POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to Teleinformatics [S1Cybez1>WdTi]

Course

Field of study	Year/Semester
Cybersecurity	1/1
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
30	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Basic mathematical and physical knowledge that enables understanding of the phenomena occurring in teleinformatics systems.

Course objective

The aims of the course are: • To familiarize students with the fundamental principles of how teleinformatics systems operate. • To provide a practical introduction to network device configuration and network analysis. • To understand the basics of analog and digital transmission, as well as data encoding. • To prepare students for more advanced courses related to computer networks and cybersecurity.

Course-related learning outcomes

Knowledge:
• The student knows the basic communication models and understands the differences between analog and digital transmission.
• The student knows the fundamentals of data encoding and can apply appropriate algorithms in practice.

Skills:
• The student is able to configure basic network devices and diagnose network issues.
• The student knows the basic network protocols and understands their application in teleinformatics systems.

Social competences:
The student understands the impact of teleinformatics systems on contemporary society and recognizes their significant role in the development of societies and countries.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by a test in either written or oral form. In the written test, students must answer 7 to 10 questions (multiple-choice and open-ended), each worth a different number of points. There are three or four point-value groups. In the case of an oral exam, the student draws one question from each point-value group. During the oral exam, for each drawn question, the student may receive an additional question related to the one drawn. The assessment of each question (including both the drawn question and any additional question) takes into account the scope of the answer and the depth of understanding of the topic.
Skills acquired during the laboratory classes are verified on an ongoing basis. In each laboratory session, the correctness of the exercises is graded on a scale from 0 to 10 points. A minimum of 50% of the total possible points is required to pass the laboratory component.
number of points grade
<=50 % 2,0
51% - 60% 3,0
61% - 70% 3,5
71% - 80% 4,0
81% - 90% 4,5
91% - 100% 5,0

Programme content

The course "Introduction to Teleinformatics" is intended for first-year Cybersecurity students and serves as an introduction to the fundamental issues related to the operation of teleinformatics systems. The course covers the basics of computer networks, communication models, data transmission, as well as data encoding and information processing. By combining theoretical knowledge with practical laboratory exercises, it prepares students for further studies in teleinformatics and cybersecurity. The course does not require any prior knowledge in this area.

Course topics

I. Fundamentals of Teleinformatics
1. Introduction to Teleinformatics Systems
o Definition and significance of teleinformatics in the modern world.
o Applications: communication, industry, services, education.
2. Basic Concepts and Communication Models
o Data, information, information processing.
o Basic communication model: sender, channel, receiver, interference, feedback.
3. Teleinformatics Infrastructure
o Infrastructure elements: network devices (routers, switches, access points).
o Transmission media: wired (copper cables, optical fibers) and wireless.
II. Data Transmission and Encoding
1. Analog and Digital Transmission
o Fundamentals of analog transmission: continuous signals, amplitude modulation, frequency modulation, phase modulation.
o Digital transmission: discrete signals, digital modulation (ASK, FSK, PSK).
o Differences and applications of analog and digital transmission.
2. Fundamentals of Encoding
o Data encoding: ASCII, Unicode.
o Signal encoding: binary, Manchester, RZ, and NRZ.

o Introduction to error-correcting codes (e.g., Hamming, CRC).
III. Computer Network Architecture
1. Communication Models
o OSI model: layers and their functions.
o TCP/IP model: protocols and their applications.
2. Network Protocols
o Ethernet and Wi-Fi: network access technologies.
o TCP/UDP: data transmission.
o IP (IPv4 and IPv6): addressing and packet routing.
3. Network Addressing and Configuration
o Basics of IP addressing: IP address, subnet mask, default gateway.
o DHCP protocol and DNS servers.
IV. Selected Concepts of Wireless and Wired Networks in Practice
• Cellular network concepts, WLAN, Bluetooth, and NFD communication.
• Issues arising from wireless communication, electromagnetic compatibility challenges, and radio security concerns.
V. Laboratories

Teaching methods

• Theoretical lectures with elements of case studies.
• Laboratory exercises covering the configuration and testing of computer networks, as well as the implementation of basic encoding algorithms.
• Discussions and analysis of practical examples.

Bibliography

Basic:
1. Andrew S. Tanenbaum, „Sieci komputerowe". 5th edition.
2. William Stallings, „Podstawy sieci komputerowych". 2003
3. Kurose, Ross, „Computer Networking: A Top-Down Approach". 2012

Additional:
1. Dokumentacja i standardy protokołów (np. RFC 791, RFC 793).
2. Materiały online: przewodniki konfiguracji urządzeń sieciowych (np. Cisco).

Breakdown of average student's workload

	Hours	ECTS
Total workload	130	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	70	2,50