

## Antenes Planes per a Sistemes sense Fil

2014/2015

Codi: 42834

Crèdits: 6

| Titulació   | Tipus | Curs | Semestre |
|---|-------|------|----------|
| 4313797 Enginyeria de Telecomunicacions / Telecommunication Engineering | OB    | 1    | 2        |

### Professor de contacte

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### Utilització de llengües

Llengua vehicular majoritària: anglès (eng)

Grup íntegre en anglès: No

Grup íntegre en català: Sí

Grup íntegre en espanyol: No

### Prerequisites

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

### Objectius

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 to obtain different antenna parameters.

### Competències

- 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

### Resultats d'aprenentatge

1. Carry out measurements to obtain different antenna parameters
2. 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
3. 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
4. Use electromagnetic simulation tools for the analysis and design of antennas

### Continguts

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 Techniques

## Metodologia

### Guided activities:

- In the class: explanation of theoretical 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.

## Activitats formatives

| Títol                | Hores | ECTS | Resultats d'aprenentatge |
|----------------------|-------|------|--------------------------|
| Tipus: Dirigides     |       |      |                          |
| Lab classes          | 15    | 0,6  | 1, 2, 4                  |
| Theory classes       | 30    | 1,2  | 1, 2, 3, 4               |
| Tipus: Supervisades  |       |      |                          |
| Supervision meetings | 15    | 0,6  | 1, 2, 3, 4               |
| Tipus: Autònomes     |       |      |                          |
| Personal work        | 55    | 2,2  | 1, 2, 3, 4               |

## Avaluació

### Evaluation activities:

Final Exam (FEx): 40% To pass is a must having FEx  $\geq 4$

Midterm Exam (MEx): 20%

Lab reports (LR): 30% Individual reports about the work developed in the lab. To pass, all the reports must be rated  $\geq 4$

Solving exercises(SE): 10%

The qualification "Not evaluated" will be only granted if the student does not participate in none of the evaluation activities

### Activitats d'avaluació

| Títol             | Pes | Hores | ECTS | Resultats d'aprenentatge |
|-------------------|-----|-------|------|--------------------------|
| Final exam        | 40% | 3     | 0,12 | 1, 2, 3, 4               |
| Lab reports       | 30% | 15    | 0,6  | 1, 2, 3, 4               |
| Midterm exam      | 20% | 2     | 0,08 | 1, 2, 3, 4               |
| Solving exercises | 10% | 15    | 0,6  | 1, 2, 3, 4               |

### Bibliografia

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