

The syllabus of the discipline
Network operating systems

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Field name	Detailed content, comments
Name of the faculty	Faculty of Infocommunications
Level of higher education	First (bachelor's)
Code and name of the specialty	172 Telecommunications and radio engineering
Type and name of educational program	EPP "Information and Network Engineering"
Name of the discipline	Network operating systems
Number of ECTS credits	4
Discipline structure (distribution by types and hours of study)	24 hours - 12 lectures, 24 hours - 6 laboratory classes, 8 hours - 4 consultations, 64 hours - homework, type of control: credit
Schedule (terms) of studying the discipline	3rd year, V semester
Prerequisites for studying the discipline	students must study the discipline "Computing technology and microprocessors ", " Programming "and "Local area networks" for a systematic understanding of the features of network equipment configuration.
Competences, knowledge, skills, understanding, which is acquired by the applicant in higher education in the learning process	The discipline is used for formation the following competencies: universal packages of applied computer programs. FC-5. Ability to use regulatory and legal documentation specific to the field of telecommunications networks, telecommunication and radio systems (laws of Ukraine, technical regulations, international and national standards, recommendations of the International Union telecommunications, etc.). FC-6. Ability to conduct instrumental measurements in telecommunications networks, telecommunications and radio systems. FC-7. Willingness to monitor compliance and ensuring environmental safety. FC-8. Readiness to promote the introduction of advanced technologies and standards. FC-9. Ability to accept and development of new equipment in accordance with current regulations. FC-10. Ability to develop, manufacture, installation, adjustment, adjustment, adjustment, pilot testing, testing and delivery in operation of constructions, means and the equipment telecommunications and radio engineering. FC-15. Ability to perform calculations in the process of designing structures and means of telecommunication networks, telecommunication and radio systems in accordance with the terms of reference using both standard methods, techniques and means of design automation, and self-created original programs.

The quality of the educational process	Educational-methodical and material-technical resource provision of the educational program, within the framework of which the discipline is studied, meets the licensing requirements and accreditation conditions of the educational activity of the university. Annual monitoring and revision of the curriculum of the discipline in accordance with the requirements and recommendations of the Ministry of Education and Science, state certification of acquired competencies of graduates, standards of cooperation with employers to ensure a competitive level of training. Adherence to the principles of academic integrity (https://lib.nure.ua/plagiat). Contains public information on the requirements, competencies, level of education within the current educational program.
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Description and content of the discipline

The purpose of the discipline is to acquaint students with popular operating systems used in network equipment for various purposes. Acquisition of skills of configuration of the network equipment with use of the command interpreter of the corresponding operating system.

Content

Content module 1. Basic concepts. OS components

Topic 1. Introduction to operating systems. Basic terms and concepts

Topic 2. Features and limitations of hardware platforms

Topic 3. Types and features of network software

Topic 4. File systems

Content module 2. Network operating systems

Topic 1. Network hardware operating systems

Topic 2. Microsoft Windows networking capabilities

Topic 3. Implementing the Microsoft TCP / IP stack

Topic 4. UNIX and UNIX-like operating systems

Topic 5. Windows / UNIX operators and commands

Learning outcomes of higher education

As a result of studying the discipline, students must:

know: basic types of network operating systems, types of equipment where network operating systems are used, rules for setting up network equipment, basic commands for different network operating systems;

be able to: set and configure the parameters of a network device that has a network operating system, using a basic set of commands, perform network formation;

to possess (list of formed competencies): PRN1. Apply a thorough knowledge of the basic sections of higher mathematics (linear and vector algebra, differential calculus, integral calculus, functions of many variables, functional series, differential equations for functions of one and many variables, operational calculus, complex variable function theory, probability theory and mathematical statistics, theory random processes) to the extent necessary for the use of mathematical apparatus and methods in the field of telecommunications and radio

