UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: COMPONENTS AND CIRCUITS
Code: 59604
Type: BASIC
ECTS credits: 6
Degree: 385 - DEGREE IN TELECOMMUNICATI TECHNOLOGY ENGINEERING
Academic year: 2022-23
Center: 308 - SCHOOL POLYTECHNIC OF CUENCA
Group(s): 30
Year: 1
Duration: First semester
Main language: Spanish
Second language:
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **RAQUEL CERVIGON ABAD** - Group(s): **30**

Building/Office	Department	Phone number	Email	Office hours
E. Politécnica Cuenca (0.05)	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	926054049	raquel.cervigon@uclm.es	The tutoring timetable will be posted at the beginning of each term.

Lecturer: **ESTEFANIA PRIOR CANO** - Group(s): **30**

Building/Office	Department	Phone number	Email	Office hours
2.11	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES		Estefania.PriorCano@uclm.es	The tutoring timetable will be posted at the beginning of each term.

2. Pre-Requisites

There are no specified enrollment restrictions with other subjects of the curriculum. We recommended study Mathematics Fundamentals I and II and Fundamentals of Physics subjects.

In particular, it is necessary to master the contents related to trigonometry, algebra, complex numbers, calculus, electric and magnetic fields, etc.

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

This subject is the first one that develops the subject of Electronics, one of the professional branches of Telecommunication Engineering. It establishes the fundamentals of circuit analysis and provides the basis for understanding how electronic and electrical circuits work, as well as the operating principles of the passive components found in them.

This subject is essential to study the rest of subjects belonging to the subjects of Fundamentals of Electronics and Electronics and for the optional subjects: "Electronic Technology", "Audiovisual Equipment in Electromedicine" and "Sensors and Wireless Sensor Networks".

4. Degree competences achieved in this course

Course competences

Code	Description
E04	Understanding and mastering the basic concepts of linear systems and related functions and transformations, electrical circuit theory, electronic circuits, physical principle of semiconductors and logic families, electronic and photonic devices, materials technology and their application for solving engineering related problems.
G02	Correct, oral and written, communication skills.
G06	Knowledge of basic subjects and technologies, enabling students to learn new methods and technologies, as well as providing great versatility to adapt to new situations
G12	The ability to work in a multidisciplinary group and in a multilingual environment and to communicate, both in writing and orally, knowledge, procedures, results and ideas related to telecommunications and electronics
G13	The ability to look for and understand information, wether technical or commercial in different sources, to relate and structure it to integrate ideas and knowledge. Analysis, synthesis and implementation of ideas and knowledge.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Identification of components, typical parameters and electrical behaviors in electronic systems.

Simulation of electrical behaviors through computer packages as an approximation to the real operating model.

Correct use of oral and written expression to convey ideas, technologies, results, etc.

Use of ICT to achieve the specific objectives set in the subject.

Design of simple electronic circuits.

Obtaining relevant information of electronic devices through the manufacturer data sheets.

Problem solving by applying the fundamental theorems.

Identification of the components of a basic electrical circuit: independent and dependent sources on voltage and current, resistive elements (fixed and variable resistors) and energy storage elements (capacitors, coils and transformers).

Choice of the most suitable strategy to solve a certain circuit.
Experimental verification of the basic electronic components behavior, as well as power or energy calculation in these components.
Analysis of linear circuits from systematic methods (knots, meshes, superposition, transformation of sources) derived from the Kirchhoff's laws.
Comprehension of technical documentation and mastery of specific vocabulary.
Understanding the use of basic electronic instrumentation to check the performance of different devices.

6. Units / Contents

Unit 1: Foundations. Elements of the circuits.
- **Unit 1.1** Basic and fundamental concepts of circuits.
- **Unit 1.2** Elements of the circuits.
- **Unit 1.3** Identification of Electronic Components.

