Universitat Autònoma de Barcelona

2020/2021

Advanced Communications Circuits Design

Code: 102727
ECTS Credits: 6

Degree	Type	Year	Semester
2500895 Electronic Engineering for Telecommunication	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Jordi Bonache Albacete

Prerequisites

It is convenient to have studied the subjects "Transmitters and Receptor Electronics" and "RF and Microwave Engineering"

Objectives and Contextualisation

The overall objective of this subject is to provide the basic knowledge and techniques that allow the student to design circuits and passive communication components for specific applications through professional simulation tools. An special effort will be focused on the problems related to the practical implementation of communication components, such as non-ideals, lost due to different causes, generation of parasite modes, size, presence of spurious, etc.

Competences

- Communication
- Design, analyse and propose specialised radiofrequency and microwave components, devices, circuits and systems for telecommunication systems.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Work in a team.

Learning Outcomes

1. Communicate efficiently, orally and in writing, knowledge, results and skills, both professionally and to non-expert audiences.

2. Design communication circuits and components for specific applications using professional simulation tools.
3. Develop curiosity and creativity.
4. Develop systemic thinking.
5. Generate innovative and competitive proposals in professional activity.
6. Maintain a proactive and dynamic attitude with regard to ones own professional career, personal growth and continuing education. Have the will to overcome difficulties.
7. Make ones own decisions.
8. Manage information by critically incorporating the innovations of ones professional field, and analysing future trends.
9. Provide solutions to problems related to the practical implementation of communications components, such as interference, radiation loss, generation of parasitic modes, size, presence of spurious elements, etc.
10. Work cooperatively.
11. Work in complex or uncertain surroundings and with limited resources.

Content

Practical considerations for the design of communication circuits: losses, tolerances, radiation.

Design and characterization of passive microwave and millimeter filters. Designs based on resonators.

Specific software for the design of communication circuits: electric simulators versus electromagnetic simulators.

Circuit design with electromagnetic simulators. Optimization

Compaction techniques. Application examples: microwave filters, other microwave circuits.

Methodology

Directed activities:

Master Classes: The teacher will explain the topics through the use of slides and blackboard.

Problems seminars: The teacher will carry out, or in some cases the students themselves, sample problems in small groups of students.

Laboratory sessions: Prior to the internship session, the student must prepare it and after the session must submit a report.

Note: The teaching materials of the subject will be available in the Virtual Campus of the UAB

Supervised activities:

Tutorials outside of class hours.

Autonomous activities:

Autonomous study by the student.

Resolution of class problems prior to the realization of them.

Preparation of Laboratory sessions.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory sessions	12	0.48	9, 2, 5, 7, 10
Master Classes	26	1.04	9, 2
Problems seminars	12	0.48	9, 4, 2, 10
Type: Supervised			
Tutorials outside of class hours.	7.5	0.3	9, 1, 2
Type: Autonomous			
Laboratory sessions preparation	12	0.48	9, 4, 2, 5, 7, 10
Solve problems at home	15	0.6	9, 2
Study at home	25	1	9, 4, 2

Assessment

The subject will be evaluated from the delivery of two works with a weight of 37.5% each and the results of the laboratory reports with a weight of 25%.

The works will be averaged between them and if the result of the average is higher than 4 will average with the practices of the subject to give rise to the final grade.

In the case of not passing the subject, the part corresponding to the works can be recovered in a single final exam where all the subject of the course will be evaluated. To participate in the recovery, you must have previously evaluated activities that involve a minimum 2/3 of the final grade of the subject.

Failure to attend any of the practices or not having any note in the works or in the final exam will mean that the student will be declared as not evaluable.

Granting a grade of honor registration is the decision of the faculty responsible for the subject. The regulations of the UAB indicate that MH can only be granted to students who have obtained a final grade equal to or greater than 9.00. You can grant up to 5% of MH of the total number of students enrolled.

Without prejudice to other disciplinary measures deemed appropriate, the irregularities committed by the student that may lead to a variation of the grade of an evaluation act will be scored with a zero. Therefore, copying, plagiarism, cheating, letting copy, etc. in any of the evaluation activities will involve failing with a zero. The evaluation activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these assessment activities to pass the subject, this subject will be failed directly, with no opportunity to recover it in the same course.

In case of repeating the subject, the same evaluation system as the rest of the students will be followed.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
1st work delivery	37.5	15	0.6	9, 1, 4, 3, 2, 5, 8, 6, 7
2nd work delivery	37.5	10.5	0.42	9, 4, 2, 7, 10, 11
Delivery of Lab reports	25	15	0.6	9, 1, 4, 3, 2, 5, 8, 6, 7

Bibliography

- D.M. Pozar, Microwave Enginering, Addison Wesley.

- J.S. Hong, M.J. Lancaster, Microstrip filters for RF/Microwave Applications, John Wiley.