SUBJECT TEACHING GUIDE

G830 - Power Supply and Electronic Systems

Degree in Telecommunication Technologies Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	Optional. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Applied Electronics				
Course unit title and code	G830 - Power Supply and Electronic Systems				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web	https://moodle.unican.es/course/view.php?id=6197				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA
Name of lecturer	PABLO PEDRO SANCHEZ ESPESO
E-mail	pablo.sanchez@unican.es
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO PROFESOR (S3002)
Other lecturers	

3.1 LEARNING OUTCOMES
- To be able to design PCBs that comply basic EMC/EMI and signal integrity requirements.
- The participant will know and be able to apply basic noise reduction techniques on PCBs (conducted emission).
- The participant will know and be able to apply electronics technologies to continuous-current power supplies and systems
- To know how to use power supply and PCB design and analysis tools

4. OBJECTIVES
To understand the fundamentals and basic topologies of switching power converters
Participant acquires fundamentals of EMC/EMI (conducted emission).
Participant will be able to design digital PCB that complies basic EMC and signal integrity requirements.
Participants will learn how to use PCB design tools and equipment for noise/inference measurement.

6. COURSE ORGANIZATION	
CONTENTS	
1	PCB fundamentals. Noise and interferences. Basic concepts of EMC/EMI. Conducted emission.
2	Power supply: fundamentals
3	CC/CC power converter.
4	Switching power supply: Analysis
5	Integrated switching power supply. Basic techniques. Noise reduction techniques. Filters.
6	Low power design: basic techniques. Power-supply influence on low power design.
7	Batteries: types, chargers, security.
8	Modeling of digital system noise.
9	High-speed digital systems. Differential signals. Terminators.
10	PCB Design-Assistant frameworks. PCB design guides
11	Crosstalk
12	Ground plane design. Decoupling capacitors.
13	Noise reduction techniques. Shield.
14	ESD protection.
15	Noise evaluation techniques

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Continuous evaluation	Activity evaluation with Virtual Media	No	Yes	20,00
Lab exercises	Laboratory evaluation	No	Yes	30,00
Final exam	Written exam	Yes	Yes	50,00
TOTAL				100,00

Observations

If a student cannot participate in a continuous evaluation exercise or the exercise grade is less than the final exam grade the continuous evaluation exercise will not be taken into account and its grade percentage will be added to the final exam percentage.

Observations for part-time students

It is possible to pass the course if the participant passes the final exam and the labs.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Clayton, “Introduction to electromagnetic compatibility”, Second Edition, Wiley.
Mark I. Montrose; “EMC Made Simple ”, Montrose Compliance Services. 2014.
B. Erickson, D. Maksimovic. “Fundamentals of Power ELectronics”. Second Edition. Kluwer.
Bogatin,”Signal Integrity-simplified”. Prentice Hall. 2004.