

230673 - EMC - Emc in Electronic Design

Coordinating unit:	230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit:	710 - EEL - Department of Electronic Engineering
Academic year:	2017
Degree:	DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 1992). (Teaching unit Optional) DEGREE IN ELECTRONIC ENGINEERING (Syllabus 1992). (Teaching unit Optional) MASTER'S DEGREE IN ELECTRONIC ENGINEERING (Syllabus 2013). (Teaching unit Optional) MASTER'S DEGREE IN INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Teaching unit Optional) MASTER'S DEGREE IN ELECTRONIC ENGINEERING (Syllabus 2009). (Teaching unit Optional) ERASMUS MUNDUS MASTER'S DEGREE IN PHOTONICS ENGINEERING, NANOPHOTONICS AND BIOPHOTONICS (Syllabus 2010). (Teaching unit Optional)
ECTS credits:	5
Teaching languages:	English

Teaching staff

Coordinator:	Silva Martínez, Ferran
Others:	Silva Martínez, Ferran Pous Sola, Marc

Degree competences to which the subject contributes

Transversal:

1. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
2. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Teaching methodology

- Laboratory practical work
- Short answer test (Control)
- Short answer test (Final Exam)
- Extended answer test (Final Exam)

Learning objectives of the subject

Learning objectives of the subject:

The aim of this course is to train students in including electromagnetic compatibility issues to consider the design of electronic products. First we consider the mandatory international standards and tests. Then, they will study specific electronic design technique to fulfil these requirements.

Learning results of the subject:

- Ability to understand and apply EMC international standards.
- Ability to perform radiated and conducted tests, including ESD, to evaluate electronic designs emissions and immunity.
- Ability to apply specific electronic design techniques to reduce conducted and radiated interferences.
- Ability to apply specific electronic design techniques to improve conducted and radiated immunity.
- Ability to understand and apply international Electromagnetic Compatibility (EMC) standards with special focus in



230673 - EMC - Emc in Electronic Design

European Directives.

- Ability to plan and perform conducted and radiated EMC tests.
- Ability to design electronic circuits and products taken into account their electromagnetic emission and immunity.

Study load

Total learning time: 125h	Hours large group:	13h	10.40%
	Hours medium group:	0h	0.00%
	Hours small group:	26h	20.80%
	Guided activities:	0h	0.00%
	Self study:	86h	68.80%

230673 - EMC - Emc in Electronic Design

Content

<p>Introduction to Electromagnetic Compatibility (EMC)</p>	<p>Learning time: 8h Laboratory classes: 2h Self study : 6h</p>
<p>Description: EMC Basics Concepts</p>	
<p>Radiated interferences</p>	<p>Learning time: 36h Theory classes: 4h Laboratory classes: 8h Self study : 24h</p>
<p>Description: - Emission sources and radiating elements - Coupling on cables and PCB - Shielding</p>	
<p>Conducted interferences</p>	<p>Learning time: 19h Theory classes: 2h Laboratory classes: 4h Self study : 13h</p>
<p>Description: - Filtering - Transient suppression</p>	
<p>Transients</p>	<p>Learning time: 19h Theory classes: 2h Laboratory classes: 4h Self study : 13h</p>
<p>Description: Burst, Surge, ESD Protections</p>	

230673 - EMC - Emc in Electronic Design

PCB design	Learning time: 19h Theory classes: 2h Laboratory classes: 4h Self study : 13h
Description: Layout design	
EMC standards	Learning time: 19h Theory classes: 2h Laboratory classes: 4h Self study : 13h
Description: European and International Standards	
Numerical Simulation Techniques	Learning time: 5h Theory classes: 1h Self study : 4h
Description: FDTD	

230673 - EMC - Emc in Electronic Design

Planning of activities

Laboratory	Hours: 26h Laboratory classes: 26h
Description: - EMC measurements - EMC electronic design techniques	
SHORT ANSWER TEST (CONTROL)	Hours: 1h Laboratory classes: 1h
Description: Mid term control.	
EXTENDED ANSWER TEST (FINAL EXAMINATION):	Hours: 2h Theory classes: 2h
Description: Final examination with theoretical questions and short exercises.	

Qualification system

Laboratory assessments: 20%
Partial examinations and controls: 30%
Final examination: 50%

Bibliography

Basic:

Williams, T.. EMC for product designers [on line]. 4th ed. Oxford ; Boston: Newnes, 2007 [Consultation: 26/07/2013]. Available on: <<http://www.sciencedirect.com/science/book/9780750681704>>. ISBN 0750681705.

Complementary:

Paul, C.R. Introduction to electromagnetic compatibility. 2nd ed. New York: John Wiley and Sons, 2006. ISBN 0471755001.

Balcells, J. [et al.]. Interferencias electromagnéticas en sistemas electrónicos. Barcelona: Marcombo, 1991. ISBN 8426708412.

Others resources:

IEE videos series (5 modules, 13 videos) 1995.