



IDENTIFYING DATA

Multimedia Networks

| | | | | |
|---------------------|---|----------|------|------------|
| Subject | Multimedia Networks | | | |
| Code | V05G300V01643 | | | |
| Study programme | Degree in Telecommunications Technologies Engineering | | | |
| Descriptors | ECTS Credits | Choose | Year | Quadmester |
| | 6 | Optional | 3rd | 2nd |
| Teaching language | Spanish | | | |
| Department | Telematics Engineering | | | |
| Coordinator | López García, Cándido Antonio | | | |
| Lecturers | Herrería Alonso, Sergio López García, Cándido Antonio | | | |
| E-mail | candido@det.uvigo.es | | | |
| Web | http://faitic.uvigo.es | | | |
| General description | This subject presents the main specific technological solutions for distributing multimedia contents over telecommunication networks. | | | |

Competencies

| | | | | |
|------|--|--|--|--|
| Code | | | | |
| B3 | CG3: The knowledge of basic subjects and technologies that enables the student to learn new methods and technologies, as well as to give him great versatility to confront and adapt to new situations | | | |
| B6 | CG6: The aptitude to manage mandatory specifications, procedures and laws. | | | |
| C30 | CE30/TEL4 The ability to describe, program, assess and optimize communication protocols and interfaces at different network architecture layers . | | | |
| C33 | CE33/TEL7 The ability to program network and distributed applications and services. | | | |
| D3 | CT3 Awareness of the need for long-life training and continuous quality improvement, showing a flexible, open and ethical attitude toward different opinions and situations, particularly on non-discrimination based on sex, race or religion, as well as respect for fundamental rights, accessibility, etc. | | | |

Learning outcomes

| Expected results from this subject | Training and Learning Results | | |
|---|-------------------------------|-----|----|
| (*)CE-14 Comprender el concepto de responsabilidad social corporativa, ser capaz de elaborar una memoria de sostenibilidad conforme a las normas establecidas y utilizarla como medio de comunicación con los grupos de interés de la organización. | | | |
| The comprehension of basic concepts in digital encoding of audio and video. | B3 | | |
| The knowledge of the main standards in the field of digital encoding of audio and video. | B6 | | |
| The knowledge and comprehension of the main problems raised in the transmission of multimedia contents. | B3 | C30 | D3 |
| The knowledge of the main protocols used for the transmission of multimedia contents. | | C30 | |
| The knowledge and comprehension of the main techniques used to provide quality of service in Internet. | B3 | C30 | D3 |
| The ability to analyze and develop VoIP networks. | | C30 | |
| | | C33 | |

Contents

| | | | |
|-------------------------------------|---|---|--|
| Topic | | | |
| Encoding of digital audio and video | a) Digital audio (PCM). Audio compression | b) Digital video. Intraframe and interframe compression | |

| | |
|------------------------------------|--|
| Multimedia applications | a) Classes. Quality of service (QoS) requirements b) Impact of delay and packet losses c) Content distribution. Multicast. CDN d) IP telephony: architecture, codecs, softphones, softswitches... |
| Multimedia protocols | a) Transport protocols: TCP/UDP, RTP, HTTP b) Adaptive streaming. MPEG-DASH c) Session protocols: SIP, H.323, RTSP |
| Quality of service in the Internet | a) Monitoring and policing techniques b) Scheduling and resource allocation c) Differentiated Services (DiffServ) d) Integrated Services (IntServ). RSVP |

Planning

| | Class hours | Hours outside the classroom | Total hours |
|--------------------|-------------|-----------------------------|-------------|
| Lecturing | 20 | 40 | 60 |
| Computer practices | 12 | 18 | 30 |
| Supervised work | 6 | 24 | 30 |
| Problem solving | 1 | 5 | 6 |
| Essay | 1 | 5 | 6 |
| Problem solving | 2 | 16 | 18 |

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

| | Description |
|--------------------|---|
| Lecturing | Exhibition of the ideas, concepts and techniques of each topic of the course. In these sessions, students must acquire competences CG3, CG6, CE30 and CT3. |
| Computer practices | Practical learning of basic tools for the distribution of multimedia contents on computer networks. Group activity. In these sessions, students must acquire competences CE30 and CE33. |
| Supervised work | Configuration, with the teacher's guidance, of a basic IP PBX. Group activity. This work should help students to acquire competence CE33. |