Unit 2: Circuit analysis methods.
- **Unit 2.1** Fundamental methods of circuit analysis
- **Unit 2.2** Measurements of voltages and currents in direct current

Unit 3: Network Theorems in Electrical Engineering.
- **Unit 3.1** Circuits Theorems
- **Unit 3.2** Practice 3: Theorems of Electrical Circuits

Unit 4: Sinusoidal Steady & State Analysis.
- **Unit 4.1** Alternating Current Circuits Analysis
- **Unit 4.2** Practice 4: Alternating Current Analysis

Unit 5: Circuit Analysis Techniques in the Frequency Domain.
- **Unit 5.1** Frequency response. Passive filters.
- **Unit 5.2** Resonant circuits
- **Unit 5.3** Practice 5: Passive Filters & Resonant Circuits

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	E04 G02 G06	0.99	24.75	N	-	Theoretical lectures and/or guided activities.
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	E04	0.37	9.25	Y	N	During the lessons, problems will be solved. In addition, students will have to carry out exercises and/or directed activities. The recovery of this activity will be carried out within the final theory test considered in the extraordinary exam.
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	E04 G02 G06 G12 G13	0.76	19	Y	N	The students will carry on practical work according to the provided instructions. Their work will be monitored in-situ and may modulate the marks obtained in the practical part. This activity cannot be recovered.
Practicum and practical activities report writing or preparation [OFF-SITE]	Group Work	E04 G02 G06 G12 G13	0.8	20	Y	Y	The students should hand out a report of each practical activity according to the conditions provided and even including additonal files of results and configurations. In some cases, an oral defense of the work could be demanded. The recovery of this activity in the extraordinary exam will be carried out by means of a test and the performance and defence of a final practice. Plagiarism or copying will be punished with a mark of 0 point to all the people involved.
Other off-site activity [OFF-SITE]	Assessment tests	E04 G02 G06 G12 G13	0.2	5	Y	N	Self-study and test evaluation to prepare theoretical concepts. These activities can be recovered in the extraordinary call.
Study and Exam Preparation [OFF-SITE]	Self-study	E04 G02 G06 G12 G13	2.6	65	N	-	Self-study.
Project or Topic Presentations [ON-SITE]	Problem solving and exercises	E04 G02 G06 G12 G13	0.1	2.5	Y	N	The problems carried out autonomously by the student will be presented. This activity could be retaken in the fixed session of the extraordinary call.
Final test [ON-SITE]	Assessment tests	E04 G02 G06 G12 G13	0.14	3.5	Y	Y	Final exam including theory and problems. This could be recovered in the fixed session of the extraordinary call.
Individual tutoring sessions [ON-SITE]	Other Methodologies	E04 G02 G06 G12 G13	0.04	1	N	-	Personal attention to the students.

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	35.00%	35.00%	Assessment of the reports submitted for hands-on experiments.
Test	50.00%	65.00%	A final exam assessing all theory concepts
Assessment of problem solving and/or case studies	10.00%	0.00%	In-class activities
Self Evaluation and Co-evaluation	5.00%	0.00%	Test assessment.
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:

All proposed laboratory practices will have to be submitted. No minimum grade will be required in any practice, but the average grade of all of them will have to be equal or higher than 4 points (out of 10). The course will be passed when the final score obtained should be igual or superior to 5 points (out of 10).

The student who passes the laboratory practices (equal or higher than 5 points) will keep the grade during the following course, unless, voluntarily, he decides to repeat it. In case of not passing the course in the next course, the student will have to do the laboratory practices again.

Non-continuous evaluation:

By default, all students take continuous assessment. If a student cannot or does not want to take the continuous assessment, he/she must inform the lecturer in order to change to non-continuous assessment. This change must be made as soon as possible and never after having taken 50% or more of the continuous assessment tests, at which point this change can no longer be made. Likewise, this change cannot be made after the end of the class period.
All proposed laboratory practices must be submitted. No minimum grade will be required for any practice, but the average grade of all of them will have to be equal or higher than 4 points (out of 10).

