UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: ELECTRONIC TECHNOLOGY
Code: 59668
Type: ELECTIVE
ECTS credits: 6
Degree: 385 - DEGREE IN TELECOMMUNICATI TECHNOLOGY ENGINEERING
Academic year: 2021-22
Center: 308 - SCHOOL POLYTECHNIC OF CUENCA
Group(s): 30
Year: 4
Duration: First semester
Main language: Spanish
Second language:
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **ROBERTO ZANGRONIZ CANTABRANA** - Group(s): **30**

Building/Office	Department	Phone number	Email	Office hours
E. Politécnica Cuenca (0.03)	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	926054061	roberto.zangroniz@uclm.es	Office hours will be posted on the bulletin board

2. Pre-Requisites

It is recommended that students have previously followed and passed the courses "Components and Circuits", "Electronics Devices", "Electronics I", "Electronics II", and "Digital Electronics Systems".
More precisely, students are required to undersand and handle basic concepts about electronics components, analysis and design of electronics circuits, power conversion, and digital electronics systems

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

This elective course, taught in the penultimate semester of the degree program, aims to integrate the knowledge acquired in the areas of electronics and projects. For this purpose, those knowledge will be applied to a guided design project of a Printed Circuit Board.

Throughout the course, basic knowledg acquired in the subjects "Electronic Devices", "Electronics I", and "Digital Electronics Systems" will be applied more directly.

Customized design of printed circuit boards and their manufacturing process, as well as a basic knowledge of electronic technology, open a wide range of professional opportunities in the field of engineering

4. Degree competences achieved in this course

Course competences

Code	Description
E07	The ability to use communication and computer applications (office automation, databases, advanced calculation, project management, visualisation, etc.) to support the development and operation of telecommunication and electronic networks, services and applications.
E08	The ability to use computer tools to search for bibliographic resources or for information related to telecommunications and electronics.
E28	The ability to analyse components and its specifications for guided and non-guided communications systems.
G01	Knowledge of Information and Communication Technologies (ICT).
G03	Ethical commitment and professional ethics.
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
Analysis, synthesis and compression of technical documentation and mastery of specific vocabulary.
Acquisition of knowledge and skills in the use of computer tools that provide the student a greater operational capacity of the acquired knowledge.
Application of current and emerging technologies in real situations within the telecommunication field.
Identification and understanding of emerging technologies within the ICT field, such as electronic technology, biometrics, etc.
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.

6. Units / Contents

Unit 1: Printed circuit technology and design overview

Unit 1.1 Printed Circuit Boards (PCB)

Unit 1.2 PCB Manufacture
Unit 1.3 Non-ideal components
Unit 2: Computer aided printed circuit design
Unit 2.1 Design tools
Unit 2.2 Circuit schematic
Unit 3: Design rules and techniques
Unit 3.1 Layers and rules
Unit 3.2 Placement and layout
Unit 4: Post-processing and industrial standards
Unit 4.1 Design for manufacturing
Unit 4.2 Circuit verification
Unit 5: [LAB]
Unit 5.1 Components
Unit 5.2 Schematic
Unit 5.3 Layout
Unit 6: [PROJECT]
Unit 6.1 Design (and manufacture)

ADDITIONAL COMMENTS, REMARKS

Hardware and software tools, available in the electronics laboratory, will be used

