



COURSE DESCRIPTION CARD - SYLLABUS

Course name

PO 2.2.2 Metody optymalizacji sieci teleinformatycznych - EC 2.2.2 ICT network optimization methods

Course

Field of study

Teleinformatics

Year/Semester

1/2

Area of study (specialization)

Profile of study

general academic

Level of study

second-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

Tutorials

0

Projects/seminars

0/0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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Prerequisites

- Has a basic understanding of the TCP / IP stack protocols



- Understands the communication process between network devices
- Has basic knowledge of routing protocols
- Is able to configure IP network nodes in terms of second and third layer protocols
- Is able to configure IP network nodes in terms of routing protocols
- He is ready to work in a group

Course objective

The aim of the module is to familiarize students with the methods of optimization of ICT networks. Students learn ICT network architectures as well as techniques and protocols for optimizing local and backbone networks. The aim of the module is also to familiarize students with the methods, techniques and tools used in the design and optimization of ICT networks.

Course-related learning outcomes

Knowledge

- He/She knows advanced methods of network modeling, design and optimization ICT
- Knows advanced techniques for solving optimization problems in ICT networks
- Has advanced knowledge of the architecture and configuration of ICT network devices and traffic flow management mechanisms in ICT networks

Skills

- Is able to educate independently, gaining the knowledge necessary to understand and solve problems occurring in ICT networks
- Can acquire knowledge from databases that store scientific articles and conference papers as well as standardization recommendations in the field of broadly understood issues of optimization of ICT networks
- Is able to work in a group, actively participating in the planning of the course and in the implementation of laboratory classes related to the optimization of ICT networks
- Can draw conclusions based on the results of experiments conducted during laboratory classes
- Can use ready-made tools and environments for monitoring and optimization of ICT networks

Social competences

- Is aware of the progress and the resulting need for continuous training in the field of optimization of ICT networks
- Is aware of the responsibility for joint work in teams implementing joint ICT projects
- Is aware of the responsibility for the results of his work, which has a direct impact on the safety of people and devices that make up ICT networks

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The learning outcomes presented above are verified as follows:
Assessment in the field of laboratory exercises is carried out by continuous assessment at each class (small tests, oral answers) and by the assessment obtained on the final test.



Assessment of lectures is verified by the assessment of knowledge shown in the exam.

The exam consists of 2 parts: the first part consists of answers to 10 theoretical questions and allows you to get 60% of the points, the second part is to solve two open tasks and allows you to get 40% of the exam points. To get the price of 3.0 it is necessary to get a minimum of eleven 51% points.

Programme content

The lecture will present techniques, methods, mechanisms and protocols used to optimize the operation of ICT networks. In the laboratory part, students will learn the principles of configuration of selected mechanisms and network optimization protocols.

- Architecture of modern ICT networks
- Technologies used in modern ICT networks
- Network automation and virtualization methods
- Methods of ensuring reliability in switching networks: link aggregation protocols and Ethernet rings,
- Techniques and methods supporting optimization of routing in corporate networks: rules of protocol selection and their effective use
- Techniques and methods supporting optimization of routing in backbone networks: rules of protocol selection and their effective use
- Rules for redistributing routing protocols
- Methods of introducing the IPv6 protocol to the ICT network
- Branch communication protocols: protocol selection and configuration
- Application of branch communication to provide services on the example of IPTV
- Virtualization of signaling mechanisms (e.g. L3VPN, EVPN)
- Using different encapsulation methods (MPLS vs VxLAN) in the transport network
- The impact of service quality assurance mechanisms on the design of ICT networks
- Tools supporting the design and optimization of ICT networks
- Procedures for the optimal design of ICT networks

Teaching methods

Conversational lecture (with discussion elements). Laboratory exercises are conducted in groups. Each group carries out its own practical task based on real Cisco Systems network devices.

Bibliography

Basic

1. Ch. E. Spurgeon, J. Zimmerman : "Ethernet. Biblia administratora", Helion, 2014
2. R. Froom, E. Frahim: "Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide: (CCNP SWITCH 300-115)", Cisco Press, 2015
3. D. Teare, B. Vachon, R. Graziani: "Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide: (CCNP ROUTE 300-101)", Cisco Press, 2015
4. R. Graziani: "IPv6 Fundamentals: A Straightforward Approach to Understanding IPv6", Cisco Press, 2017

Additional



1. T. Szigeti, Ch. Hattingh, R. Barton, K. Briley: "End-to-End QoS Network Design: Quality of Service for Rich-Media & Cloud Networks", Cisco Press, 2013
2. N. Kocharians: "CCIE Routing and Switching v5.1 Foundations: Bridging the Gap Between CCNP and CCIE", Cisco Press, 2017
3. J. Loveless, R. Blair, A. Durai: "IP Multicast, Volume II: Advanced Multicast Concepts and Large-Scale Multicast Design", Cisco Press, 2018

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4.0
Classes requiring direct contact with the teacher	64	3.0
Student's own work (preparation for tests, preparation for laboratory classes, preparation for exam, literature studies)	56	1.0