UAB
Universitat Autònoma de Barcelona

2018/2019

Plannar Antennas for Wireless Systems

Code: 42834
ECTS Credits: 6

Degree	Type	Year	Semester
4313797 Telecommunications Engineering	OB	1	2

Contact

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Teachers

Carlos Cisneros Gonzalez

Use of languages

Principal working language: english (eng)

Prerequisites

The student is supposed to have knowledge about radiation, guided waves, fundamental parameters of antenna and the transmission equation

Objectives and Contextualisation

Once completed the course the student should be able to:

1. Understand and describe the structures that are commonly used in the design of planar antennas.
2. Apply different techniques to adjust the antennas to the requirements of a particular application.
3. Use simulation tools to predict the behavior of these antennas.
4. Carry out measurements of different parameters of antennas.

Skills

- Capacity for developing radio communications systems: design of antennas, equipment and subsystems, channel modelling, calculation of links and planning.
- Students should know how to apply the knowledge they have acquired and their capacity for problem solving in new or little known fields within wider (or multidisciplinary) contexts related to the area of study
- Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously

Learning outcomes

1. Analyze antennas assessing whether they meet the requirements of an application.
2. Carry out measurements of different parameters of antennas.
3. Design antennas according to the requirements of a particular application.
4. Students should know how to apply the knowledge they have acquired and their capacity for problem solving in new or little known fields within wider (or multidisciplinary) contexts related to the area of study

5. Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously
6. Use electromagnetic simulation tools for the analysis and design of antennas

Content

1. Introduction
2. Fundamental parameters of antennas
3. Fundamentals of radiation
4. Dipole antennas
5. Loop antennas
6. Slot antennas
7. Microstrip antennas
8. Simulations Tools
9. Measurement Tecniques

Methodology

Guided activities:

- In the class: explanation of theorical contents with application examples
- In the lab: develop a planned activity using simulation tools and measurement techniques

Autonomous activities:

- Individual study of the subject
- Solving exercises, preparation of lab activities and reports

Supervised activities:

- Tutorials in small groups or individual meetings to clarify concepts, advise on the development of the course or attend other specific issues.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Lab classes	15	0.6	4, 6
Theory classes	30	1.2	4, 5, 6
Type: Supervised			
Supervision meetings	15	0.6	4, 5, 6
Type: Autonomous			
Personal work	56	2.24	4, 5, 6

Evaluation

a) Evaluation activities

- **Final exam (FEx): 50%** short questions and problems. It is compulsory to obtain FEx >= 4 to pass the course.

- **Solving exercises (EX): 20%** short questions and problems will be proposed along the course. They must delivered on a given date otherwise they'll be qualified with zero.

- **Lab activities (LR): 30%** reports on the activites developed in the lab (25%) and lab exam (short questions 5%). They must delivered on a given date otherwise they'll be qualified with zero.

b) Evaluation activities schedule

- **FEx:** final exam dates will be public the first day of the course in the Campus Virtual and the web page of the Engineering School (section exams).

- **EX, LR:** schedule of lab sessions and deliverables will be made public the first day of the course in the Campus Virtual.

This schedule can be modified due to unexpected events. Please check Campus virtual often since any modification will be published there.

c) Second chance procedure

- **FEx:** According to UAB regulations there will be one second chance exam for those students with FEx < 4 that have participated in, at least, 2/3 of the evaluation activities of the course.

- **EX, LR:** these evaluation activities do not have second chance procedure

d) Grades revision procedure

For every evaluation activity it will be scheduled a date in which the student can review the grade together with the teacher. The grade of the activity will not be modified after the scheduled date.

e) Final grade

- If FEx<4, final grade = FEx
- If FExF>=4, final grade = 0.5*FEx + 0.2*EX + 0.3*LR
- It is mandatory a final grade >= 5 in order to pass the course
- Matricules d'honor: the highest grade available can only be awarded by the coordinator of the course to those students who have demonstrated and excellent performance (final grade > 9.00). According to UAB regulations, the number of MH is restricted to the 5% of the students enrolled in the course.
- "Not evaluated" will be only granted when the student participates in less than the 10% of evaluation activities.

f) Irregularities by the student, copy and plagiarism

Without prejudice to other disciplinary measures considered appropriate, the irregularities committed by the student that can lead to a variation of the grade of an evaluation activity (such as copying, plagiarizing, cheating ...) will be qualified with zero.

g) Students repeating the course

There is no differential treatment for students repeating the course. No grades of the previous course will be kept.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Final exam	50%	3	0.12	4, 5, 6

Lab activities	30%	15	0.6	1, 2, 3, 4, 5, 6
Solving exercises	20%	16	0.64	4, 5, 6

Bibliography

C.A Balanis, Antenna Theory, 3rd edition, John Wiley & Sons, 2005

J.L. Volakis, C. Chen, K. Fujimoto, Small Antennas: Miniaturization techniques and applications, McGraw-Hill, 2010

K.L. Wong, Planar antennas for Wireless Communications, John Wiley & Sons, 2003