

SUBJECT TEACHING GUIDE

M1594 - Active Microwave Circuits

Master's Degree in Telecommunication Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Master's Degree in Telecommunication Engineering			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline					
Course unit title and code	M1594 - Active Microwave Circuits				
Number of ECTS credits allocated	5	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES				
Name of lecturer	JOSE ANGEL GARCIA GARCIA				
E-mail	joseangel.garcia@unican.es				
Office	Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 1. DESPACHO (S137)				
Other lecturers	LUISA MARIA DE LA FUENTE RODRIGUEZ JUAN PABLO PASCUAL GUTIERREZ				

3.1 LEARNING OUTCOMES
- Applying strategies for the resolution of technical problems, specific to this profession.
- Distinction of the peculiarities of microwave circuits when compared to conventional DC and low-frequency electrical and electronic circuits.
- Team-work cooperative capability.
- Student response to real-life problems, typical of the work in the radiocommunications industry

4. OBJECTIVES

In this course, microwave active components and circuits will be studied. Its main objective is to extend and deepen the knowledge already acquired in the course "Radiofrequency Circuits" of the first year of the Master, or alternatively in the course "Radiofrequency Electronics" for students of the Mention on Electronic Systems.

Attention will be paid to the acquisition of practical abilities, of use in the profession. They will include not only the simulation of active circuits, but also their assembling, adjustment and lab characterization.

It will start with a brief study of the simulation tools to be applied in the design of small-signal amplifiers, oscillators, power amplifiers, mixers, etc. Then, each of these blocks will receive an in depth treatment.

Simulation practices will be held along the course, together with design and characterization activities of amplifiers and/or mixer circuits. Visits to fabrication and circuit mounting facilities will be also organized.

6. COURSE ORGANIZATION

CONTENTS	
1	Monolithic technologies
2	Small-signal Amplifiers
3	Oscillators
4	Power Amplifiers
5	Mixers

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Evaluation exercises or continuous monitoring: 50%. At the end of each constituting block, a short evaluation exercise will be realized on the treated subjects. Details and criteria are included in the "observations".	Written exam	No	Yes	50,00
Lab Practices: 50%. Simulation, characterization/measurement and design/implementation practices will be included, as well as oriented works. They will be realized, according to the subjects, along the course. Further details appear in the "observations".	Laboratory evaluation	No	Yes	50,00
TOTAL				100,00
Observations				
<p>The continuous evaluation through the exercises will be conditioned to the participation in at least a 70% of the activities in class. The student performance and the way the treated subjects have been followed will contribute to the grade or score to be granted by these exercises.</p> <p>The design/implementation and characterization/measurement practices will not be repeated or recovered. That possibility exists for the simulation ones.</p> <p>Those students who may have not passed an exercise or who may have not followed the continuous monitoring evaluation, according to the described criteria, may present to a Final Exam. Its percentage over the final grade will be 50%.</p> <p>The lab practices are mandatory to pass the course.</p>				
Observations for part-time students				
For part-time students, the evaluation criteria will be the same to those explained above.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

"Microwave Transistor Amplifiers: Analysis and Design", Guillermo Gonzalez, 2nd Edition. Prentice Hall 1997.

"Microwave Devices, Circuits and Subsystems for Communication Engineering", Ed. I.G. Glover, S.R. Pennock and P.R. Shepherd, Wiley, 2005.

"Microwave Mixers", Stephen A. Maas, 2nd Ed., Artech House, 1993.

"RF Power Amplifiers" 2nd Edition, Marian K. Kazimierczuk, Wiley 2015.

"The RF and Microwave Circuit Design Cookbook", S.A. Maas, Artech House 1998.