

Program	09TT- Engineering in Telecommunication Technologies and Services
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Course number and name	
Number	95000063
Name	Analog and Mixed Electronic Systems Sistemas Electrónicos Analógicos y Mixtos
Semester	Y4-S7

Credits and contact hours	
ECTS Credits	6
Contact hours	60

Coordinator's name	Fernando González Sanz
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Specific course information		
Description of course content		
<p>This course aims to complete the basic formation on analog and digital electronic circuits from previous courses. Students are expected to apply previous knowledge on circuit analysis, with a further insight in non-ideal behavior of components. The aim is to understand design constraints and to evaluate different design alternatives with well established and widely used analog/mixed integrated circuits. Together with general classic concepts in analog and digital electronics, key issues like design methodologies and simulation tools will also be covered.</p>		
List of topics to be covered		
<p>1- Operational Amplifier circuits with resistive feedback. Static and dynamic limitations. 2- Non linear systems. Signal generators. 3- D/A and A/D converters: performance specifications and conversion techniques. 4- Active Filters: second order filter implementation, cascade design techniques. 5- Power circuits: power dissipation, discrete and integrated power circuits design. 6- Voltage references and regulators: performance specifications and applications. Linear and switching regulators.</p>		
Prerequisites or co-requisites		
<p>Students are recommended to have successfully completed the previous required courses: 95000020 - Analog Electronics; 95000025 - Electronic Circuits; 95000029 - Circuit Analysis and Design.</p>		
Course category in the program		
<input type="checkbox"/> R (required)	<input checked="" type="checkbox"/> E (elective)	<input type="checkbox"/> SE (selective elective)

Specific goals for the course

Specific outcomes of instruction

RA70: Advanced knowledge of electronic devices, circuits and systems
 RA71: Ability to apply analog electronic circuit design techniques
 RA72: Ability to apply feedback and control theory in electronic circuits design.
 RA75: Ability to define specifications, build and document electronic equipment and systems
 RA77: Ability to design analog-digital interfaces.

Student outcomes addressed by the course

CG8, CG9, CG12
 CE-SE2 , CE-SE3, CE-SE4, CE-SE5, CE-SE6, CE-SE7

Bibliography and supplemental materials

Reference Book: Sergio Franco, "*Design with Operational Amplifiers and Analog Integrated Circuits*", 3rd Edition McGraw-Hill, International Edition 2002.
 Complementary: N.R. Malik, "*Electronic Circuits: Analysis, Simulation and Design*", Prentice Hall, 1995
 PSPICE–V9.1: Circuit simulation software (evaluation version).
<https://moodle.upm.es/titulaciones/oficiales/>

Teaching methodology

X lectures	X problem solving sessions	— collaborative actions	— laboratory sessions
Other:	Individual assignments in circuit design and simulation		