

SYLLABUS
Fall semester 2025 – 2026 academic year
Educational program “6B06102 – Information Systems”

ID and name of course	Independent work of the student (IWS)	Number of credits			General number of credits	Independent work of the student under the guidance of a teacher (IWST)
		Lectures (L)	Practical classes (PC)	Lab. classes (LC)		
65731 – Fundamentals of Computer Networks and Telecommunications	4	1.7	-	3.3	5	7

ACADEMIC INFORMATION ABOUT THE COURSE

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Learning Format	Cycle, component	Lecture types	Types of practical classes	Form and platform final control
Offline	B, UC	Problem-oriented	Learning the theories of networking and configuring network devices	Oral offline
Lecturer - (s)	Vladislav Karyukin			
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Phone :	+77019405992			
Assistant - (s)	-			
e-mail :	-			
Phone :	-			

ACADEMIC COURSE PRESENTATION

Purpose of the course	Expected Learning Outcomes (LO) *	Indicators of LO achievement (ID)
	1. Know theoretical and methodological concepts of networking	1.1 Ability to build configure network topologies 1.2 Knowledge of the features and specifications of all seven layers of the OSI model
	2. Apply knowledge of working with CISCO network devices	2.1 Configuring switches and routers 2.2 Developing complex topologies
	3. Develop of the routing configurations	3.1 Configuring the communication between network devices and hosts in different networks 3.2 Configuring static and dynamic routes
	4. Configure the security of devices	4.1 Creating access control lists to prevent unauthorized traffic in the networks 4.2 Using DHCP and NAT protocols in the networks
Prerequisites	18070 – Operating Systems	
Postrequisites	84567 – Programming Technologies	
Learning Resources	Literature: main, additional. 1. Wendell O. “CCNA 200-301 Official Cert Guide Library,” Cisco Press, 2019. 2. Glen E Clarke (Author), Richard Deal (Author), “CCT/CCNA Routing and Switching All-in-One Exam Guide (Exams 100-490 & 200-301) 1st Edition,” 2021. 3. Andrew S. Tanenbaum. Computer Networks 5th By Andrew S. Tanenbaum (International Economy Edition) by Andrew S. Tanenbaum David J. Wetherall (2011-01-09). 4. Networking Essentials Lab Manual, Cisco Networking Academy, 2021. 5. James Kuros, Keith Ross. Computer Networking: A Top-Down Approach Hardcover – Student Edition, 2016. Research infrastructure 1. Business incubator № 12 2. Laboratory room 517	

