POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Foundations of teletransmission [S1EiT1>PTELETR]

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	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	0	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Students starting this subject should have a structured, mathematically underpinned, detailed knowledge of the basics of telecommunications theory necessary to understand, analyze, evaluate the operation of analog and digital telecommunications systems. They should also have the ability to obtain information from literature, databases and other sources in Polish or English.

Course objective

The aim of the course is to provide students with knowledge about teletransmission systems used to transfer information between nodes of the modern telecommunications network, starting with the currently commonly used SDH teletransmission hierarchy, together with its newer version NG-SDH, ending with the OTH hierarchy that is currently introducing into the telecommunications network, also known as OTN. Developing in students the ability to evaluate teletransmission systems in terms of their suitability in specific operating conditions.

Course-related learning outcomes

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired as part of the lecture is verified on the basis of written and/or oral credit, consisting of 5 open questions, identically scored. The passing threshold is 50%. The distribution of thresholds for grades from 2 to 5 is even. Credit issues, on the basis of which open questions are developed, are sent to students electronically.

Programme content

During the lecture students will learn about the basic reasons that led to the withdrawal from the use of PDH teletransmission systems and the development of a new hierarchy of teletransmission systems, called synchronous digital hierarchy SDH. The genesis of SDH, SDH layered model, linear SDH model, container, virtual container, tributary unit, group of tributary units, administrative unit, synchronous transport module level n, where n can be equal to 1, 4, 16, 64, 256, pointer, pointer processing and adaptation, methods of mapping source signals into containers, the concept of tandem connection, methods of protection and alarm signaling in SDH, types and construction of SDH multiplexers are discussed, SDH clocks, rules for synchronizing the frequency of SDH clocks, topologies of SDH networks (linear, ring, lattice), methods of protection offered by ring structures and lattice, methods of connecting ring structures, principles of creating a hierarchical multiring network, methods of designing a multiring network, examples of multiring networks in different countries, methods of entering data into NG-SDH networks, LCAS bitrate adaptation mechanism, GFP encapsulation procedure for data coming from IP networks and transmitted using NG-SDH, the principle of creating virtual containers of any throughput using containers defined in SDH. Issues discussed during the lecture concerning OTH (OTN) include multiplication structures (OPU, ODU, OTU, OCh, OCC, OCG, OTM), the concept of optical section, description of the multiplication process in OTN, OTN frame structure, error correction, OTN layered model, comparison of advantages and disadvantages of NG-SDH and OTN, methods of introducing OTN to a telecommunications network based on SDH and NG-SDH.

Course topics

Teaching methods

Multimedia presentation, illustrated with examples; presentations in the form of lecture material are made available in PDF files.

Bibliography

Basic:
1. R. K. Jain „Principles of Synchronous Digital Hierarchy", CRC Press, Boca Raton, 2013
2. Sławomir Kula „Systemy Teletransmisyjne", WKŁ, Warszawa, 2004.

Additional:
1. A. Valdar „Understanding Telecommunications Networks", IET, London, 2006.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50