UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: NETWORK MANAGEMENT AND OPERATION
Code: 310905
Type: CORE COURSE
ECTS credits: 6
Degree: 2349 - MASTER DEGREE PROGRAMME IN TELECOMMUNICATION ENGINEERING
Academic year: 2019-20
Center: 308 - SCHOOL POLYTECHNIC OF CUENCA
Group(s): 30
Year: 1
Duration: First semester
Main language: Spanish
Second language:
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **JOSE ANTONIO BALLESTEROS GARRIDO** - Group(s): **30**

Building/Office	Department	Phone number	Email	Office hours
E. Politécnica Cuenca (2.16)	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	926053863	josea.ballesteros@uclm.es	Se comunicará a través del campus virtual y el tablón de anuncios

Lecturer: **JUAN JOSE DE DIOS DE DIOS** - Group(s): **30**

Building/Office	Department	Phone number	Email	Office hours
E. Politécnica Cuenca (2.18)	INGENIERÍA ELÉCTRICA, ELECTRÓNICA, AUTOMÁTICA Y COMUNICACIONES	926053898	juanjose.dedios@uclm.es	Se indicará al principio del semestre.

2. Pre-Requisites

Not established

It is advisable to have basic knowledge about computer networks.

3. Justification in the curriculum, relation to other subjects and to the profession

Telematics is one of the working fields of the telecommunication engineers.

This course is complemented by 'Network Planning and Design' and 'Network integration, Services and Applications'

4. Degree competences achieved in this course

Course competences

Code	Description
E06	The ability to build, design, implement, manage, operate, run and maintain networks, services and content.
E07	The ability to carry out planning, decision-making, and packaging of network, services and applications while considering service quality, direct and operational costs, plans for implementation, supervision, security processes, scaling and maintenance, as well as managing and ensuring quality in the development process.
E08	The ability to understand and know how to apply the operation and organisation of the Internet, the latest-generation Internet technology and protocols, component models, intermediary software and services.
G01	The ability to conceptualise, calculate and design products, processes and facilities in all fields of Telecommunications Engineering.
G02	The ability to lead the creation and installation of telecommunication systems while complying with current regulations ensuring quality service.
G08	The ability to apply acquired knowledge and solve problems in new or unknown settings within wide and multidisciplinary environments while being capable of integrating knowledge.
G11	The ability to know how to communicate their conclusions and the latest supporting knowledge or data to both specialised and non-specialised audiences clearly and free from ambiguity.
G12	The ability to have the learning skills which allow them to continue studying in a largely self-directed or autonomous way.
G14	The ability to have knowledge and understanding which provides a basis or opportunity to be original in the development and/or application of ideas, often within a research context.
G15	The ability to integrate knowledge and face the complexities of making assessments based on information which, whether incomplete or limited, includes reflections on the social and ethical responsibilities in the application of their knowledge and judgements.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Adequate defence of the solutions provided in the different phases of design, planning and implementation of telematic networks.

Skills in the search of bibliographical sources to autonomously complete the knowledge in the field of telematic networks.

Active participation in making decisions in the different ways of addressing a problem or issue.

Planning, decision making and packaging of networks, services and applications considering service quality, direct and operating costs, implementation plan, supervision, security procedures, scaling and maintenance.

Teamwork in a cooperative way.
Correct communication orally and in writing of the solutions to the problems raised.
Understanding of technical documentation in English and mastery of specific vocabulary in this language.
Application of knowledge about the operation and configuration of the different network and transport protocols to make decisions related to the management and planning of networks.
Analysis and synthesis of technical documentation.
Knowledge, application and configuration of management, maintenance and network monitoring protocols.
Knowledge of network security mechanisms and design of network security strategies.
Knowledge of new routing protocols in wired and mobile networks.
Knowledge of new protocols and transport services.
Knowledge and adequate application of the standards and regulations used in communication networks.

6. Units / Contents

Unit 1: Network deployment and operation
- **Unit 1.1** Network logic structure. local area, IP network, access networks, transport networks
- **Unit 1.2** Infraestructures
- **Unit 1.3** Service operators

Unit 2: Communication network management
- **Unit 2.1** Redundancy and Scalability
- **Unit 2.2** VLANs and Spanning-Tree
- **Unit 2.3** Intradomain routing: Advanced OSPF, MPLS/GMPLS
- **Unit 2.4** Interdomain routing: iBGP, eBGP

Unit 3: Network security
- **Unit 3.1** Security threats
- **Unit 3.2** Defense techniques
- **Unit 3.3** Security plans