Specifications for the resit/retake exam:

- The theory exam will be held on the date set by the head of studies and will have a weight of 65% in the final grade.
- The laboratory practices will be recovered through the assessment of a single final practice that will take place on the date indicated by the head of studies. It will have a weight of 35% in the final note.

In order to pass the course, students will have to satisfy the following three conditions:
- They must submit the proposed practice and take the laboratory exam. In each of these two activities a minimum mark of 4 points (out of 10) will be required.
- A score equal or higher than 4 (out of 10) will be required in the theory exam.
- An average mark of more than 5 (out of 10) is required for all assessment activities.

The same requirements apply as in the ordinary exams, regarding the repetition of the laboratory practices in subsequent years.

Specifications for the second resit / retake exam:

If the student has passed the lab in the immediately preceding course, he/she will only have to take the theory exam. If not, the student will have to take two exams, one of theory and another of laboratory, on the date fixed by the sub-direction of studies. In both cases, the theory exam will have a weight of 65% and the laboratory exam of 35%. In order to pass each part, at least a score of 4 points (out of 10) will be required, with a final score equal or higher than 5 points (out of 10) being necessary to pass.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	20
Other off-site activity [AUTÓNOMA][Assessment tests]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	65
Project or Topic Presentations [PRESENCIAL][Problem solving and exercises]	2.5
Final test [PRESENCIAL][Assessment tests]	3.5
Individual tutoring sessions [PRESENCIAL][Other Methodologies]	1

General comments about the planning: Units will be taught consecutively along the real calendar of the term in which the course is placed. The planning of the course could slightly change to be adapted to the appropriate progress of the class. During the beginning of the term, the weekly planning will be published in virtual campus.

Unit 1 (de 5): Foundations. Elements of the circuits.

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	3

Unit 2 (de 5): Circuit analysis methods.

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	3

Unit 3 (de 5): Network Theorems in Electrical Engineering.

Activities	Hours

Class Attendance (theory) [PRESENCIAL][Lectures]	4.75
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.25
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	3
Unit 4 (de 5): Sinusoidal Steady & State Analysis.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	7.25
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.25
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Unit 5 (de 5): Circuit Analysis Techniques in the Frequency Domain.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2.75
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1.25
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	6
Global activity	
Activities	**hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	19
Study and Exam Preparation [AUTÓNOMA][Self-study]	65
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	20
Other off-site activity [AUTÓNOMA][Assessment tests]	5
Project or Topic Presentations [PRESENCIAL][Problem solving and exercises]	2.5
Class Attendance (theory) [PRESENCIAL][Lectures]	24.75
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	9.25
Individual tutoring sessions [PRESENCIAL][Other Methodologies]	1
Final test [PRESENCIAL][Assessment tests]	3.5
	Total horas: 150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Alexander, Charles K.	Fundamentos de circuitos eléctricos	McGraw-Hill		978-970-10-5606-6	2006	
Carlson, A. Bruce	Teoría de circuitos : ingeniería, conceptos y análisis de ci	Thomson		978-84-9732-066-5	2004	
Cervigón Raquel & Sánchez César	Electronic Components and Circuits Lab	Ediciones Universidad de Castilla-La Mancha		978-84-6957-355-6	2013	
Dorf, Richard C.	Introduction to electric circuits	John Wiley & Sons		0-471-38689-8	2006	
Hayt, William H., Jr.	Análisis de circuitos en ingeniería	McGraw-Hill		978-970-10-6107-7	2007	
López Ferreras, Francisco	Análisis de circuitos lineales	Ciencia 3		84-86204-63-1 (T.II)	1994	
Nilsson, James W. & Riedel Susan A.	Circuitos electricos	Pearson/ Prentice Hall		84-205-4458-2	2012	
Sánchez Barrios, Paulino	Teoría de circuitos : problemas y pruebas objetivas orientados al aprendizaje	Pearson / Prentice Hall		978-84-8322-387-1	2007	