



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Broadband networks [S2EiT1-SKiTi>SSZP]

### Course

Field of study

Electronics and Telecommunications

Year/Semester

2/3

Area of study (specialization)

Computer Networks and Internet Technologies

Profile of study

general academic

Level of study

second-cycle

Course offered in

polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

prof. dr hab. inż. Wojciech Kabaciński  
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### Lecturers

### Prerequisites

He has extensive knowledge of the most important standards, architecture and network analysis telecommunications. He has in-depth knowledge of the construction and operation of systems telecommunications services used to provide multimedia services. Has basic information from range of computer protocols and networks. He can analyze the operation of multimedia systems. Can solve problems related to multimedia systems, including tasks containing research component. Can understand professional literature in English (books, technical and scientific journals, application notes, catalogues, manuals and standards, etc.). Can prepare a scientific study and present a presentation (in Polish or English) on the topic performing a task (solving a problem) in the field of electronics and/or telecommunications, can discuss the presented problem. He can use optimization methods to solving problems encountered in electronics and telecommunications.

### Course objective

The aim of the course is to familiarize students with architecture, standards and directions of development and applications of broadband telecommunications networks. will also be included modern solutions in the field of all-optical networks.

### Course-related learning outcomes

## Knowledge:

1. Has knowledge of development trends: in the field of multimedia services of the Internet of the Future and technical solutions that are or are to be used in telecommunications networks for the purpose ensuring the possibility of providing services of this type for all Internet users.
2. Has knowledge of devices, protocols and broadband telecommunications techniques, that will be used in the Internet of the Future.

## Skills:

1. Can critically analyze current, comprehensive solutions in the field of multimedia networks and suggest their improvement.
2. Can work in a group of several people; can prepare and present a report containing the results work done.
3. Can formulate the requirements for the network used to implement basic multimedia services; is able to assess and select the broadband technique that should be used in the network, to ensure the appropriate level of QoS.

## Social competence:

1. Understands the importance of the information society for the development of the country.
2. Can formulate their own opinions on currently used and available technologies solutions for broadband networks that determine the introduction of the Internet of the Future.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge gained during the lectures is verified by the final test. The test has a form written and consists of 45-60 test questions. Each question has four answers to choose from one is correct. The student receives 1 point for the correct answer and 0 points for 0 points wrong answer or no answer. Passing the test from 50% of the points. For students who have number of points close to passing, an additional oral question is possible.

The final grade from the laboratory is determined on the basis of the final test and as a percentage score based on the points obtained: 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

Lectures: Evolution of telecommunications networks towards broadband networks. multimedia services and the possibility of their provision using telecommunications networks. ATM technology - basic concepts, standards, network architecture, interfaces. ATM technique - adaptation layer i ATM layer, QoS mechanisms and ATM network parameters. IP QoS: DiffServe, IntServe, MPLS. Integration in IP networks: VoIP, IP/WDM. Broadband access networks and networks convergent. optical networks.

Labs cover the following topics: configuring routing on devices

final; configuration of ATM switches; ATM and Ethernet routing; server configuration

VoIP; configuration of VoIP clients; support for VoIP calls; configuration of network devices to be used VoIP traffic.

## Teaching methods

Lecture: lectures are conducted in the form of a conventional lecture with the use of presentations multimedia previously made available to listeners.

Laboratory: classes are conducted using the practice method. Students have specific tasks to complete sets of tasks depending on the topic and presenting a report on the implementation of these tasks.

## Bibliography

Basic

1. K. Ahmad, Sourcebook of ATM and IP Internetworking. IEEE Press, Wiley Interscience, 2002.
2. M. Bromirski, Telefonía 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.

Additonal

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.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	55	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	2,00