

Sistemes d'Identificació per Radiofreqüència (RFID)**2014/2015**

Code: 42848

ECTS Credits: 6

Degree	Type	Year	Semester
4313797 Enginyeria de Telecomunicacions / Telecommunication Engineering	OT	2	1

Contact

Name: Jordi Bonache Albacete

Email: Jordi.Bonache@uab.cat

Use of languages

Principal working language: anglès (eng)

Some groups entirely in English: No

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

Prerequisites

Plannar Antennas for Wireless Systems and other modules related to RF and Microwave circuits

Objectives and Contextualisation

The main aim of the module is to acquire advanced knowledge related to Radio Frequency Identification systems (RFID) with an special emphasis on the design of high performance RFID Tags. It is also the aim of the module an introduction to commercial electromagnetic simulators for the design of RFID devices and also the use specific instrumentation for its characterization.

Skills

- Capacity for critical reasoning and thought as means for originality in the generation, development and/or application of ideas in a research or professional context.
- Capacity for developing radio communications systems: design of antennas, equipment and subsystems, channel modelling, calculation of links and planning.
- Capacity to apply advanced photonic and optoelectronic knowledge , as well as high frequency electronics
- Maintain proactive and dynamic activity for continual improvement
- Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
- Students should be capable of integrating knowledge and facing the complexity of making judgements using information that may be incomplete or limited, including reflections on the social and ethical responsibilities linked to that knowledge and those judgements
- 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. Capacity for critical reasoning and thought as means for originality in the generation, development and/or application of ideas in a research or professional context.

2. Define the characteristics of the RFID system to be used according to the characteristics of the product you want to identify.
3. Maintain proactive and dynamic activity for continual improvement
4. Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
5. Students should be capable of integrating knowledge and facing the complexity of making judgements using information that may be incomplete or limited, including reflections on the social and ethical responsibilities linked to that knowledge and those judgements
6. 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
7. 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
8. Use electromagnetic simulation tools for the analysis and design of antennas

Content

- Introduction to RFID systems. Components and operation of an RFID system. Bands and regulated emission power. Types of RFID systems (passive vs active and near field vs far field).
- Modulation and coding. Communication protocol.
- RFID tags. Fundamental parameters (read range, EIRP, gain and power transmission coefficient)
- Design of RFID tags. Antennas for RFID, conjugate matching. Tags for metal products. "Global band" tags.
- RFID Readers
- Measurement and characterization of RFID tags
- Applications

Methodology

The methodology will combine in-situ classes, problem resolution, work in the laboratory, the realization of supplemental works from recommended lectures and autonomous work as well. Virtual platforms will be used.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Magistral Classes	30	1.2	1, 2, 4, 5, 6, 7
Problem Resolution	15	0.6	1, 2, 4, 5, 6, 7
Supplemental work	10	0.4	1, 2, 3, 5, 6, 7
Type: Supervised			
work in the laboratory	15	0.6	1, 2, 3, 4, 5, 6, 7, 8
Type: Autonomous			
Home study and preparation of laboratory sessions	70	2.8	1, 2, 3, 4, 5, 6, 7

Evaluation

Final Exam + partial exams (75%)

Deliverables from lab. and exercises (25%)

Changes to this evaluation method are possible if considered by the teacher.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Exams	60	10	0.4	1, 2, 3, 4, 5, 6, 7
Lab reports	20	0	0	1, 2, 3, 4, 5, 6, 7, 8
Supplemental work	20	0	0	1, 2, 3, 4, 5, 6, 7

Bibliography

1. V.D. Hunt, A. Puglia and M. Puglia. RFID. A guide to Radio Frequency Identification. John Wiley & Sons, New Jersey 2007.
2. H. Lehpamer. RFID design principles. Artech House, Norwood 2008.
3. D. M. Dobkin. The RF in RFID. Passive UHF RFID in Practice. Elsevier 2008.