	3. Laboratory room 323 4. Laboratory room 514 Professional scientific databases 1. Scopus – https://www.scopus.com 2. Elsevier – https://www.elsevier.com/ 3. Researchgate – https://www.researchgate.net/ Internet resources 1. Cisco Netacad – https://www.netacad.com/ 2. Basics of Cisco Networking – https://www.coursera.org/learn/basics-of-cisco-networking 3. IBM Computer Networking – https://www.ibm.com/think/topics/networking Software 1. Cisco Packet Tracer – https://www.netacad.com/cisco-packet-tracer 2. Networking – https://www.cisco.com/site/us/en/learn/topics/networking/what-is-networking-software.html 3. GNS 3 – https://www.gns3.com/
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Academic course policy	The academic policy of the course is determined by <u>the Academic Policy and the Policy of Academic Integrity of Al-Farabi Kazakh National University</u>. Documents are available on the main page of IS Univer . Integration of science and education. The research work of students, undergraduates and doctoral students is a deepening of the educational process. It is organized directly at the departments, laboratories, scientific and design departments of the university, in student scientific and technical associations. Independent work of students at all levels of education is aimed at developing research skills and competencies based on obtaining new knowledge using modern research and information technologies. A research university teacher integrates the results of scientific activities into the topics of lectures and seminars (practical) classes, laboratory classes and into the tasks of the IWS, which are reflected in the syllabus and are responsible for the relevance of the topics of training sessions and assignments. Attendance. The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course. Failure to meet deadlines results in loss of points. Academic honesty. Practical/laboratory classes, IWS develop the student's independence, critical thinking, and creativity. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of completing tasks are unacceptable. Compliance with academic honesty during the period of theoretical training and at exams, in addition to the main policies, is regulated by <u>the "Rules for the final control" , "Instructions for the final control of the autumn / spring semester of the current academic year" , "Regulations on checking students' text documents for borrowings"</u>. Documents are available on the main page of IS Univer. Basic principles of inclusive education. The educational environment of the university is conceived as a safe place where there is always support and equal attitude from the teacher to all students and students to each other, regardless of gender, race / ethnicity, religious beliefs, socio-economic status, physical health of the student, etc. All people need the support and friendship of peers and fellow students. For all students, progress is more about what they can do than what they can't. Diversity enhances all aspects of life. All students, especially those with disabilities, can receive counseling assistance by phone / e- mail vladislav.karyukin@gmail.com / +77019405992 or via video link in MS Teams https://teams.microsoft.com/l/channel/19%3A3NCyVOKXFPQhtoOyKFhXIIOkF5YRYULY7dYixOVgNrM1%40thread.tacv2/General?groupId=dfbde614-a63e-4574-8d2e-727d4b7a85bf&tenantId=b0ab71a5-75b1-4d65-81f7-f479b4978d7b Integration MOOC (massive open online course). In the case of integrating MOOC into the course, all students need to register for MOOC. The deadlines for passing MOOC modules must be strictly observed in accordance with the course study schedule. ATTENTION! The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course, as well as in the MOOC. Failure to meet deadlines results in loss of points.
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INFORMATION ABOUT TEACHING, LEARNING AND ASSESSMENT				
Score-rating letter system of assessment of accounting for educational achievements				Assessment Methods
Grade	Digital equivalent points	points, % content	Assessment according to the traditional system	Criteria-based assessment is the process of correlating actual learning outcomes with expected learning outcomes based on clearly defined criteria. Based on formative and summative assessment. Formative assessment is a type of assessment that is carried out in the course of daily learning activities. It is the current measure of progress. Provides an operational relationship between the student and the teacher. It allows you to determine the capabilities of the student, identify difficulties, help achieve the
A	4.0 _	95-100	Great	
A-	3.67	90-94		

	3.33	85-89	Fine	best results, timely correct the educational process' for the teacher. The performance of tasks, the activity of work in the classroom during lectures, seminars, practical exercises (discussions, quizzes, debates, round tables, laboratory work, etc.) are evaluated. Acquired knowledge and competencies are assessed. Summative assessment - type of assessment, which is carried out upon completion of the study of the section in accordance with the program of the course. Conducted 4 times per semester when performing IWS. This is the assessment of mastering the expected learning outcomes in relation to the descriptors. Allows you to determine and fix the level of mastering the course for a certain period. Learning outcomes are evaluated.	
B	3.0	80-84		Formative and summative assessment	Points % content
B-	2.67	75-79		Activity at lectures	5
C+	2.33	70-74		Work in practical classes	20
C	2.0	65-69	Satisfactorily	Independent work	25
C-	1.67	60-64		Design and creative activity	10
D+	1.33	55-59		Final control (exam)	40
D	1.0	50-54		TOTAL	100
FX	0,5	25-49	Unsatisfactory		
F	0	0-24			

Calendar (schedule) for the implementation of the content of the course. Methods of teaching and learning.

