Course guides
11570 - XSBA - Broadband Networks and Services

Last modified: 13/05/2015

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 744 - ENTEL - Department of Network Engineering.

Degree: DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 1992). (Optional subject).
DEGREE IN ELECTRONIC ENGINEERING (Syllabus 1992). (Optional subject).
MASTER'S DEGREE IN NETWORK ENGINEERING (Syllabus 2009). (Optional subject).
MASTER'S DEGREE IN INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Optional subject).
ERASMUS MUNDUS MASTER'S DEGREE IN RESEARCH ON INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Optional subject).
MASTER'S DEGREE IN RESEARCH ON INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Optional subject).
MASTER'S DEGREE IN NETWORK ENGINEERING (Syllabus 2006). (Optional subject).

Academic year: 2015 **ECTS Credits:** 5.0 **Languages:**

LECTURER

Coordinating lecturer:

Others:

PRIOR SKILLS

That acquired previously in Communication Networks, Systems and Services.

REQUIREMENTS

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

To model and assess broadband networks and services. To become acquainted with the most common standards. To get to know the architectures of broadband protocols. To introduce the most common broadband services.

CONTENTS

1. Introduction (2 hours)

2. Access technologies (10 hours)

2.1. Frame relay.

2.2. High-speed local networks. Ethernet technologies.

2.3. HFC technologies.

2.4. xDSL technologies

2.4.1. ADSL

2.4.2. Other xDSL technologies

2.5. PLC.

3. ISDN and B-ISDN (4 hours)

3.1. Reference model.

3.2. Protocol architecture.

3.3. Access methods ATM.

3.4. The ATM layer and the adaptation layer.

3.5. Control plan. Signalling. Standardization. ITU-T. ATM Forum. Traffic characterization

4. B-ISDN resource management (14 hours)

4.1. Classes of service.

4.2. ATM traffic management.

4.3. Traffic descriptors.

4.4. Control mechanisms.

4.5. Policing function. GCRA.

4.6. Congestion control.

4.7. Management using ABR services. Fairness.

5. Interworking (10 hours)

5.1. IP over ATM.

5.2. LANE

5.3. Frame relay over ATM.

6. Quality of service and traffic engineering (4 hours)

6.1. Integration of QoS on the network.

6.2. Protocols

6.2.1. RSVP

6.2.2. RTP, RTCP

6.2.3. IPv6

6.3. DiffServ and IntServ.

6.3.1. QoS requirements

7. MPLS networks (8 hours)

7.1. Label Switching Basics.

7.2. Label Distribution.

7.3. MPLS and ATM networks.

7.4. Traffic Engineering.

7.5. VPN

8. Optical Packet Networks

8.1. OPS

8.2. OBS

GRADING SYSTEM

- Continuous assessment 40%

- Final examination 60%

EXAMINATION RULES.

BIBLIOGRAPHY

Basic:
- Schwartz, M. Broadband integrated networks. Upper Saddle River, N.J.: Prentice Hall PTR, 1996. ISBN 0135192404.
- Asatani, K. [et al.]. Introduction to ATM Networks and B-ISDN. Chichester [etc.]: John Wiley and Sons, 1997. ISBN 0471967661.
- Armitage, G. Quality of service in IP networks: foundations for a multi-service Internet. Indianapolis: MacMillan Technical Publishing, 2000. ISBN 1578701899.
- Sackett, G.C.; Metz, C.Y. ATM and multiprotocol networking. New York [etc.]: McGraw-Hill, 1997. ISBN 0070577242.
- Leduc, J.-P. Digital moving pictures-coding and transmission on ATM networks. Amsterdam: Elsevier, 1994.

Complementary:
- Tomsu, P.; Schmutzer, C. Next generation optical networks: the convergence of IP intelligence and optical technology. Upper Saddle River: Prentice Hall, 2002. ISBN 013028226X.
- Händel, R.; Huber, M.N.; Schröder, S. ATM networks: concepts, protocols, applications. 3rd ed. Harlow [etc]: Addison-Wesley, 1998. ISBN 0201178176.
- Prycker, M. Asynchronous transfer mode: solution for broadband ISDN. 3rd ed. London [etc.]: Prentice Hall, 1995. ISBN 0133421716.
- Onvural, R.O. Asynchronous transfer mode networks: performance issues. 2nd ed. Boston [etc.]: Artech House, 1995. ISBN 0890068046.
- Stallings, W. ISDN and broadband ISDN with frame relay and ATM. 4th ed. Upper Saddle River: Prentice Hall, 1999. ISBN 0139737448.
- Black, U.D. ATM (Vol. III: Internetworking with ATM). New Jersey: Prentice Hall, 1998. ISBN 0137841825 (V. 3).
- Bertsekas, D.P; Gallager, R.G. Data networks. 2nd ed. Englewood Cliffs, NJ: Prentice Hall, 1992. ISBN 0132009161.
- Black, U.D. Frame relay networks: specifications and implementations. 2nd ed. New York [etc.]: McGraw Hill, 1996.
- Kilkki, K. Differentiated services for the internet. Indianapolis: McMillan Technical Publishing, 1999. ISBN 1578701325.

RESOURCES

Other resources:

Slides. Published notes. Problems.