

Course guide

230688 - NFIO - Networking and Future Internet Opportunities

Last modified: 13/05/2015

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering.
Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Optional subject).
Academic year: 2015 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Jaume Comellas
Others: Josep Solé Pareta
José Antonio Lázaro Villa
Alberto Cabellos

PRIOR SKILLS

Basic knowledge about Network Architecture as well as transmission technologies used in data networks.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:

CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

TEACHING METHODOLOGY

This is a subject integrated in the framework of Erasmus+ programme, which consists in a collaboration activity among 7 Universities from different countries (coordinated by University of Aalborg, DK). There are two face-to-face seminars (one in April and the final one in July) which are mandatory to attend, and a main part of autonomous off-line student work. In the first phase the student works on different theoretical modules which are evaluated during the April meeting. Then, the student is assigned to a multi-national group which works in a project evaluated at the July meeting.

LEARNING OBJECTIVES OF THE SUBJECT

Knowledge of Future Internet technologies
Knowledge of Future Internet seen from social and business perspectives.
Skills in exploring the opportunities in Future Internet, by relating technical, social and business aspects.
Competences in working together in teams across scientific areas, countries and cultures, and to bring into play his/her own knowledge in such a context.

STUDY LOAD

Type	Hours	Percentage
Hours large group	20,0	16.00
Hours small group	19,0	15.20
Self study	86,0	68.80

Total learning time: 125 h

CONTENTS

Advances in information systems

Description:

This module gives the student an introduction to advances and trends in information systems. More specifically, this module covers the state of the art in aspects such as big data, cloud computing and sociotechnical systems.

Specific objectives:

Knowledge of issues, architecture, technologies and impact concerning big data
Knowledge of issues, architecture, technologies and impact concerning cloud computing
Knowledge of issues, technologies and impact concerning usability and sociotechnical systems

Related activities:

Autonomous work, learning assessment

Full-or-part-time: 10h

Self study : 10h

Nanonetworking and Molecular Communications

Description:

Nano-networks and molecular communications principles.

Specific objectives:

Major molecular communication systems, namely the communication via diffusion, calcium signalling, and molecular motors and how these mechanisms can be translated into the telecommunication domain.

Skills in basic issues in the Tera-hertz band; the differences and challenges of working in the Tera-hertz band of the electromagnetic spectrum; and how the Shannon limit will be applied to the Tera-hertz band.

Knowledge of the microscopic theory on diffusion and how it can work in conjunction with information theory to evaluate the performance of a communication via a diffusion system.

Full-or-part-time: 10h

Theory classes: 10h

Future Internet Architecture

Description:

to problems of the current Internet and introduces the approaches of new alternative Internet Architectures.

Specific objectives:

Software Defined Networking (SDN),
Overlay Networks (LISP - Locator/ID Separation Protocol)
Information Centric Networking (ICN).

Full-or-part-time: 10h

Theory classes: 10h

Services and Applications

Description:

Introduction to special issues and trends in Internet services and applications.

Specific objectives:

?trends in Internet usage?.
The Internet of things.
Design processes.
The creation and pricing of services.

Full-or-part-time: 10h

Theory classes: 10h

Advances in Wireless Technologies

Description:

Basic concepts in radio communications and the state of the art wireless and mobile systems, including their applications.

Specific objectives:

wireless sensor network,
IEEE 802.11 with latest extensions: carrier sense multiple access with collision avoidance (CSMA/CA)
Knowledge of mobile networks (cellular and latest evolutions LTE, LTE-A)

Full-or-part-time: 10h

Theory classes: 10h

Implementation of broadband networks

Description:

Implementation procedure of broadband access and distribution networks, including master plans for broadband networks.
Common architectures which are used to design long haul IP networks and common logical and physical topologies of real life broadband IP networks.

Specific objectives:

GIS tools.
Real-life architectures and equipment (and technologies) through the presentation of case studies
Designing a network implementing proper topologies in each layer of the network

Full-or-part-time: 10h

Theory classes: 10h

Advances in Broadband Technologies

Description:

Current and future network technologies.

Specific objectives:

Basic wired and wireless broadband access network technologies: Digital Subscriber Line (xDSL), Hybrid Fiber Coax (Cable TV & Cable Modems), Broadband Power Line (BPL), Fibre to the Home/Curb, CDMA, 3G, and WiFi and WiMax.

Basic backbone network technologies: MPLS, SDH, Carrier-Ethernet, and DWDM, in conjunction with scalability, statistical multiplexing, traffic engineering, reliability and QoS provisioning concepts.

Full-or-part-time: 10h

Theory classes: 10h

Network Security

Description:

Introduction to network monitoring and security.

Specific objectives:

Concepts about common threats including bots, spyware, adware, DoS/DDoS attacks, click-fraud, spam, and information theft.

Full-or-part-time: 8h 20m

Theory classes: 8h 20m

Enterprise Architecture

Description:

Introduction to enterprise architecture frameworks and enterprise architecture's role in enterprise and infrastructure management.

Specific objectives:

Enterprise architecture frameworks.

Knowledge of how enterprise architecture supports sustainability of business architecture and alignment between business processes and IT

Full-or-part-time: 8h 20m

Theory classes: 8h 20m

Entrepreneurship and corporate entrepreneurship

Description:

Linking technology and Future Internet prospects to commercial business models for ambitious corporate and start-up Entrepreneurs.

Specific objectives:

How to model an innovative idea and develop it into a successful enterprise through Business Model Canvas and through concrete examples of 'Future Internet'-related business models

Knowledge of how to set up your team, how to identify and how to approach your customers

Full-or-part-time: 10h

Theory classes: 10h

GRADING SYSTEM

The final mark is obtained by adding 30% of the theoretical part and 70% from the project.

EXAMINATION RULES.

No specific rules.

RESOURCES

Audiovisual material:

- Class Notes. Resource