A week	Topic name	Number of hours	Max. ball
MODULE 1 OSI model's layers			
1	L 1. Introduction to Networking	1	
	LC 1. The IOS Operating System	2	
2	L 2. Transport layer	1	
	LC 2. Cisco IOS devices	2	
3	L 3. Networking layer	1	
	LC 3. The life of a packet	2	
4	L 4. IP addressing	1	
	LC 4. The Cisco troubleshooting methodology	2	
5	L 5. Class addresses	1	
	LC 5. Cisco router and switch basics	2	
MODULE 2 Routing configuration			
6	L 6. Classless addresses	1	3
	LC 6. Cisco device management	2	15
	ISWT1. Consultation on implementation of ISW1 "Building an extended network topology and configuring IP addresses". Acceptance of ISW1		25
7	L 7. Data layer and physical layer	1	1
	LC 7. Routing fundamentals	2	15
	IWST 2. Consultations on the implementation of IWS 2 "Building an extended network topology and static routing"		
8	L 8. Network devices	1	1
	LC 8. Dynamic routing protocols	2	15
	IWST 3. Acceptance of ISW2		25
Midterm control 1			100
9	L 9. Network troubleshooting	1	1
	LC 9. Interior gateway protocol (IGP). Fundamental configuration	2	5
	IWST 4. Consultations on the implementation of IWS 3 "Building an extended network topology, static and dynamic routing"		
10	L 10. Device management	1	1
	LC 10. OSPF configuration	2	8
MODULE 3 DHCP and NAC configuration			
11	L 11. Routing fundamentals	1	1
	LC 11. VLAN and Inter-VLAN routing configuration	2	10
	IWST 5. Acceptance of ISW3		20
12	L12. Routing distances	1	1
	LC 12. DHCP configuration	2	10
13	L 13. DHCP configuration	1	1
	LC 13. ACL configuration	2	10
	IWST 6. Consultation on the implementation of IWS 4 "Building a network with DHCP and ACL"		

14	L 14. Access control lists	1	1
	LC 14. NAT configuration	2	10
15	L 15. NAT	1	1
	LC 15. IPv6 configuration	2	10
	IWS 7. Acceptance of IWS 4		10
Midterm control 2			100
Final control (exam)			100
TOTAL for course			100

RUBRICATOR OF THE SUMMATIVE ASSESSMENT CRITERIA FOR ASSESSING LEARNING RESULTS

IWS1. Building an extended network topology and configuring IP addresses (25% of 100% MC1)				"Unsatisfactory" 0-5%
Criterion	"Great" 21-25%	"Fine" 11-20%	"Satisfactory" 6-10%	
Knowledge and understanding of the basic elements of the network topology and configuration	Understanding the degree of relevance, relevance, and reliability of the data found. Knowledge and understanding of all basic elements of the network topology and configuration	Understanding the degree of relevance, relevance and reliability of the data found. Knowledge of most elements of the network topology and configuration	Limited understanding of the appropriateness, relevance, and validity of basic elements of the network topology and configuration	Superficial understanding/lack of understanding of the degree of relevance, relevance, and reliability of the data found. Lack of knowledge of basic elements of the network topology and configuration
Designing skills	Clear presentation of the network topology and configuration	There are minor logical errors in the network topology and configuration	A large number of logical errors in the network topology and configuration	No network topology and configuration
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing, and the clarity needs improvement.	The writing is unclear, and it is not easy to follow the content. Lots of errors in the text

IWS2. Building an extended network topology and static routing (25% of 100% MC1)

Criterion	"Great" 21 - 25%	"Fine" 11-20%	"Satisfactorily" 6-10%	"Unsatisfactory" 0-5%
Working with extended network topology and static routing	Understand the degree of compliance, relevance, and reliability of routing protocols. Knowledge and understanding of extended network topology and static routing	Understanding the degree of relevance, relevance, and reliability of routing protocols. Knowledge of extended network topology and static routing	Limited understanding of the consistency, relevance, and validity of extended network topology and static routing	Superficial understanding/lack of understanding of the degree of compliance, relevance, and reliability of routing protocols. Lack of knowledge of extended network topology and static routing
Designing skills	Clear and clear presentation of extended network topology and static routing	There are small logical errors in the extended network topology and static routing	A large number of logical and syntax errors in the extended network topology and static routing	No network topology and static routing
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing, and the clarity needs improvement.	The writing is unclear, and it is difficult to follow the content. Lots of errors in the text