Personalized attention

| Methodologies | Description |
|--------------------|---|
| Lecturing | It will be dispensed personalized attention during the office hours that will be announced at the beginning of the course. There is no appointment necessary. |
| Computer practices | It will be dispensed personalized attention during the office hours that will be announced at the beginning of the course. There is no appointment necessary. |
| Supervised work | It will be dispensed personalized attention during the office hours that will be announced at the beginning of the course. There is no appointment necessary. |

Assessment

| | Description | Qualification | Training and Learning Results |
|-----------------|--|---------------|-------------------------------|
| Problem solving | Midterm exam covering some of the contents of the subject. Questions and problems of conceptual, logical, analytical or applied character. One hour long written exercise. | 20 | B3 C30 B6 |
| Essay | Evaluation of the features and performance of the IP PBX configured by the student during the course. | 20 | C33 |
| Problem solving | Final exam covering all the contents of the subject. Questions and problems of conceptual, logical, analytical or applied character. Two hour long written exercise. | 60 | B3 C30 B6 |

Other comments on the Evaluation

Two different methods of evaluation will be offered to the students: continuous assessment and eventual assessment.

Students opting for the continuous assessment must take two intermediate tasks: a midterm exam (20% of the final grade) and a project involving the configuration of a basic IP PBX (20% of the final grade), together with a final exam at the end of the course (60% of the final grade). If the score of the final exam is less than 3.5/10, then the final grade of the subject will be the score obtained in this final exam. The score of the project will take into account both the features and performance of the IP PBX configured (75%) and the answers to a practical exam that must be solved individually (25%). Both intermediate

tasks are not recoverable and will be only valid for the current course.

Students can also opt for being evaluated by means of just a final exam at the end of the course. The final grade of the subject will be, in this case, just the score obtained in this exam.

It will be considered that a student opts for the continuous assessment if he takes the midterm exam or the project proposed. The final exam will contain some additional questions for those students that have opted by the eventual assessment.

Plagiarism is regarded as serious dishonest behavior. If any form of plagiarism is detected in any of the tests or exams, the final grade will be FAIL (0), and the incident will be reported to the corresponding academic authorities for prosecution.

Those students that have not passed the subject in first call will have to take an extra written exam in July. Those students that opted for the continuous assessment will be able to choose between evaluation by means of just the final exam or to keep continuous assessment. In the latter case they would keep the scores obtained in the intermediate tasks (midterm exam and project) and would only have to take the final exam as the last task. Students must indicate which method they choose at the final exam.

In extraordinary calls the assessment will just consist in the realisation of a written exam including ALL the contents of the subject.

The schedule of the midterm/intermediate exams will be approved in the Comisión Académica de Grado (CAG) and will be available at the beginning of each academic semester.

Sources of information

Basic Bibliography

J. F. Kurose, K. W. Ross, **Computer networking: a top-down approach**, 7^a ed., Pearson, 2016

Kun I. Park, **QoS in packet networks**, 1^a ed., Springer, 2005

R. Bryant, L. Madsen, J. Van Meggelen, **Asterisk: the definitive guide**, 4^a ed., O'Reilly Media, 2013

Complementary Bibliography

H. W. Barz, G. A. Bassett, **Multimedia networks: protocols, design, and applications**, 1^a ed., Wiley, 2016

M. Barreiros, P. Lundqvist, **QoS-enabled networks: tools and foundations**, 2^a ed., Wiley, 2016

Bruce Hartpence, **Packet Guide to Voice over IP**, 1^a ed., O'Reilly Media, 2013

S. Wintermeyer, S. Bosch, **Practical Asterisk 1.4 and 1.6**, 1^a ed., Addison-Wesley, 2010

Alan B. Johnston, **SIP: Understanding the Session Initiation Protocol**, 4^a ed., Artech House Publishers, 2015

Z. Li, M. Drew, J. Liu, **Fundamentals of Multimedia**, 2^a ed., Springer, 2014

Recommendations

Subjects that continue the syllabus

Multimedia services/V05G300V01941

Subjects that it is recommended to have taken before

Fundamentals of Sound and Image/V05G300V01405

Computer Networks/V05G300V01403