

Course guide

340360 - XAMU-C9X44 - Multimedia Networks

Last modified: 01/07/2023

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 744 - ENTEL - Department of Network Engineering.

Degree: BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2018). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: David Rincón Rivera

Others: David Rincón Rivera

PRIOR SKILLS

It is mandatory to have attended previous courses Computer Networks (Q4) and Internet (Q5).

REQUIREMENTS

It is mandatory to have attended previous courses Computer Networks (Q4) and Internet (Q5).

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. CETI1. Ability to understand the environment of an organization and its needs in the field of information technology and communications.
2. CETI2. Ability to select, design, develop, integrate, value, construct, manage, exploit and maintain technologies of machines, programming and nets, keeping suitable costs and quality parameters.
3. CETI4. Ability to select, design, deploy, integrate and manage network and communications infrastructure in an organization.
4. CETI6. Ability to design systems, applications and services based on network technologies, including internet, website, e-commerce, multimedia, interactive services and mobile computing.

Transversal:

5. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
6. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
7. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

TEACHING METHODOLOGY

Theoretical and problem-based lectures
Laboratory sessions
Directed activities during autonomous learning time

LEARNING OBJECTIVES OF THE SUBJECT

The objectives of the subject are distributed in a top-down scheme. After an Introduction / Presentation of the subject, the multimedia applications and the requirements that these demand of the network architecture for an efficient transport are defined. The following is a general introduction to data compression techniques. Once these bases have been established, the specific transport protocols for this type of data that are commonly used on the Internet are studied. Finally, the architectures of IP Telephony and IP TV services are presented.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	10.00
Self study	90,0	60.00
Hours large group	45,0	30.00

Total learning time: 150 h

CONTENTS

Introduction

Description:

Introduction to audiovisual services
Definitions and revision of prior knowledge
Quality of Service

Related activities:

Laboratory about QoS

Full-or-part-time: 22h

Theory classes: 7h
Laboratory classes: 3h
Self study : 12h

2. Digitization

Description:

Audio, image and video sampling
Transport of uncompressed audiovisual signals over IP networks

Related activities:

Joint questionnaire with unit 3 (if the course calendar allows it)

Full-or-part-time: 16h

Theory classes: 6h
Self study : 10h

3. Compression

Description:

Introduction to Information Theory
Lossless compression
Lossy compression

Related activities:

Joint questionnaire with unit 2 (if the course calendar allows it)

Full-or-part-time: 16h

Theory classes: 6h
Self study : 10h

4. Audiovisual codecs

Description:

Audio compression
Image compression
Video compression

Related activities:

Laboratory session on audio compression
Laboratory session on image compression
Laboratory session on video compression

Full-or-part-time: 48h

Theory classes: 12h
Laboratory classes: 6h
Self study : 30h

5. Interactive services - IP telephony and video conferencing

Description:

From analog telephony to IP telephony
IPtel architecture based on SIP

Related activities:

Laboratory session on IP Telephony
Activities on SIP, SIP trunking, and / or the UPC IP telephony service (if the course calendar allows it)

Full-or-part-time: 21h

Theory classes: 6h
Laboratory classes: 3h
Self study : 12h

6. Diffusion services: IP TV and digital TV

Description:

Digital TV

DVB-IP and over-the-top (OTT) architectures

Advanced Services: CDN, Hybrid TV, Adaptive Streaming (DASH)

Related activities:

Laboratory session about IPTV

Activity on OTT operators, visit to i2Cat (if the course calendar allows it)

Full-or-part-time: 21h

Theory classes: 6h

Laboratory classes: 3h

Self study : 12h

7. Conclusions

Description:

Conclusions

Trends in networked audiovisual technology

Full-or-part-time: 6h

Theory classes: 2h

Self study : 4h

GRADING SYSTEM

Mark_Theory = 0.4 (Midterm ex.) + 0.6 (Final ex.). The reevaluation exam substitutes the Final Exam.

Mark_Lab = average of the lab sessions.

Mark_activities: includes exercises, tests, reports, etc that can performed at the classroom or as autonomous work outside the classroom. Depending on the semester, the number and type of activities can be variable, and its weight can also vary, with a total of 10% of the global qualification.

Mark_Course = 0.6 (Mark_Theory) + 0.3 (Mark_Lab) + 0.1 (Mark_Activities)

EXAMINATION RULES.

Attendance to the evaluation activities (exams, tests, laboratory sessions, exercises, etc) is mandatory

BIBLIOGRAPHY

Basic:

- Kurose, James F.; Ross, Keith W. Redes de computadoras : un enfoque descendente [on line]. 7a ed. Madrid: Pearson, 2017 [Consultation : 19/02/2024]. Available on : https://www-ingebook-com.reursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6752. ISBN 9788490355282.

- Halsall, Fred. Multimedia communications : applications, networks, protocols, and standards. Harlow [etc.]: Addison-Wesley, 2001. ISBN 0201398184.

Complementary:

- Simpson, Wes. Video Over IP : IPTV, Internet Video, H.264, P2P, Web TV, and Streaming: A Complete Guide to Understanding the

Technology. 2nd. Amsterdam: Focal Press, 2008. ISBN 9780240810843.