developed in mathematics and physics.

3. Justification in the curriculum, relation to other subjects and to the profession

The subject of Electrical Technology contributes to the acquisition of the specific competence related to the knowledge and use of the principles of circuit theory and electrical machines.

4. Degree competences achieved in this course

Course competences

| Code | Description |
|-------|--|
| CB02 | Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area. |
| CB03 | Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues. |
| CB04 | Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences. |
| CB05 | Have developed the necessary learning abilities to carry on studying autonomously |
| CEC04 | Knowledge and use of the principles of circuit theory and electrical machines. |
| CG03 | Knowledge of basic and technological subjects to facilitate learning of new methods and theories, and provide versatility to adapt to new situations. |
| CG04 | Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of industrial engineering. |
| CG06 | Ability to handle specifications, regulations and mandatory standards. |
| CT02 | Knowledge and application of information and communication technology. |
| CT03 | Ability to communicate correctly in both spoken and written form. |

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Application to electrical installations.

Ability to analyse magnetically coupled circuits.

Knowledge of, and ability to apply, the procedures used for the analysis of sinusoidal steady-state circuits.

Knowledge and characterisation of the components of electrical circuits.

Knowledge of the general principles of electrical machines.

Additional outcomes

6. Units / Contents

Unit 1: INTRODUCTION. FUNDAMENTAL IDEAS.

Unit 2: CIRCUIT COMPONENTS.

Unit 3: ANALYSIS OF STEADY-STATE CIRCUITS. METHODS OF ANALYSIS AND THEOREMS.

Unit 4: SINUSOIDAL STEADY-STATE CIRCUITS. POWER AND ENERGY.

Unit 5: THREE-PHASE CIRCUITS. POWER AND ENERGY.

Unit 6: CIRCUITS WITH MAGNETIC COUPLINGS.

Unit 7: GENERAL PRINCIPLES OF ELECTRICAL MACHINES.

Unit 8: APPLICATION IN ELECTRICAL INSTALLATIONS.

ADDITIONAL COMMENTS, REMARKS

Practical programme:

Practice 1: Passive components and active components. Measuring devices.

Practice 2: Analysis of direct current circuits.

Practice 3: Analysis of sinusoidal steady-state circuits.

Practice 4: Power and energy in steady state sine wave.

Practice 5: Three-phase systems.

7. Activities, Units/Modules and Methodology

| Training Activity | Methodology | Related Competences (only degrees before RD 822/2021) | ECTS | Hours | As | Com | Description |
|--|----------------------------------|---|---|------------|----|-----|---|
| Class Attendance (theory) [ON-SITE] | Combination of methods | CB05 CEC04 CG03 CT02 | 1.2 | 30 | N | - | Presentation and development of fundamental theoretical concepts. |
| Problem solving and/or case studies [ON-SITE] | Problem solving and exercises | CB02 CB03 CB05 CEC04 CG03 CG04 CG06 | 0.4 | 10 | N | - | Resolution of exercises by the teacher that illustrate the theoretical contents discussed above. |
| Class Attendance (practical) [ON-SITE] | Practical or hands-on activities | CB02 CB03 CB04 CB05 CEC04 CG03 CT02 CT03 | 0.6 | 15 | Y | Y | They will consist of small groups of laboratory practices. It is a compulsory activity and a prerequisite for passing the course. The way to make up is to take a practice test. In the section on evaluation criteria, the rules for the evaluation and/or recovery of the same are established. |
| Formative Assessment [ON-SITE] | Assessment tests | CB02 CB03 CB04 CB05 CEC04 CG03 CG04 CG06 CT02 CT03 | 0.2 | 5 | Y | Y | Written tests to evaluate the theoretical and practical contents developed in the course. |
| Study and Exam Preparation [OFF-SITE] | Self-study | CB02 CB03 CB04 CB05 CEC04 CG03 CG04 CG06 CT02 CT03 | 3.6 | 90 | N | - | |
| Total: | | | 6 | 150 | | | |
| Total credits of in-class work: 2.4 | | | Total class time hours: 60 | | | | |
| Total credits of out of class work: 3.6 | | | Total hours of out of class work: 90 | | | | |

