

Program	09TT- Engineering in Telecommunication Technologies and Services
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Course number and name	
Number	95000052
Name	Mobile communication networks Redes de comunicaciones móviles
Semester	Y4-S7

Credits and contact hours	
ECTS Credits	6
Contact hours	60

Coordinator's name	Manuel Álvarez-Campana Fernández-Corredor
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Specific course information		
Description of course content		
<p>This course covers the principles of mobile communication networks: network architectures, communication protocols, signalling procedures, services, dimensioning and traffic engineering. The development of the syllabus follows a chronological order through the different generations of mobile communication systems: 2G (GSM/GPRS), 3G (UMTS/HSPA) and 4G (LTE).</p>		
List of topics to be covered		
<ol style="list-style-type: none"> 1. Principles of mobile communication networks. Standards. Evolution. 2. Second generation mobile communication networks: GSM and GPRS. Services, architecture, signalling procedures, dimensioning. 3. Third generation mobile communication networks: UMTS and HSPA. Services, architecture, signalling procedures, dimensioning. 4. Fourth generation mobile communication networks: LTE. Services, architecture, signalling procedures, dimensioning. 		
Prerequisites or co-requisites		
<p>None, but it is assumed that the student has a background on the following topics:</p> <ul style="list-style-type: none"> • Telecommunication networks and services • Computer Networks 		
Course category in the program		
__ R (required)	<u>X</u> E (elective)	__ SE (selective elective)

Specific goals for the course

Specific outcomes of instruction

- RA1 To know the evolution of mobilecommunications networks, through the different generations, and the services they provide. To know the standards organizations involved.
- RA2 To know the two major subsystems (access network and core network) of the mobile communications networks, their main components and the basic functions they provide: communications control, mobility management, resource control, network intelligence, and interworking with other networks.
- RA3 To know the principles of the evolution of mobile communications networks towards "all IP" architectures, and the corresponding protocols used in the user and the control planes.
- RA4 To understand the structure and operating principles of the second generation (2G) mobile communication networks. To know its elements, interfaces and protocols. To be able to use dimensioning models applicable to these networks.
- RA5 To understand the structure and operating principles of the third generation (3G) mobile communication networks. To know its elements, interfaces and protocols. To be able to use dimensioning models applicable to these networks.
- RA6 To understand the structure and operating principles of the fourth generation (4G) mobile communication networks. To know its elements, interfaces and protocols. To be able to use dimensioning models applicable to these networks.

Student outcomes addressed by the course

CE-TL1, CE-TL2, CE-TL3, CE-TL4, CE-TL5, CE-TL6

Bibliography and supplemental materials

J. Eberspächer, H.J. Vögel, C. Bettstetter, C. Hartmann. GSM Architecture, Protocols and Services. Thrid Edition, Wiley, 2009.

C. Kappler. UMTS Networks and Beyond, Wiley, 2009.

C. Cox. An introduction to LTE: LTE, LTE-Advanced, SAE and 4G Mobile Communications, Wiley, 2012.

Teaching Slides used in classes and available for downloading from web server:
<http://moodle.upm.es/titulaciones/oficiales>

Teaching methodology

<input checked="" type="checkbox"/> lectures	<input checked="" type="checkbox"/> problem solving sessions	<input checked="" type="checkbox"/> collaborative actions	<input type="checkbox"/> laboratory sessions
Other: During the course, students are required to develop a number of individual and team assignments, which are presented and reviewed in the classroom.			