engineering. PRN2. Demonstrate knowledge and understanding of fundamental, natural and engineering disciplines, including physics, circuitry and microprocessor engineering, at the level required to achieve other outcomes of the educational program and solve common problems and problems of telecommunications and radio engineering. PRN3. Apply: basic knowledge in the field of informatics and modern information technologies, have skills in programming and use of software and work in computer networks, ability to create databases, use Internet resources and demonstrate the ability to develop algorithms and computer programs using high languages level and technologies of object-oriented programming for the implementation of tasks in the field of telecommunications and radio engineering. PRN4. Be able to use modern computer simulation tools to study the means of telecommunications and radio systems and networks. PRN5. Be able to use computer-aided design systems to develop devices for telecommunications and radio systems and networks. PRN6. Be able to use modern programming languages to implement algorithms for managing telecommunications networks. PRN7. Be able to work with tools of collective management and distributed storage. PRN8. Ability to analyze the performance of software products, have the means to debug them, and testing, apply modern technologies of visual design of software products. PRN9. Understand and take into account social, environmental, ethical, economic aspects, requirements of labor protection, industrial sanitation and fire safety in the formation of technical solutions. PRN10. Ability to calculate the parameters of efficiency and quality of work of elements, objects and services provided in telecommunications.

Assessment system according to each task for passing the test / exam

To assess the work of a student during the semester, the final rating score Q_{sem} is calculated as the sum of marks for different types of classes and control activities.

Type of lesson / control measure	Rating
Lc №1-6	$(1...2) \times 6 = 6...12$
Lb №1,2	$(9...12) \times 2 = 18...24$
Checkpoint 1	24...36
Lc №7-12	$(1...2) \times 6 = 6...12$
Lb №3-5	$(9...12) \times 3 = 27...36$
Practice Control testing	3...16
Checkpoint 2	36...64
Total for the semester	60...100

Each lecture is evaluated in 2 points (1 point for attendance, 1 point for active participation). Each laboratory work is evaluated in 12 points (1 point for attendance, 1 point for preparation, 10 points for defense). Auditory test ACR - 16 points. The maximum rating during the semester is 100 points.

The test is used as a form of final control in the discipline "Network Operating Systems".

Qualitative evaluation criteria in the national scale and ECTS

Satisfactory, D, E (60-74). Show the required minimum of theoretical knowledge. Know the ways and methods of solving practical problems and be able to use them in practice.

Well, C (75-89). Firmly know a minimum of theoretical knowledge. Demonstrate the ability to solve a practical problem and justify all stages of the proposed solution.

Excellent, A, B (90-100). Show complete knowledge of basic and additional theoretical material. Unmistakably solve a practical problem, explain and justify the chosen method of solution.

Assessment scale: national and ECTS

The sum of points for all types of educational activities	ECTS assessment	Score on a national scale	
		for exam, course project (work), practice	for offset
90 – 100	A	perfectly	credited
82-89	B	fine	
74-81	C	satisfactorily	
64-73	D		
60-63	E		
35-59	FX	unsatisfactory with the possibility of reassembly	not credited with the possibility of re-assembly
0-34	F	unsatisfactory with mandatory re-examination	not credited with compulsory re-study of the discipline

Methodical support

Basic literature

1. Olyfer V.H., Olyfer N.A. Setevye operatsyonnye systemy. Spb.: Yzdatelskyi dom Pyter, 2001.

Supporting literature

2. Karpov V.E., Konkov K.A. Osnovy operatsyonnykh system. Kurs lektsyi. M.: Ynternet-unyversytet ynformatsyonnykh tekhnolohyi, 2005. 536 s.
3. Tanenbaum Э. Sovremennye operatsyonnye systemy. SPb.: Yzdatelskyi dom Pyter, 2002.
4. Robachevskiy A. Operatsyonnaia systema UNIX. Spb.: BHV, 1999.
5. Bony Dzh. Rukovodstvo po Cisco IOS. Spb.: Pyter, 2008.

Methodical instructions for different types of classes

6. Metodychni vkazivky do laboratornykh robit z dystsypliny «Merezhni operatsiini systemy», dlia studentiv usikh form navchannia spetsialnosti 172 «Telekomunikatsii ta radiotekhnika», osvithnia prohrama «Telekomunikatsii»/ Uporiad.: V.O. Vlasova. – Kharkiv, KhNURE, 2018. – 36 s.

Information support

1. VirtualBox - virtualization software product.
2. Cisco Packet Tracer - a data network simulator manufactured by Cisco Systems.
3. Microsoft Windows 10 operating system.
4. CentOS or Ubuntu operating system.