UAB
Universitat Autònoma de Barcelona

2019/2020

Simulation and Design Tools I

Code: 102693
ECTS Credits: 6

Degree	Type	Year	Semester
2500898 Telecommunication Systems Engineering	OT	4	2

Contact

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Teachers

Josep Parron Granados

Gary Junkin

Jordi Verdu Tirado

Use of Languages

Principal working language: spanish (spa)

Some groups entirely in English: No

Some groups entirely in Catalan: No

Some groups entirely in Spanish: No

Prerequisites

It is desirable that students who want to take this course have broad knowledge in the field of microwaves and antennas, as well as a general vision of communications system.

Objectives and Contextualisation

This course has been created with a user perspective, oriented towards the acquisition of competences in the use of the CAD software tools that industry generally uses in the field of RF-FEM components manufacturing and Antennas, along with presence in the markets of communications infrastructures, sector of mobile communications, broadcasting, space sector or automotive between many others.

The use of the subject by the student will mean that this acquires new methodologies and skills for the efficient exploitation of software tools available in a wide variety of situations for the development of the profession.

Competences

- Develop personal work habits.
- Develop thinking habits.
- Learn new methods and technologies, building on basic technological knowledge, to be able to adapt to new situations.
- Select and devise communication circuits, subsystems and systems that are guided or non-guided by electromagnetic, radiofrequency or optical means to fulfil certain specifications.
- Work in a team.

Learning Outcomes

1. Contrast numerical and analytical results.
2. Describe the main methodologies of modelling and simulation, and choose the most suitable for the simulation of a certain subsystem.
3. Develop independent learning strategies.
4. Develop the capacity for analysis and synthesis.
5. Measure the parameters of a communication system on the basis of simulation results.
6. Use software tools for electromagnetic and radiofrequency analysis.
7. Work cooperatively.

Content

1. CAD tools for passive components.

2. CAD tools based on Circuit Theory. ADS.

3. CAD tools based on Field Theory.

4. Methods of electromagnetic analysis.

4.1 The method of moments (eg FEKO).

4.2 The finite element method (eg HFSS).

4.3 The method of finite differences (eg CFDTD)

Methodology

The course will be completely practical. It will be developed in the Laboratories under a strict system of learning by projects. The subject will have an orientation towards analysis and diagnosis. Work will be carried out on the operation of real devices and the obtaining of input functions, but it is not intended to give guidance to the device design.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical seminars.	50	2	1, 2, 3, 4, 5, 7, 6
Type: Supervised			
Tutorials	7.5	0.3	1, 4
Type: Autonomous			
Preparation of laboratory work.	92.5	3.7	1, 2, 3, 4, 5, 7, 6

Assessment

As it is a practical subject in its entirety, the work will be continuously evaluated in two forms: work in laboratory using comercial and in-house simulators with examples of antennas and filters, evaluated via a final individual report. Reports are individual but colaborative in terms of laboratory work. Related to the laboratory work will be a set of questions and problems designed to train the student in the efficient use of simulation with each particular software package and method. If the report is not of high enough standard, the student will be advised to resubmit the report within a period of two weeks from the initial submission.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Labwork (3 modules FEKO, CFDTD, HFSS)	(23%, 22%, 22%)	0	0	1, 2, 3, 4, 5, 7, 6
Questions (3 modules, FEKO, CFDTD, HFSS)	(11%, 11%, 11%)	0	0	1, 2, 3, 4, 5, 6

Bibliography

It will be provided by the teacher once the course has begun.