



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Routing protocols [N1EiT1>PR]

Course

Field of study

Electronics and Telecommunications

Year/Semester

4/8

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

20

Laboratory classes

0

Other

0

Tutorials

20

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

A student joining this course should have a basic knowledge in the field of computer networks and programming. She/he should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of a team.

Course objective

Providing students with basic knowledge of the routing mechanisms, routing algorithms and routing protocols necessary for the correct design and maintenance of packet networks. Developing student skills in solving problems arising in the design and maintenance of wide area networks based on the IP protocol.

Course-related learning outcomes

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Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired as part of the lecture is verified by an oral and / or written exam.

Test issues, on the basis of which questions are prepared, are sent to students by e-mail using the university e-mail system.

The written and / or oral exam consists of from 3 to 5 questions for which a descriptive answer is expected. Each answer to a question is rated on a scale of 0 to 5 points. Each question is scored equally. Passing threshold: 50% of points.

In the case of the oral test, students draw questions from a set of 30 questions. In the case of a written test, questions are selected by the teacher.

Skills acquired as part of tutorials are verified on an ongoing basis. At the end of each tutorial, the correctness of tasks is assessed on a scale of 2 to 5. The final grade is the average of grades obtained from individual tutorials.

Programme content

- IPv4 and IPv6 address space management methods
- Introduction to routing in IP networks;
- Distance vector algorithms;
- Link-state algorithms;
- Basics of optimization of routing protocols;
- Introduction to BGP.

Course topics

1. The lecture will cover the following issues:

- IPv4 and IPv6 address space management methods (subnets, supernets, address types, IPv4 and IPv6 address allocation);
- Introduction to routing in IP networks; classification and characteristics of routing protocols (intra-domain, inter-domain; distance vector, link state, path vector);
- Distance vector algorithms;
- Link-state algorithms;
- RIP2 and RIPng protocol;
- Single-area OSPF protocol for IPv4 and IPv6;
- OSPF multi-area protocol for IPv4 and IPv6;
- IS-IS protocol for IPv4 and IPv6;
- Basics of optimization of routing protocols;
- Introduction to BGP.

2. The following exercises will be conducted as part of the tutorials:

- Optimization of address space management (subnets, supernets)
- Implementation of BFS algorithm;
- Implementation of Dijkstra algorithm;
- Configuration of distance vector protocols;
- Configuration of the RIPng protocol and the default gateway in a network built of Cisco routers;
- OSPFv2 multi-area protocol configuration for IPv4;
- OSPFv3 multi-area protocol configuration for IPv4 and IPv6 using stuby and totally stuby areas;
- Configuration of multi-domain IS-IS protocol for IPv4 and IPv6;
- Modification of the administrative distance in multi-protocol networks;
- Introduction to BGP configuration in a multi-domain environment, analysis of BGP tables;
- Using the AS_PATH attribute to control traffic flow in networks with BGP protocol.

Teaching methods

Informative lecture: multimedia presentation, illustrated with examples on the board.

Tutorials: practical exercises in groups using PCs and network devices.

Bibliography

1. Network routing: algorithms, protocols, and architectures / Deep Medhi, Karthik Ramasamy, MK Morgan Kaufmann Publishers, 2018.
2. Routing i switching: praktyczny przewodnik / Bruce Hartpence; Wydawnictwo Helion, 2013.
3. Sieci VPN. Zdalna praca i bezpieczeństwo danych. Wydanie II rozszerzone, Marek Serafin, Helion 20 10.

Supplementary

1. Materiały dydaktyczne dostępne na platformie cisco.netacad.net w ramach Akademii Sieci Cisco prowadzonej w Instytucie Sieci Teleinformatycznych;
2. www.ietf.org

Breakdown of average student's workload

	Hours	ECTS
Total workload	110	4,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,00