

**1. General information****Course:** ELECTRICAL TECHNOLOGY**Type:** CORE COURSE**Degree:** 417 - UNDERGRAD. IN INDUSTRIAL ELECTRONICS AND AUTOMAT. ENGINEERING**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:** 2022-23**Group(s):** 20 21**Duration:** First semester**Second language:****English Friendly:** Y**Bilingual:** N**Lecturer:** NATALIA ALGUACIL CONDE - Group(s): 20 21

Building/Office	Department	Phone number	Email	Office hours
Edificio Politécnico 2-D05	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	Vía Teams	Natalia.Alguacil@uclm.es	Flexible upon request via email, indicating student's availability.

**Lecturer:** GREGORIO MUÑOZ DELGADO - Group(s): 20 21

Building/Office	Department	Phone number	Email	Office hours
Edificio Politécnico 2-D06	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	Vía Teams	Gregorio.Munoz@uclm.es	

**2. Pre-Requisites**

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

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

Tecnología Eléctrica course contributes to the acquisition of the specific competence related to the knowledge and use of the basic principles of circuit theory and electric 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**

Knowledge of the general principles of electrical machines.

Knowledge and characterisation of the components of electrical circuits.

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.

**6. Units / Contents****Unit 1: Introduction. Fundamentals.****Unit 2: Components of electric circuits.****Unit 3: Steady state circuit analysis. Analysis methods and theorems.**

Unit 4: AC steady state circuits. Power and energy.

Unit 5: Three-phase circuits. Power and energy.

Unit 6: Magnetically coupled circuits.

Unit 7: Fundamentals of electric machines.

Unit 8: Application to 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]	Combination of methods	CB04 CB05 CEC04 CG03 CG04	1.2	30	N	-	Combination of methods: expository method, master lesson, problem resolution and group tutoring.
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CB04 CB05 CEC04 CG03 CG04 CT03	0.4	10	N	-	Solving drill exercises and problems in the blackboard.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB02 CB03 CB04 CB05 CEC04 CG03 CG04 CG06 CT03	0.6	15	Y	Y	After each lab session, the student must fill out a form in Campus Virtual indicating the measurements made in the laboratory, as well as the required calculations.
Formative Assessment [ON-SITE]	Assessment tests	CB02 CB03 CB04 CB05 CEC04 CG03 CG04 CG06 CT03	0.2	5	Y	Y	In the continuous evaluation mode, two partial exams will take place once the explanations are finished. Additionally, after the explanation of each topic, a set of drill exercises will be proposed to be solved, being automatically evaluated. In the non-continuous evaluation mode, a final exam will take place covering all the course' contents. Additionally, an online quizz will be proposed with exercises to be solved the day before the ordinary call.
Study and Exam Preparation [OFF-SITE]	Self-study	CB02 CB03 CB04 CB05 CEC04 CG03 CG04 CG06 CT02 CT03	3.6	90	N	-	Group study and/or self-study.
<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
Mid-term tests	70.00%	0.00%	<p>Continuous: Two midterm exams will take place throughout the course. The first exam corresponds to units 1 to 3 with a weight of 21% and the second one corresponds to the rest of the contents with a weight of 49%.</p> <p>Approximately, in the middle of the course the first exam will take place. If the score obtained is less than 4 out of 10, this exam can be retaken later in the ordinary call, which it will also include the exam corresponding to the rest of the contents.</p> <p>To pass the course it is necessary to obtain a minimum score of 4 out of 10 in each of these exams.</p> <p>Non-continuous: non-applicable.</p>
Laboratory sessions	15.00%	15.00%	<p>Continuous: The students should submit a 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 measurements and the calculated magnitudes as well as the exactness of the calculus. The report will be made on an individual basis and will consist of completing a questionnaire in Campus Virtual before deadlines. The reports' assessment will be posted within 1 month after its submission (the automatic rating posted by Campus Virtual is invalid).</p> <p>Non-continuous: There will be an exam corresponding to lab sessions. In the lab, the student should make different circuit connections and take the corresponding measurements.</p>
			Continuous: Non-applicable.

Final test	0.00%	70.00%	Non-continuous: The final exam may include problems and questions about theoretical or lab concepts. The assessment will not only consider the correctness of the explanations but also the results' consistency.
Assessment of problem solving and/or case studies	15.00%	15.00%	Continuous: The students should upload the solution of selected problems to an online application before deadlines. Non-continuous: The students should answer a online quizz posted in Campus Virtual before the final test.
<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 attend to all laboratory sessions as well as to send the reports after each laboratory session within the deadline.

##### Non-continuous evaluation:

This assesment include three parts that cover all the competences of the course:

1. A final exam with 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 15% of the final mark.
3. An online quizz available in Campus Virtual. This part represents 15% of the final mark.

To pass the course it is compulsory to have a minimum score of 4 out of 10 in the final exam.

#### 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][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
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	10
Formative Assessment [PRESENCIAL][Assessment tests]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Class Attendance (theory) [PRESENCIAL][Combination of methods]	30
<b>Total horas: 150</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
J. Fraile	Circuitos Eléctricos	Ibergarceta Publicaciones S.L.		9788416228478	2019	
A.J. Conejo, A. Clamagirand, J.L. Polo, N. Alguacil	Circuitos Eléctricos para la Ingeniería	McGraw-Hill		9788448141790	2004	
D.E. Johnson	Electric Circuit Analysis	Wiley		9780132524797	1997	
J.M. Nilsson	Electric Circuits	Pearson Prentice Hall		9780133760033	2014	
A.B. Carlson	Teoría de Circuitos	Ediciones Paraninfo, S.A.		9788497320665	2004	
J. Fraile	Máquinas Eléctricas	Garceta Grupo Editorial		9788416228669	2016	