POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Broadband Networks [S2EiT2E-TIT>SSZ]

Course

Field of study
Electronics and Telecommunications

Year/Semester
2/4

Area of study (specialization)
Information and Communication Technologies

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points
3,00

Coordinators	Lecturers
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Prerequisites

Has knowledge of the most important standards, architectures and analysis of telecommunication networks. Has knowledge on structure and operation of telecommunication systems used for provisioning multimedia services. Can analyze operation of multimedia systems. Can solve problems connected with multimedia systems. Can formulate opinion on basic chalanges for current electronics and telecommunications. Knows the limitations of their own knowledge and skills, he understands the need for further education.

Course objective

To make students familiar with the architecture, standards, applications, and evolution of broadband networks. Current solutions in the optical networks will be also presented.

Course-related learning outcomes

Knowledge:

1. Knows trends in evolution of multimedia services, Future Internet, and technical solutions wich are to be used in telecommunication networks to realize such servicesfor all Internet users.

2. Knows devices, protocols, and telecommunication techniques, which will be used in the Future Internet.

Skills:

1. Can critically analyze current solutions of multimedia networks and propose their improvements.
2. Can work in the group of several people; can prepare and present report with results of work.
3. Can formulate requrements for a network which should realize basic multimedia services; can chose and evaluate a broadband technique which should be used in a network to ensure required QoS.

Social competences:

1. Understands the role of Information society in country development.
2. Can formulate their own opinion on currenty used and available technologies and solutions in broadband networks reguried for introducing the Future Internet.

Methods for verifying learning outcomes and assessment criteria
Learning outcomes presented above are verified as follows:

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Knowledge acquired during the lectures is verified by the final written test. This test consists of 45-60 questions of multi-choice type. Each question has four answers, one of them is correct. The student gets 1 point per each correct answer and 0 points in the case of no answer or a wrong answer. The student must get at least 50% of the total number of points to pass the test. In questionable cases, students can correct the mark by answering some questions in oral.
Skills mustered during laboratory classes are evaluated based on two colloquia, in the mid and in the end of semester. To pass laboratories, both colloquia must be passed, and the final mark depend on the sum of point of both colloquia:: 5.0 from 93%; 4.5 from 85%; 4.0 from 76%, 3.5 from 65%; 3.0 from 50%; 2.0 below 50%.

Programme content

Possibilities of transforming telecommunications networks into broadband networks with the ability to provide multimedia services.

Course topics

Lectures: Evolution of telecommunication networks towards broadband networks. Multimedia services and their provision through telecommunication networks. ATM - basic terminology, standards, network architecture, interfaces. ATM - ATM layer and adaptation layer, QoS mechanisms, parameters of ATM networks. QQoS in IP networks: DiffServe, IntServe, and MPLS models. Integration in IP networks: VoIP, IP/WDM. Broadband access networks and convergent networks. Optical networks.
Laboratory:
Basic of ATM networks. Configuration of QoS parameters in ATM networks.
Routing w sieciach ATM. Routing in ATM networks. Configuration of a VoIP server. Call handling in VoIP.

Teaching methods

Lectures: Lectures are conducted in the traditional form, with computer presentations that are available earlier to students.
Laboratory: laboratory classes use exercise methodology. Students have to realize practical exercises, according to provided descriptions, using different types of equipment (routers, switches, end devices) available in the laboratory and check if they operate correctly.

Bibliography

Basic
1. K. Ahmad, Sourcebook of ATM and IP Internetworking. IEEE Press, Wiley Interscience, 2002.
2. M. Bromirski, Telefonia VoIP. Multimedialne sieci IP, Wydawnictwo BTC, 2006.
3. B. Mukherjee, Optical WDM Networks, Springer 2006.
4. S.S. Dixt, IP over WDM, J. Wiley & Sons, 2003.

Additional

1. H. J. Chao, B. Liu: High Performance Switches and Routers, A John Wiley & Sons, 2007.
2. T.E. Stern, K. Bala, Multiwavelength Optical Networks. A layered Approach. Addison-Wesley, 1999.
3. W. D. Simpson, Video over IP: A Practical Guide to Technology and Applications, Focal Press, Elsevier, 2005.
4. K. Wajda, Sieci szerokopasmowe, Wydawnictwo Fundacji Postępu Telekomunikacji, Kraków, 2000.
5. K.H. Liu, IP over WDM, J. Wiley and Sons, 2002.
6. A.S. Tanenbaum, Sieci komputerowe, Helion, Gliwice, 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	40	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,00