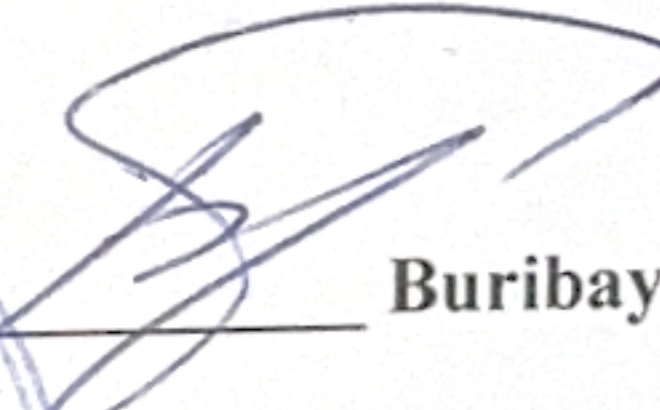
IWS3. Building an extended network topology, static and dynamic routing (20% of 100% MC2)

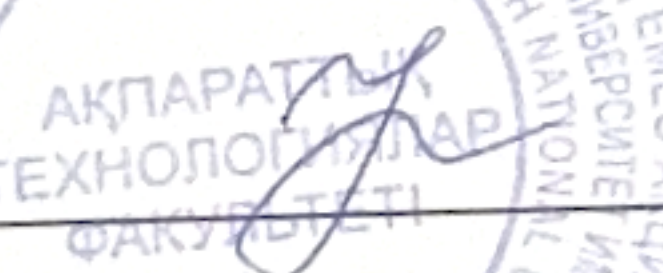
Criterion	"Great" 16 - 20%	"Fine" 11 - 15%	"Satisfactory" 6 - 10%	"Unsatisfactory" 0-5%
Knowledge of static and dynamic routing	Full understanding of network topology, static and dynamic routing	Almost complete understanding of static and dynamic routing	Partial understanding of static and dynamic routing	Lack of understanding of static and dynamic routing
Writing program code for test tasks	Clear and clear presentation of the program code, absence of syntax errors in the code	There are small logical errors in the program code	A large number of logical errors in network topology, static, and dynamic routing	No network topology, static, and dynamic routing
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing, and the clarity needs improvement.	The writing is unclear, and it is not easy to follow the content. Lots of errors in the text

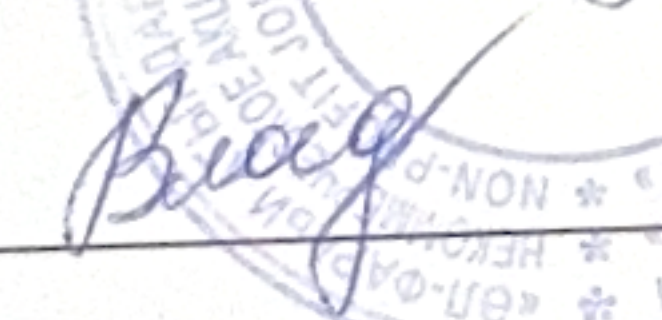
IWS4. Building a network with DHCP and ACL (10% of 100% MC2)

Criterion	"Great" 8-10%	"Fine" 5-7%	"Satisfactory" 3-4%	"Unsatisfactory" 0-2%
Knowledge and understanding of the network with DHCP and ACL	Understand the consistency, relevance, and reliability of working with the network with DHCP and ACL	Understand the consistency, relevance, and reliability of working with Python libraries. Knowledge and understanding of the network with DHCP and ACL	Limited understanding of the network with DHCP and ACL	Superficial understanding/lack of understanding of the network with DHCP and ACL
Development skills	Clear presentation of the network with DHCP and ACL	There are small logical errors in the network with DHCP and ACL	A large number of logical errors in the network with DHCP and ACL	No network with DHCP and ACL
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing, and the clarity needs improvement.	The writing is unclear, and it is not easy to follow the content. Lots of errors in the text

Dean  Imankulov T.S.

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