POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Telecommunication networks [S1EiT1E>ST]

Course

Field of study	Year/Semester
Electronics and Telecommunications	2/4
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	English
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
30	0	0
Tutorials	Projects/seminars	
15	0	

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

The student should have the basic knowledge in transmission systems, probability theory, and graph theory. He should be able to obtain information from the literature, databases, and other sources in English, integrate the information, make their interpretation, draw conclusions, and justify opinions. He should also be able to communicate in English in a professional environment.

Course objective

To familiarize students with the fundamentals of the structures and operation of different kinds of telecommunication networks, the principles of their analysis, modeling, design, and services offered by them.

Course-related learning outcomes

Knowledge:
1. He has a structured knowledge in the field of telecommunication network architectures.
2. He has knowledge about the standards concerning telecommunication networks.
3. He knows the directions of telecommunication network development.

Skills:
1. He understands the basic requirements of the relevant international standards for basic telecommunication networks.
2. He can evaluate typical parameters indicating the proper operation of telecommunication networks.
3. He can choose the design of some elements and equipment for telecommunication networks.

Social competences:
1. He knows the limits of his knowledge and skills and understands the need for ongoing education.
2. He has awareness of the importance of telecommunication networks in the functioning of society.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Knowledge aquired during the lectures is verified by the final exam. This exam is in the oral or/and written form, depending on the number of students.
The oral exam consists of a set of 5 questions, a set of questions is drawn from at least 10 sets; answer to each question is marked in 0-10 points. 50% of points are needed to pass the exam.
The written exam consists of 45-60 questions of multiple choice type. Students get 1 point for the correct answer and 0 points for wrong answer or lack of answer. 50% of points are needed to pass the exam.An additional oral question is possible for students with a number of points close to completion.

Skills mustered during tutorial classes are evaluated by students activity (20%) and final colloquium (80%) held in the last meeting. The final colloquium contains of 5-10 problems, number of points assigned to each problem depends on the problem complexity. Colloquium is passed when student gets at least 50% of the total points. For students whose number of points is close to passing, an additional oral question is possible.

Programme content

Structures and operation of telecommunications networks, telecommunications services, construction and operation of network devices, basics of traffic theory.

Course topics

Lectures: The concept of telecommunication systems and networks. Network topologies, transfer modes, and architectures. Telecommunication networks evolution and classification. Telecommunication services: the concept of telecommunication services, classes, and attributes. Basics of transport networks: PDH, SDH, WDM. Principles of telecommunication networks operation: telephone networks, integrated services digital networks, mobile networks, and data networks. Numbering and addressing principles in telecommunication networks. The grade of services and quality of services. Signaling systems in telecommunication networks and connection management (connection, disconnection, maintenance). Switching methods and techniques. Classification of switching networks, topologies, properties, and routing. General structures and functions of switching nodes. The basics of traffic theory: telecommunication traffic and traffic engineering models.

Exercises: Network topologies, telecommunication services. Switching fabrics: topologies, designing, evaluation, routing. Queueing and packet scheduling. Call control. Traffic models for loss systems. Traffic models for queueing systems.

Teaching methods

Lectures: Lectures are conducted in the traditional form, with computer presentations that are available earlier to students. Some lectures, or their parts, are led as interactive or problem lectures, where students participate in solving some problems or examples, especially in proving of some mathematical theorems.

Exercises: Students get some problems or tasks for solving individually or in groups and then presents solutions to other students.

Bibliography

Basic

[1] R. L. Freeman, Fundamentals of Telecommunications, 2nd ed. John Wiley & Sons, Inc., 2005. (available from PUT network: https://onlinelibrary.wiley.com/doi/book/10.1002/0471720941)

[2] A. Valdar, Understanding telecommunications networks. The Institution of Engineering and Technology, 2006.

[3] T. N. Saasawi, M. H. Ammar, and A. El Hakeem, Fundamendals of Telecommunication Networks. Wiley, 1994.

Additional

[1] J. G. van Bosse and F. U. Devetak, Signaling in Telecommunication Networks, 2nd ed. Hoboken, NJ, USA: John Wiley & Sons, Inc., 2007.

[2] H. Akimaru and K. Kawashima, Teletraffic. Theory and Applications. London Berlin Heidelberg New York Paris Tokyo Hong Kong Barcelona Budapest: Springer-Verlag, 1993.

[3] J. E. Flood, Telecommunication Networks, Second. The Institution of Electrical Engineers, 1997.

[5] N. Benvenuto and M. Zorzi, Priniples of Communications Networks and Systems. John Wiley & Sons, Ltd, 2011.

[6] H. J. Chao and B. Liu, High Performance Switches and Routers. John Wiley & Sons, Inc., 2007.

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