

<b>Program</b>	<b>09AQ-Master in Telecommunication Engineering</b>
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<b>Course number and name</b>	
<b>Number</b>	93000791
<b>Name</b>	Communication Systems Sistemas de Comunicaciones
<b>Semester</b>	Y1 – S2

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

<b>Coordinator's name</b>	Federico Álvarez García
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<b>Specific course information</b>		
<b>Description of course content</b>		
<p>Communication systems will cover the most common systems used by the telecom operators nowadays, oriented to the lower layers of those systems but also covering the interrelation to the higher layers and architectural aspects (deeply covered in other MSc. Programme subjects).</p> <p>The subject will offer the needed knowledge to understand, analyze, design and dimension communication systems with a pragmatic and professional orientation, covering current and future systems communication systems which will reach the market in next 5 years.</p> <p>The content will be organized as case studies, covering satellite, fixed, mobile and IoT communication systems.</p>		
<b>List of topics to be covered</b>		
<ol style="list-style-type: none"> <li>1. Introduction and interfaces to the communication systems</li> <li>2. New satellite communications and global positioning</li> <li>3. New fixed communication systems (transport and access) including optical, electrical and hybrid systems</li> <li>4. New mobile communication systems towards 5G and the Internet of Things.</li> </ol>		
<b>Prerequisites or co-requisites</b>		
none		
<b>Course category in the program</b>		
<input checked="" type="checkbox"/> <b>R (required)</b>	<input type="checkbox"/> <b>E (elective)</b>	<input type="checkbox"/> <b>SE (selective elective)</b>

**Specific goals for the course**

**Specific outcomes of instruction**

RA1: Capability to design and dimension a communication system encompassing both fixed and mobile communications, from a pragmatic and professional orientation.  
 RA2: Knowledge on the new satellite communication systems including positioning systems, and the methodology, techniques and tools for the analysis and design  
 RA3: Knowledge on the new mobile communication system and the evolution towards 5G, and the Internet of Things (and application to smart cities)  
 RA4: Knowledge on the new fixed communication systems (electrical and optical) in triple-play services and the evolution towards new systems with improved capabilities.  
 RA5: Capability to develop in terms practical cases (as projects) including the analysis, design, dimensioning, and simulation and testing, involving the different presented communication systems.

Student outcomes addressed by the course

CE1 , CE2, CE3, CE4, CE9, CE13, CG1, CG2, CG4, CG5, CT2, CT3, CT4, CT5

**Bibliography and supplemental materials**

- Dennis Roddy. "Satellite Communications, Fourth Edition". Professional Engineering, 2006
- Milorad Cvijetic and Ivan B. Djordjevic. "Advanced Optical Communication Systems and Networks". Artech House Applied Photonics, 2013
- Christopher Cox. "An Introduction to LTE: LTE, LTE-Advanced, SAE, VoLTE and 4G Mobile Communication". Wiley, 2014
- G. P. Agrawal. "Fiber-Optic Communication Systems (Fourth Edition)". Wiley Interscience, 2010
- I. Kaminow, T. Li, A. Willner. "Optical Fiber Communications Vol. VI-B, Systems and Networks". Academic Press, 2013
- Full standards documents from IEEE, ITU, IETF, ISO, ETSI... as presented during the course

**Teaching methodology**

<input checked="" type="checkbox"/> <b>lectures</b>	<input checked="" type="checkbox"/> <b>problem solving sessions</b>	<input checked="" type="checkbox"/> <b>collaborative actions</b>	<input checked="" type="checkbox"/> <b>laboratory sessions</b>
<b>Other:</b>	Project based learning		