

Program	09TT- Engineering in Telecommunication Technologies and Services
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Course number and name	
Number	95000047
Name	Radio Frequency Subsystems Subsistemas de Radiofrecuencia
Semester	Y4 - S8

Credits and contact hours	
ECTS Credits	4.5
Contact hours	45 hours

Coordinator's name	José Ramón Montejo Garai
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Specific course information		
Description of course content		
<p>The course presents the basis for the design of subsystems being part of the Radio Frequency communication systems: filters, amplifiers, oscillators, mixers, etc. The classical configurations are introduced into each of the analyzed subsystems with particular emphasis on the aspects that determine their election; power handling, distortion, noise, suitable technology, etc.</p> <p>The main objective is to generate in students the ability to carry out simple designs fulfilling specifications of any of the subsystems covered in the course.</p>		
List of topics to be covered		
<ol style="list-style-type: none"> 1. Introduction to Radio Frequency subsystems. 2. Microwave Filters. 3. Noise and nonlinear distortion. 4. Microwave amplifiers. 5. Switches, microwave oscillators and mixers. 		
Prerequisites or co-requisites		
<p>The content of the following previous courses is imperative:</p> <p>Microwave Engineering (Y4/S7) Fields and Waves in Telecommunications (Y2/S4) Basic Circuit Analysis (Y1/S1)</p>		
Course category in the program		
___ R (required)	___ E (elective)	X SE (selective elective)

Specific goals for the course

Specific outcomes of instruction
<p>RA1: To know the fundamental characteristics and classification of RF systems.</p> <p>RA2: To handle the general concepts of radio frequency subsystems and their representation by flow charts and matrix connection of S parameters.</p> <p>RA3: To synthesize microwave filters with distributed elements, applying circuit transformations.</p> <p>RA4: To understand the concepts of noise power and noise equivalent temperature and to characterize noise and nonlinear distortions in radio frequency subsystem</p> <p>RA5: To design microwave amplifiers for maximum gain and minimum noise using the concept of stability.</p> <p>RA6: To analyze microwave switching circuits and basic oscillators.</p>
Student outcomes addressed by the course
<p>CE-ST3 CE-ST4 CE-ST5 CG2,CG4, CG5, CG9, CG12</p>

Bibliography and supplemental materials

<p>“Microwave Engineering”, David. M. Pozar, John Wiley and Sons Inc., 2012, 4th edition.</p> <p>“Foundations for Microwave Engineering”, Robert E. Collin, McGraw-Hill Inc. 1992.</p> <p>“Microwave Engineering Passive Circuits”, Peter A. Rizzi, Prentice-Hall Inc., 1998.</p> <p>“Field and Waves in Communications Electronics”, S. Ramo, J.R. Whinnery, T.V. Duzzer, 3th edition, John Wiley and Sons, 1993.</p> <p>“An Introduction to Guided Waves and Microwaves Circuits”, R.S. Elliot, Ed. Prentice-Hall, 1998</p> <p>“Advanced Engineering Electromagnetics”, C.A. Balanis. John Wiley and Sons.</p> <p>“Microwave Filters Impedance-Matching Networks and Coupling Structures”, G.L. Matthaei, L. Young, E.M.T. Jones, Artech House, 1980.</p> <p>“Computer Aided Design of Microwave Circuits”, K. C. Gupta, Ed. Artech House, 1981.</p> <p>“Principles of Microwave Circuits”, C. G. Montgomery, R. H. Dicke, and E. M. Purcell.</p> <p>WEB http://wad.etc.upm.es/moodle/ Additional resources.</p>
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Teaching methodology

X lectures	X problem solving sessions	— collaborative actions	— laboratory sessions
Other:			