60958 - Next generation internet

Syllabus Information

Academic Year: 2020/21
Subject: 60958 - Next generation internet
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 623 - Master's Degree in Telecommunications Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as:

1. **Theory sessions** whose main contents are organized in 5 topics.
2. **Practice sessions.** The student will be given a set of problems which aims to help strengthen the concepts presented in the theory sessions. In addition, the student shares the solutions of problem-solving with the class. In this way, the student needs to be critical in the presentation of the results as well as in the proposals made by other students. This where all the students share their answers.
3. **Laboratory sessions.** Their objective is the development of techniques and procedures seen in theory and practice sessions, and its application in the field of IP communication networks.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

4.2.Learning tasks

The course includes the following learning tasks This is a 6 ECTS course organized as follows:
- **Theory classes (30 hours).** Presentation by the teacher of the main contents of the course, combined with the active participation of students. This methodology, supported with the student's autonomous work, is designed to provide students with the necessary theoretical foundations for the course.
- **Practice sessions (10 hours).** Guided exercises and case studies with the possibility of students presenting them, individually or in groups, under the teacher's supervision. This activity may require some previous work by the students.
- **Laboratory sessions (20 hours).** Students will take 10 sessions of 2 hours. These sessions allow students to address aspects related to the theoretical concepts presented in theory classes in a more practical manner.
- **Tutorials.**
- **Assessment.** A set of theory and practice tests, reports or questionnaires. The assessment criteria is detailed in the Assessment" section.
- **Autonomous work.**

4.3.Syllabus

The course will address the following topics:

Theory sessions

Topic 1. Internet Architecture: limitations and trends.
- Organization. Peering models: problems and related costs. Network architecture: challenges and/or problems. New trends in network architectures.

Topic 2. IP multimedia communications.
- Architecture and protocols. Requirements and classification of multimedia applications. Multimedia transport. Multimedia sessions. Session control. IP Multimedia Subsystem.

Topic 3. Multicast communications.
- Protocols and services. Multicast addressing. group management and multicast routing. Tunneling: protocols and mechanisms. Multicast and tunneling in design, planning and deployment of multimedia networks.

Topic 4. QoS Architectures and mechanisms.
- Models and mechanisms. QoS provision for multimedia applications in IP networks.

Topic 5. Internet of Things.
- Network architecture and protocols: medium access control (IEEE 802.15.4) network (ZigBee y 6LowPAN) and application (CoAP y MQTT).

Computer lab sessions

Session 1. Networks games. Network traffic measurement and QoS evaluation.

Session 2. Streaming multimedia. Mutimedia communications: protocols. Network traffic measurement and QoS evaluation. Multicast transmission.

Session 3. VoIP communications: using Asterisk PBX. SIP comunications. QoS evaluation. Bandwitch measurement: packetization. Using Asterisk PBX

Session 4. Configuration and analysis of an IoT network. Protocol stack configuration on IoT nodes. Capture and analysis traffic on an IoT network

4.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

4.5.Bibliography and recommended resources

Course material is provided:
- Notes (slides).
- Laboratory Notes.
- Set of problems.

The course bibliography will be available on website:

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=60921&Identificador=4881

The course materials will be available on the course website (Note: the access will be limited to the students of the course).