

67225 - Electromagnetic Compatibility and Electrical Safety

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	527 - Master's in Electronic Engineering
ECTS	5.0
Course	1
Period	First semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The course involves three main levels: lectures, practical cases, and laboratory exercises, with increasing student participation.

In lectures, the theoretical basis of the subject will be explained.

In classes of problems (practical cases), representative design problems are presented involving students in their analysis and solution.

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Laboratory work with representative scenarios of EMI/EMC/SE will be addressed during the course.

5.2.Learning activities

Classroom activities (1.96 ECTS, 49 hours):

A01 Lectures (20 hours)

In this activity the fundamental contents of the course will be presented and a set of representative problems will be solved. This activity will take place in the classroom. The materials used in the lectures will be available to students at the beginning of the course.

A02 Troubleshooting and cases (10 hours):

In this activity, a set of representative problems will be solved. This activity will take place in the classroom.

A03 Labs (15 hours)

Lab exercises are structured in 5 sessions of 3 hours each. Description of the practices will be available to students at the beginning of the course. Usually, one or two visits to specialized laboratories working in EMI/EMC and safety are scheduled during the course.

A06 Guided work (2 hours)

A08 Evaluation tests (2 hours)

Autonomous work (3.04 ECTS, 76 hours):

A06 Course work (20 hours)

Students (alone or in groups of two people) must solve a problem related with the contents of the course. Practical orientation is encouraged.

A07 Study (56 hours)

Time for personal study, exams preparation and tutoring

5.3.Program

DESIGN FOR EMI/EMC (75%). Fundamentals. EMI generation and coupling. Earth and ground system. EMI/EMC filtering. Design of printed circuits boards (PCBs) for EMI and Signal Integrity. Shielding. Cables. Transients and protection. EMI/EMC special techniques. Troubleshooting EMI/EMC problems. EMC tests.

ELECTRICAL SAFETY (25%). Electronic risks. Regulations. CE mark. Symbols. Isolation and high voltages. Materials.

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Fire and temperature risks. Creepage and clearance. Critical components. PCBs. Cables. Mechanical considerations. RF risks. Safety tests. Earthing. EMC and SAFETY.

5.4.Planning and scheduling

The calendar, schedules and rooms for any of the activities associated with this course will be made public in advance as required by current normative.

5.5.Bibliography and recommended resources

1. **Basic materials:** will be uploaded at the start of the academic year in <http://moodle2.unizar.es>

2. Reference bibliography:

- Henry W. Ott, Noise Reduction Techniques in Electronic Systems, Ed. John Wiley & Sons, 1988.
- Henry W. Ott, Electromagnetic Compatibility Engineering, Ed. John Wiley & Sons, 2009, ISBN-13: 978-0470189306.
- T. Williams, EMC: Control y Limitación de Energía Electromagnética, Ed. PARANINFO · 1997.
- T. Williams, EMC for Product Designers, Ed. Newnes, 2006, ISBN-13: 978-0750681704 .