Course guide
230682 - TFM MEE - Master's Thesis

Last modified: 06/05/2019

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: **Degree:** MASTER'S DEGREE IN ELECTRONIC ENGINEERING (Syllabus 2013). (Project subject).

Academic year: 2019 **ECTS Credits:** 30.0 **Languages:** English

LECTURER

Coordinating lecturer: Vice-Dean Head of Master Studies

Others: Academic staff holding a master degree or PhD and belonging to the ETSETB.

REQUIREMENTS

The Master's Thesis (TFM) must be the last enrolled subject, but it can be enrolled jointly with another subject.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CEE1. Ability to understand and apply the principles of operation of power electronic systems in regulation, undulation and amplification applications.
CEE2. Ability to understand and apply the principles of operation of the current control method and its application to battery charging, supply for LED lighting, power factor correction, and "Low Power supplies"
CEE3. Ability to apply state control techniques to the design of controllers for power electronic systems.
CEE4. Ability to design continuous and discrete time controllers for power electronic systems.
CEE5. Ability to conceive and design electronic circuits for signal amplification, for low and high (radio) frequencies, depending on the type of application and targeting specific consumption, noise, linearity, stability, impedance and bandwidth figures.
CEE6. Ability to design nonlinear electronic circuits for signal processing and synthesis, including frequency shifting, active filtering, oscillators and phase locked loops.
CEE7. Ability to design signal conversion circuits between the analog and digital domains, selecting the optimal approach depending on the specifications, resolution extension techniques and high speed conversion.
CEE8. Ability to deploy distributed instrumentation systems and advanced sensor networks including self-powered systems based on energy harvesting from the environment.
CEE9. Ability to design, implement and operate high performance laboratory electronic instrumentation, with emphasis on error analysis, calibration and virtual control.
CEE10. Ability to integrate instrumentation systems on mobile devices.
CEE11. Ability to evaluate the quality and safety of electronic products including reliability, physical testing, electrical safety and electromagnetic compatibility.
CEE12. Ability to use semiconductor devices taking into account their physical characteristics and limitations.
CEE13. Ability to analyze and evaluate the performance at the physical level of the main devices and sensors, the relations between magnitudes in their terminals and their equivalent circuits.
CEE14. Ability to establish a relationship between an electronic device and its fabrication technology, and to understand its design process.
CEE15. Ability to apply synchronization techniques and use standard buses considering electrical aspects and protocols.
CEE16. Ability to specify and develop embedded systems using RTOS.
CEE17. Ability to design digital systems based on multi-processors, configurable processors and FPGAs with HDL languages and CAE tools.
CEE18. Ability to design CMOS digital and analog integrated circuits of medium complexity.
CEE19. Ability to apply low-power techniques to integrated circuits (ICs).
CEE20. Ability to design for testability and test schemes for ICs.
CEE21. Ability to process continuous variable signals using digital techniques.
CEE22. Ability to characterize deterministic and random signals in time or space, and in the frequency domain.
CEE23. Ability to analyze, model, identify and simulate linear systems, especially digital filters and adaptive systems.

CEE24. Ability to identify and evaluate innovative ideas and products in the area of electronic technology.
CEE25. Ability for the development, direction, coordination, and technical and financial management of electronic focused ICT projects.
CEE26. Ability to identify funding sources and prepare innovative projects in the area of electronic companies.

Transversal:

CT1a. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding how companies are organised and the principles that govern their activity, and being able to understand employment regulations and the relationships between planning, industrial and commercial strategies, quality and profit.

CT2. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.

CT4. 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.

CT5. 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

Each student will be assigned a thesis advisor. The advisor and the student together prepare a working plan.
During the development of the thesis, they hold periodical meetings where the advisor advises the student on next steps to follow.
Most of the time the student works autonomously. At the end, the student prepares the technical report and performs the public presentation of the results.

LEARNING OBJECTIVES OF THE SUBJECT

The TFM has different objectives:
- Apply the acquired knowledge and scientific methodology to develop a technical project in the field of electronic engineering.
- Write a technical report.
- Publicly present and defend the outcome of the project.

CONTENTS

Specific contents of the TFM area of knowledge

Description:
TFM contents depends on the project to develop.

Full-or-part-time: 750h
Guided activities: 750h

GRADING SYSTEM

The TFM is evaluated by a board assigned for that purpose. The evaluation board consists of a President, a Secretary and one other Board Member. The Secretary of the evaluation board is the TFM advisor, the President is, normally, a professor of the same department than the Secretary, and the third member is a professor of another department than the President and the Secretary.
In order to determine the numerical mark of the TFM, the evaluation board will take into special account the scientific or technical quality of the work and technical report, the clarity of the presentation and oral defence, response to questions and, if applicable, the economic feasibility study, environmental impact and/or sustainable development.

RESOURCES

Other resources:
TFM regulations: Look at
http://etsetb.upc.edu/ca/estudis/normatives-academiques/normatives-academiques-etsetb />
TFM procedures: Look at
http://etsetb.upc.edu/ca/els-serveis/secretaria-oberta/procediments-i-tramits/tfm-masters-tic