

<b>Program</b>	<b>09AQ-Master in Telecommunication Engineering</b>
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<b>Course number and name</b>	
<b>Number</b>	93000792
<b>Name</b>	Signal Analysis for Communications Análisis de Señal para Comunicaciones
<b>Semester</b>	Y1-S1

<b>Credits and contact hours</b>	
<b>ECTS Credits</b>	6
<b>Contact hours</b>	60

<b>Coordinator's name</b>	Mariano García Otero
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<b>Specific course information</b>		
<b>Description of course content</b>		
A course in advanced signal processing for communications It contains two main parts: a) Optimization; b) Statistical Signal Processing.		
<b>List of topics to be covered</b>		
1. Optimization. 1.1. Introduction. 1.2. Convex optimization. 1.3. Algorithms. 1.4. Least squares. 1.5. Graph optimization. 2. Statistical Signal Processing. 2.1. Random signals and sequences. 2.2. Parameter estimation. 2.3. Bayesian estimation. 2.4. Hypothesis testing.		
<b>Prerequisites or co-requisites</b>		
None		
<b>Course category in the program</b>		
<input checked="" type="checkbox"/> R (required)	<input type="checkbox"/> E (elective)	<input type="checkbox"/> SE (selective elective)

<b>Specific goals for the course</b>	
<b>Specific outcomes of instruction</b>	
RA1: To be proficient in the use of linear algebra and calculus in optimization	

problems.

RA2: To master tools to solve fundamental optimization problems.

RA3: To get a deep knowledge of mathematical models of random signals.

RA4: To know different tools to address signal detection and estimation problems.

**Student outcomes addressed by the course**

CE1.

CT3, CT4, CT5.

CG1, CG2, CG5.

**Bibliography and supplemental materials**

- D. G. Luenberger. Linear and Nonlinear Programming, 2nd ed. Addison-Wesley, 1984.
- S. S. Rao. Engineering Optimization, Theory and Practice, 4th ed. John Wiley & Sons, 2009.
- T. K. Moon. Mathematical Methods and Algorithms for Signal Processing. Prentice-Hall, 2000.
- Papoulis, S. U. Pillai. Probability, Random Variables, and Stochastic Processes, 4th ed. McGraw-Hill, 2002.
- S. M. Kay. Fundamentals of Statistical Signal Processing, Volume 1: Estimation Theory. Prentice Hall, 1993.
- S. M. Kay. Fundamentals of Statistical Signal Processing, Volume 2: Detection Theory. Prentice Hall 1998.
- S. O. Haykin. Adaptive Filter Theory, 5th ed. Pearson, 2013.
- WEB: <http://moodle.upm.es/titulaciones/oficiales>.

**Teaching methodology**

<u>X</u> lectures	<u>X</u> problem solving sessions	___ collaborative actions	___ laboratory sessions
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**Other:**