COURSE DESCRIPTION CARD - SYLLABUS

Course name
Routing protocols

Course

Field of study
Electronics and Telecommunications
Area of study (specialization)
Computer Networks and Internet Technologies
Level of study
First-cycle studies
Form of study
full-time

Year/Semester
3/6
Profile of study
general academic
Course offered in
Polish
Requirements
elective

Number of hours

Lecture
15
Laboratory classes
15
Other (e.g. online)

Tutorials
0
Projects/seminars
0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

A student joining this course should have a basic knowledge in the field of computer networks. 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

Knowledge

1. A student has a basic knowledge of the development trends in the field of routing protocols.

2. A student has systematic, mathematical basic knowledge of the operation of routing algorithms and protocols.

3. A student has systematic knowledge of the most important standards of modern intra-domain and inter-domain routing protocols.

4. A student has basic knowledge of the operation of routing protocols in wide area and local packet networks.

5. A student has detailed knowledge of RIP, OSPF and IS-IS intra-domain routing protocol configuration and basic knowledge of BGP inter-domain routing protocol configuration.

Skills

1. A student as the ability to configure network devices in terms of routing protocols, both intra-domain RIP, OSPF and IS-IS, and inter-domain BGP.

2. A student can solve typical problems related to the selection of the optimal routing protocol.

Social competences

1. A student knows the limitations of his own knowledge and skills, understands the need for further training in the design, operation and configuration of routing protocols.

2. A student understands that knowledge and skills in the field of routing protocols very quickly become outdated.

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 test.

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 test 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 the laboratory are verified on an ongoing basis. At the end of each laboratory class, the correctness of configuration of network devices is assessed on a scale of 2 to 5. The final grade is the average of grades obtained from individual laboratory classes.

Programme content

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);

- 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 laboratory classes:

- 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.

Laboratory exercises: practical exercises in groups using Cisco / Huawei / Juniper routers.

Bibliography

Basic

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 2010.

Additional

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	75	3,0
Classes requiring direct contact with the teacher	31	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for a test [1]	44	1,0

[1] delete or add other activities as appropriate