

**1. General information****Course:** ELECTRICAL TECHNOLOGY**Type:** CORE COURSE**Degree:** 353 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING (CR)**Center:** 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL**Year:** 2**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 56312**ECTS credits:** 6**Academic year:** 2021-22**Group(s):** 20 21**Duration:** First semester**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** NATALIA ALGUACIL CONDE - Group(s): 20 21

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**2. Pre-Requisites**

Algebra, Calculus I, Calculus II, Physics and Advanced Mathematics courses in the Electronical Engineering study program provide the basic background for the Tecnología Eléctrica course.

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

Tecnología Eléctrica course provides the basic competencies considered in the common block of any engineering degree (according to Orden CIN/351/2009): knowledge and usage of the basic principles of circuit theory and electric machines.

Tecnología Eléctrica course is related to the following courses of the Electronic Engineering degree: Physics, Algebra, Calculus I, Electronic Fundamentals, Electrical Network Analysis, Electric Power Systems and Photovoltaic Systems.

Tecnología Eléctrica course reviews concepts of circuit theory that are the basic requirements for any Electrical Engineering study and it provides systematic tools to study any electrical installation. Using circuit theory it is possible to make a precise, prompt and efficient analysis of many different electrical problems without the need of recalling the laws of Electromagnetism. Furthermore, this course introduces the electric machines, which are the key components of any power system. In particular, induction machines are the most usual components in any industrial application. Therefore, Tecnología Eléctrica course is essential for the Mechanical Engineering profession.

**4. Degree competences achieved in this course****Course competences**

Code	Description
A02	To know how to apply knowledge to work or vocation in a professional manner and possess the competences that are usually demonstrated by the formulation and defence of arguments and the resolution of problems in the field of study.
A04	To be able to transmit information, ideas, problems and solutions to a specialized audience.
A05	To have developed the learning skills necessary to undertake subsequent studies with a greater degree of autonomy.
A12	Knowledge of basic materials and technologies that assist the learning of new methods and theories and enable versatility to adapt to new situations.
A15	Ability to work to specifications and comply with obligatory rules and regulations.
C04	Knowledge and use of the principles of the theory of circuits and electrical machines.
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.

**5. Objectives or Learning Outcomes****Course learning outcomes****Description**

Know and know how to apply the procedures employed in the analysis of circuits in permanent sinusoidal regimen

Application of electrical installations

Knowledge of the general principles of electrical machinery

Knowledge and characterization of the components of electrical circuits

Know and know how to analyze circuits magnetically coupled

## 6. Units / Contents

**Unit 1: Basic laws and concepts**

**Unit 2: Components**

**Unit 3: Resistive circuits**

**Unit 4: Analysis methods**

**Unit 5: Basic theorems and principles**

**Unit 6: AC steady-state analysis**

**Unit 6.1** Power and Energy

**Unit 7: Three-phase circuits**

**Unit 7.1** Power and Energy

**Unit 8: Fundamentals of Electric Machines**

**Unit 8.1** Magnetically coupled circuits

## ADDITIONAL COMMENTS, REMARKS

Units 3, 6, 7 and 8 include a variety of applications on electrical installations.

## 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]	Lectures	A04 A05 A12 C04	1.2	30	N	-	Expository method. Master lesson.
Problem solving and/or case studies [ON-SITE]	Cooperative / Collaborative Learning	A04 A05 A12 C04	0.4	10	N	-	Solving problems and drill exercises
Progress test [ON-SITE]	Assessment tests	A02 A04 A05 A12 A15 C04 CB03	0.12	3	Y	N	Two midterm tests will be held once the corresponding theoretical contents have been explained.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	A05 C04 CB03	0.6	15	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	A02 A05 A15 C04 CB03	3.6	90	N	-	
Final test [ON-SITE]	Assessment tests	A02 A04 A05 A15 C04 CB03	0.08	2	Y	N	
<b>Total:</b>			<b>6</b>	<b>150</b>			
<b>Total credits of in-class work: 2.4</b>			<b>Total class time hours: 60</b>				
<b>Total credits of out of class work: 3.6</b>			<b>Total hours of out of class work: 90</b>				

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
Progress Tests	70.00%	0.00%	Two midterm exams will be held throughout the course, covering 70% of the competences.
Final test	0.00%	100.00%	The final exam may include problems and questions about theoretical or lab concepts. The evaluation will consider not only the correctness of the answer explanations but also the results' consistency.
Practicum and practical activities reports assessment	30.00%	0.00%	Using the Moodle platform, the students should submit the lab report including all the magnitudes measured in the lab as well as the corresponding computations. The evaluation of the report will consider the mismatches between the measures and the calculated magnitudes as well as the exactness of the calculus.  Attendance to lab sessions as well as the submission of the report within the deadlines are mandatory to qualify for continuous evaluation.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

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:

- To pass the course it is compulsory to have a minimum score of 4 out of 10 in the two midterm tests.
- To pass the course it is compulsory to have a minimum score of 4 out of 10 in the evaluation of the report of the laboratory sessions. Furthermore, attendance at all laboratory sessions is compulsory.

#### Non-continuous evaluation:

The final test will include two parts that cover all the competences of the course:

1. Theoretical and / or practical questions. This part represents 70% of the final mark.
2. Theoretical and practical examination of the laboratory sessions. This part represents 30% of the final mark.

To pass the course it is compulsory to have a minimum score of 4 out of 10 in each of these parts.

**Specifications for the resit/retake exam:**

Same criteria applied for the ordinary call.

**Specifications for the second resit / retake exam:**

Same criteria applied for the ordinary call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	10
Progress test [PRESENCIAL][Assessment tests]	3
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	2
Global activity	
Activities	hours
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	10
Class Attendance (theory) [PRESENCIAL][Lectures]	30
Progress test [PRESENCIAL][Assessment tests]	3
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	2
<b>Total horas: 150</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Nilsson, James William	Electric Circuits	Pearson Prentice Hall		978-0133760033	2014	
Johnson, David E.	Electric Circuit Analysis	Wiley		978-0132524797	1997	
A. J. Conejo, A. Clamagirand, J.L. Polo, N. Alguacil	Circuitos eléctricos para la ingeniería	McGraw-Hill		9788448141790	2004	