Unit 4: Multiservice network administration and maintenance
- **Unit 4.1** Networking management models
- **Unit 4.2** SNMP
- **Unit 4.3** Monitoring
- **Unit 4.4** End-to-end measures
- **Unit 4.5** Networking management platforms

Unit 5: Laboratory
- **Unit 5.1** VLANs and Spanning-Tree
- **Unit 5.2** BGP and MPLS
- **Unit 5.3** Network security
- **Unit 5.4** Network management with SNMP

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	R	Description
Class Attendance (theory) [ON-SITE]	Lectures	E06 E07 E08 E09 G01 G02 G12	0.68	17	N	-	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	E06 E07 E08 G01 G02 G08 G11 G12	0.28	7	N	-	-	Problems, practical cases or project defense
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	E06 E07 E08 G01 G02 G08 G11 G12 G14 G15	0.72	18	N	-	-	
Practicum and practical activities report writing or preparation [OFF-SITE]	Practical or hands-on activities	E06 E07 E08 G01 G02 G08 G11 G12 G14 G15	0.8	20	Y	N	Y	
Writing of reports or projects [OFF-SITE]	Self-study	E06 E07 E08 E09 G01 G02 G08 G11 G12 G14 G15	0.4	10	Y	N	Y	
Individual tutoring sessions [ON-SITE]		E06 E07 E08 E09 G01 G02 G08 G11 G12 G14 G15	0.04	1	N	-	-	
Progress test [ON-SITE]	Assessment tests	E06 E07 E08 G01 G02 G08 G11 G12 G14 G15	0.08	2	Y	N	Y	
Study and Exam Preparation [OFF-SITE]		E06 E07 E08 E09 G01 G02 G08 G11 G12 G14 G15	3	75	N	-	-	
		Total:	**6**	**150**				
		Total credits of in-class work: 1.8						**Total class time hours: 45**
		Total credits of out of class work: 4.2						**Total hours of out of class work: 105**

As: Assessable training activity
Com: Training activity of compulsory overcoming
R: Rescheduling training activity

8. Evaluation criteria and Grading System

	Grading System		
Evaluation System	**Face-to-Face**	**Self-Study Student**	**Description**
			Practical test to evaluate the instrumentation handling and

Laboratory sessions	40.00%	0.00%	measurement protocols or writing reports about the practical sessions
Progress Tests	50.00%	0.00%	Writing tests of evaluation or problem solving to evaluate concepts and procedures.
Assessment of problem solving and/or case studies	10.00%	0.00%	Writing problems, practical cases, reports or projects carried out individually or in groups, and maybe its public exposition.
Total:	**100.00%**	**0.00%**	

Evaluation criteria for the final exam:

Those described in the 'evaluation system' table

Specifications for the resit/retake exam:

It is possible to retake the 'progress test'. The criteria for other activities will be published after the final exam. The evaluation criteria will be those described in the 'evaluation system' table.

Specifications for the second resit / retake exam:

It is compulsory to pass the practical session in advance. Other activities will be evaluated through a final test. The evaluation criteria will be 40% laboratory sessions and 60% writing test.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	**hours**
Writing of reports or projects [AUTÓNOMA][Self-study]	10
Individual tutoring sessions [PRESENCIAL][]	1
Progress test [PRESENCIAL][Assessment tests]	2
Study and Exam Preparation [AUTÓNOMA][]	75
Unit 1 (de 5): Network deployment and operation	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Unit 2 (de 5): Communication network management	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Unit 3 (de 5): Network security	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2
Unit 4 (de 5): Multiservice network administration and maintenance	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1
Unit 5 (de 5): Laboratory	
Activities	**Hours**
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	18
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	20
Global activity	
Activities	**hours**
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	7
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	18
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	20
Writing of reports or projects [AUTÓNOMA][Self-study]	10
Individual tutoring sessions [PRESENCIAL][]	1
Progress test [PRESENCIAL][Assessment tests]	2
Study and Exam Preparation [AUTÓNOMA][]	75
Class Attendance (theory) [PRESENCIAL][Lectures]	17
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Kurose, James F.	Computer networking: a top-down approach	Pearson Addison-Wesley		978-0-13-136548-3	2010	
Mark Burgess	Principles of Network and System Administration	Wiley			2004	
Mauro, Douglas R.	Essential SNMP	O'Reilly		978-0-596-00840-6	2005	
Randy Zhang , Micah Bartell	BGP Design and Implementation	Cisco Press			2003	
Sanchez Monge, Antonio	MPLS in the SDN Era	O'Reilly Media		978-1-49190-545-6	2015	
Ramos, A.	Seguridad perimetral, monitorización y ataques en redes /	Ra-Ma,		978-84-9964-297-0	2014	