

**1. General information****Course:** ELECTRICAL TECHNOLOGY**Type:** CORE COURSE**Degree:** 359 - UNDERGRAD. IN INDUSTRIAL ELECTRONICS AND AUTOMAT. 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:** 2020-21**Group(s):** 20 21**Duration:** First semester**Second language:** English**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	Online tutoring via Teams is the most preferred option. An email to Natalia.Alguacil@uclm.es should be sent in advance to ask for availability

Lecturer: RAUL FERNANDEZ RODRIGUEZ - Group(s): 20 21

Building/Office	Department	Phone number	Email	Office hours
	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES		Raul.Fernandez@uclm.es	

2. Pre-Requisites

Algebra, Calculus I, Calculus II, Physics and Advanced Mathematics courses in the Electrical 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 Electronic Engineering profession.

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

Code	Description
A01	To understand and have knowledge in an area of study that moves on from the general education attained at secondary level and usually found at a level that, while supported in advanced text books, also includes some aspects that include knowledge found at the cutting edge of the field of study.
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.
A07	Knowledge of Information Technology and Communication (ITC).
A08	Appropriate level of oral and written communication.
A12	Knowledge of basic materials and technologies that assist the learning of new methods and theories and enable versatility to adapt to new situations.
A13	Ability to take the initiative to solve problems, take decisions, creativity, critical reasoning and ability to communicate and transmit knowledge, skills and abilities in Industrial Electronic Engineering and Automation.
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.

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

Description

Application in electrical installations

Know and know how to analyze magnetically coupled circuits
 Know and know how to use the procedures employed for the analysis of circuits in sinusoidal regime
 Knowledge of the general principles of electrical machinery
 Knowledge and characterisation of the components of electrical circuits

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 7: Three-phase circuits

Unit 8: Magnetically-coupled circuits

Unit 9: Basic principles of electric machines

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	A12 A15 C04	1	25	N	-	
Individual tutoring sessions [ON-SITE]	Project/Problem Based Learning (PBL)	A04 A12 A15 C04	0.4	10	N	-	
Final test [ON-SITE]	Assessment tests	A04 A12 A15 C04	0.1	2.5	Y	Y	
Problem solving and/or case studies [ON-SITE]	Cooperative / Collaborative Learning	A12 A15 C04	0.85	21.25	N	-	
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	A04 C04	0.72	18	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	A12 A15 C04	2.88	72	N	-	
Progress test [ON-SITE]	Project/Problem Based Learning (PBL)	A04 A12 A15 C04	0.05	1.25	Y	Y	
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
Final test	70.00%	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	15.00%	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.
Progress Tests	15.00%	0.00%	
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:

To pass the course it is compulsory to have a minimum score of 5 out of 10 in the final exam.

Non-continuous evaluation:

Evaluation criteria not defined

Specifications for the resit/retake exam:

To pass the course it is compulsory to have a minimum score of 5 out of 10 in the final exam. The weight of the final mark is 85% final exam and 15% lab assignments. For those students who have previously passed the lab evaluation, the final mark is 100% final exam.

Specifications for the second resit / retake exam:

To pass the course it is compulsory to have a minimum score of 5 out of 10 in the final exam. The final mark is the mark of this exam.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Individual tutoring sessions [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Final test [PRESENCIAL][Assessment tests]	2.5
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	18
Study and Exam Preparation [AUTÓNOMA][Self-study]	72
Progress test [PRESENCIAL][Project/Problem Based Learning (PBL)]	1.25
Unit 1 (de 9): Basic laws and concepts	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	1
Unit 2 (de 9): Components	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Unit 3 (de 9): Resistive circuits	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Unit 4 (de 9): Analysis methods	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2.75
Unit 5 (de 9): Basic theorems and principles	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	3
Unit 6 (de 9): AC steady-state analysis	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	3
Unit 7 (de 9): Three-phase circuits	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	4
Unit 8 (de 9): Magnetically-coupled circuits	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2.5
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	3.5
Unit 9 (de 9): Basic principles of electric machines	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	.5
Global activity	
Activities	hours
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	21.25
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	18
Study and Exam Preparation [AUTÓNOMA][Self-study]	72
Class Attendance (theory) [PRESENCIAL][Lectures]	25
Individual tutoring sessions [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Final test [PRESENCIAL][Assessment tests]	2.5
Progress test [PRESENCIAL][Project/Problem Based Learning (PBL)]	1.25
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Johnson, David E.	Electric Circuit Analysis	Wiley		978-0132524797	1997	
Nilsson, James William	Electric Circuits	Pearson Prentice Hall		978-0133760033	2014	