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

| Evaluation System | Continuous assessment | Non-continuous evaluation* | Description |
|---------------------|-----------------------|----------------------------|---|
| Laboratory sessions | 30.00% | 30.00% | Students must attend the practical sessions and hand in the required report on each of the practical sessions in due time and form. As this is a compulsory activity, a minimum of 40% of the grade must be achieved in order to pass the course. This activity can only be recovered when, for duly justified reasons, the teaching staff deems it necessary to extend the deadline or to take a practice exam. These recuperations will only be allowed if the student has reached the minimum qualification required in the rest of the assessed activities (mid-term or final exams). The internship grade will be retained for two successive academic years. |
| Mid-term tests | 70.00% | 0.00% | They will consist of two tests related to both theoretical aspects and practical application. Passing them will require achieving at least 40% of the maximum mark in each of the mid-term exams. They will be of an eliminatory nature. If the average mark between the mid-term exams passed is equal to or higher than 4 points out of 10, the practical grade |

| | | | |
|---------------|-------|----------------|--|
| | | | will be taken into account and the subject will be passed if the mark obtained is higher than 5 points. |
| Final test | 0.00% | 70.00% | It will consist of a test related both to theoretical and practical aspects and practical application, which will be structured as two partial tests. Passing the test will require at least 40% of the maximum mark in each of the parts into which it is divided. If the average mark between the parts passed is equal to or higher than 4 points out of 10, the grade for the practical part will be taken into account and the course will be passed if the grade obtained is higher than 5 points. |
| Total: | | 100.00% | 100.00% |

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

Students will have two mid-term exams which will be eliminatory, i.e. if they pass a mid-term exam, they will not have to sit the final exam.

In order to pass the course in the ordinary exams, a minimum of 40% of the maximum grade must be obtained in each of the mid-term exams and in the practicals, all of which are compulsory activities.

If this requirement is not met, even if the overall grade for the course, after taking the weighted average of all the parts that can be assessed is higher than 5 out of 10, the grade will be Failed (4). In the event that the weighted average does not reach 4, the grade will be that obtained from the weighted average of the weighted average of all the evaluable parts.

The recovery of the partial tests will be possible in the final exam, while the recovery of the practicals will be possible as detailed in the previous description above.

During the partial or final tests it is strictly forbidden to use any kind of electronic device (mobile phones, tablets, smartwatches, etc.), even if they are switched off, are strictly forbidden during the exam.

In case of non-compliance with this rule, the grade will be Fail (0), even if the terminal is switched off. This rule is applicable for all exam sessions.

Non-continuous evaluation:

For non-continuous assessment students, the criteria will be the same as for continuous assessment, except that the part of the assessment corresponding to the mid-term tests will be examined in a single final exam which will be structured as two partial tests and which will be subject to the same criteria as those established for the partial tests of the continuous assessment.

Passing the practicals is also compulsory and is subject to the same criteria as for the continuous assessment.

Specifications for the resit/retake exam:

In the extraordinary exam session, the same criteria will be followed as in the ordinary exam session.

Specifications for the second resit / retake exam:

In the special final exam session, the same criteria will be followed as those indicated for the extraordinary exam session.

| 9. Assignments, course calendar and important dates | |
|---|-------|
| Not related to the syllabus/contents | |
| Hours | hours |
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 30 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 10 |
| Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities] | 15 |
| Formative Assessment [PRESENCIAL][Assessment tests] | 5 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 90 |
| Global activity | |
| Activities | hours |
| Formative Assessment [PRESENCIAL][Assessment tests] | 5 |
| Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises] | 10 |
| Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities] | 15 |
| Class Attendance (theory) [PRESENCIAL][Combination of methods] | 30 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 90 |
| Total horas: 150 | |

| 10. Bibliography and Sources | | | | | | |
|--|---|------------------|------|------|------|-------------|
| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
| CARLSON, A.B | Teoría de Circuitos. | Thomson. | | | 2004 | |
| EDMINISTER, J.A | Circuitos Eléctricos. | Mc Graw Hill | | | 1997 | |
| FRAILE MORA, JESÚS. | Electromagnetismo y Circuitos Eléctricos. (4ª Ed.). | Mc Graw Hill | | | 2005 | |
| Fraile Mora, Jesús | Máquinas eléctricas. | Mc Graw Hill | | | 2008 | |
| GONZÁLEZ, B. | Sistemas Polifásicos. | Paraninfo. | | | 1994 | |
| A. J. Conejo, A. Clamagirand, J. L. Polo, N. Alguacil. | Circuitos Eléctricos para la Ingeniería | McGraw-Hill | | | 2004 | |
| GONZÁLEZ, B. | Sistemas Polifásicos. Ejercicios de Aplicación. | Paraninfo | | | 1995 | |
| NILSSON, J.W. & Riedel, S.A. | Circuitos Eléctricos. | Pearson. | | | 2005 | |