Universitat Autònoma de Barcelona

2017/2018

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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Use of languages

Principal working language: spanish (spa)

Other comments on languages

English will be used in case of foreign students or other needs. Class notes are in English language.

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

Evaluation activities:

Final Exam (FEx): 50% To pass is compulsory FEx >= 4. There will be one second-chance exam for those with FEx < 4

Midterm Exam (MEx): 10%

Lab Reports + Lab Exam (LR): 25% Individual reports about the work developed in the lab + 5% Lab Exam.

Solving exercises(SE): 10%

Final qualification (FQ)

- If FEx < 4, FQ = FEx
- If FEx >= 4
  N1 = 0.5*FEx+0.1*Mex+0.1*SE+0.3*LR
  N2 = 0.7*FEx+0.3*LR
  FQ = MAX(N1,N2)
- In order to pass the course is compulsory FQ >=5
- The qualification "Not evaluated" will be only granted if the student participates in no evaluation activity

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Final exam	50%	3	0.12	4, 5, 6
Lab Reports + Lab Exam	30%	15	0.6	1, 2, 3, 4, 5, 6
Midterm exam	10%	1	0.04	4, 5, 6
Solving exercises	10%	15	0.6	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