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	E28 G01	0.95	23.75	N	-	Teaching of theoretical content
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	E07 E08 E28 G13	0.45	11.25	N	-	Solving of examples and exercises
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	E07 E08 E28 G01 G03 G06 G12 G13	0.8	20	N	-	Conducting of lab sessions
Writing of reports or projects [OFF-SITE]	Problem solving and exercises	E07 E08 E28 G01 G03 G06 G12 G13	1.6	40	N	-	Study and preparation of homework activities
Study and Exam Preparation [OFF-SITE]	Practical or hands-on activities	E07 E08 E28 G01 G03 G06 G12 G13	1	25	N	-	Study and preparation of lab activities
Study and Exam Preparation [OFF-SITE]	project-based learning	E07 E08 E28 G01 G03 G06 G12 G13	1	25	N	-	Study and preparation of a project
Other on-site activities [ON-SITE]	Assessment tests	E07 E08 E28 G01 G03 G06 G12 G13	0.07	1.75	Y	Y	For each lab activity, oral defense of the solution achieved, and submission of the implementation developed. Each activity can be individually recovered in the above indicated manner. A final examination may be required
Other on-site activities [ON-SITE]	Assessment tests	E07 E08 E28 G01 G03 G06 G12 G13	0.02	0.5	Y	N	For each homework activity, oral defense of the solution achieved, and submission of the implementation developed. Each activity can be individually recovered in the above indicated manner
Other on-site activities [ON-SITE]	Assessment tests	E07 E08 E28 G01 G03 G06 G12 G13	0.02	0.5	Y	Y	Oral defense of the carried-out project, and submission of the implementation developed. This activity can be recovered in the above indicated manner
Individual tutoring sessions [ON-SITE]		E07 E08 E28 G01 G03 G06 G12 G13	0.09	2.25	N	-	Resolution of questions and review of marks
		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
Test	60.00%	60.00%	Lab. The work developed, the defense of the solution achieved, and the time spent will be considered
Test	40.00%	40.00%	Project (and homework). The work developed, its complexity, and the defense of the solution achieved will be considered
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 mandatory to submit and defense all lab activities and obtain a grade higher than 4 points (out of 10) in each compulsory activity. In any case, the final grade must be equal or higher than 5 points (out of 10).
In the case of failing the course, the average mark on the laboratory activities (if it is equal or higher than 5 points) will be maintained for the next offering, unless the student voluntarily decides to retake this set of activities

Non-continuous evaluation:

To pass the course, it is mandatory to submit and defense all lab activities and obtain a grade higher than 4 points (out of 10) in each compulsory activity. In any case, the final grade must be equal or higher than 5 points (out of 10).
In the case of failing the course, the average mark on the laboratory activities (if it is equal or higher than 5 points) will be maintained for the next offering, unless the student voluntarily decides to retake this set of activities

Specifications for the resit/retake exam:

Students will be able to recover the assessable activities

Specifications for the second resit / retake exam:

Students will be able to recover the assessable activities by means of an exam on the date set by the management of the Centre

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	**hours**
Writing of reports or projects [AUTÓNOMA][Problem solving and exercises]	40
Writing of reports or projects [AUTÓNOMA][Problem solving and exercises]	40
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	25
Study and Exam Preparation [AUTÓNOMA][project-based learning]	25
Other on-site activities [PRESENCIAL][Assessment tests]	1.75
Other on-site activities [PRESENCIAL][Assessment tests]	25
Other on-site activities [PRESENCIAL][Assessment tests]	.5
Other on-site activities [PRESENCIAL][Assessment tests]	.5
Individual tutoring sessions [PRESENCIAL][]	2.25

General comments about the planning: The topics will be taught consecutively adapting to the actual calendar that is held in the semester in which the course is located. Planning can be adapted depending on the development of the course

Unit 1 (de 6): Printed circuit technology and design overview

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	7.75
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4.5

Unit 2 (de 6): Computer aided printed circuit design

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4.5

Unit 3 (de 6): Design rules and techniques

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	3.75
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	5

Unit 4 (de 6): Post-processing and industrial standards

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	6

Global activity

Activities	**hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	23.75
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	11.25
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	20
Writing of reports or projects [AUTÓNOMA][Problem solving and exercises]	40
Other on-site activities [PRESENCIAL][Assessment tests]	1.75
Individual tutoring sessions [PRESENCIAL][]	2.25
Other on-site activities [PRESENCIAL][Assessment tests]	0.5
Study and Exam Preparation [AUTÓNOMA][project-based learning]	25
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	25
Other on-site activities [PRESENCIAL][Assessment tests]	0.5
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
	Printed circuit board designer's					

Chris Robertson	referente	Prentice Hall	978-0130674814	2003
Clyde F. Coombs	Printed circuits handbook	McGraw-Hill	978-0071467346	2007