



"Approved"  
Dean  
Syzdykova Z.A.  
2024

**Syllabus**  
**Academic Year 2024- 2025**

<b>1. General information</b>	
Course title	Computer Networks
Degree cycle (level)/ major	"6B06102" Software Engineering
Year, term	3, 7
Number of credits	5
Language of delivery:	English
Prerequisites	Information and communications technology (ICT)
Postrequisites	Recommending to take Cisco CCNA exam
Lecturer(s)	Nurzhaubayeva Gulsaya Sakenovna, MSc in Science, Senior Lecturer <a href="mailto:g.nurzhaubayeva@astanait.edu.kz">g.nurzhaubayeva@astanait.edu.kz</a> Yessenbek Sanida, MSc in Science, Senior Lecturer <a href="mailto:sanida.y.y@gmail.com">sanida.y.y@gmail.com</a> Kuttybek Azhar Armankzyz, MSc in Science, Senior Lecturer <a href="mailto:kuttybek.azhar@mail.ru">kuttybek.azhar@mail.ru</a> Contact details: Expo C1, Room C1.1.329
<b>2. Goals, objectives and learning outcomes of the course</b>	
1. Course description	"Computer Networks" is a 10-week course, where students will learn both the practical and conceptual skills to design and analyze computer communication networks. The course will cover basic and in-depth the most important concepts in contemporary networking and prepare students to plan and implement a network. Students will have hands-on experience using Cisco Packet Tracer network simulator tool by practicing every single chapter on labs.
2. Course goal(s)	Course goal is to introduce students with the fundamental building blocks that form a modern network, such as protocols, topologies, hardware, and network operating systems. Moreover, to provide in-depth coverage of the most important concepts in contemporary networking, such as TCP/IP, Ethernet, wireless transmission, and security. Finally, to prepare students to pass Cisco certification exam (CCNA).
3. Course objectives:	Students will: <ul style="list-style-type: none"><li>- Examine human versus network communication and see the parallels between them</li><li>- Cover common network components, architectures, and designs</li><li>- Examine IPv4 and IPv6 structure, basic and advanced subnetting</li><li>- Cover Ethernet switching technologies, Virtual LANs, STP</li><li>- Be introduced and examine the OSI and TCP/IP layers in detail to</li></ul>

	<p>understand their functions and services</p> <ul style="list-style-type: none"> <li>- Gain an understanding of the "layered" approach to networks</li> <li>- Become familiar with the various network devices and network addressing schemes</li> <li>- Discover the types of media used to carry data across the network</li> </ul>
4. Skills & competences	<ul style="list-style-type: none"> <li>- have hands-on experience and solve problems using Cisco Packet Tracer network simulator;</li> <li>- understand both the practical and conceptual skills to design and analyze computer communication networks.</li> </ul>
5. Course learning outcomes:	Students will have a good understanding of the main elements that work together to form the Internet; will get familiar with diagnostic tools, network application development, and typical network designs and configurations. Students will be able to build LANs, build small and medium scale network topologies, perform configurations for routers and switches, implement IP addressing schemes and understand Network automation tools and latest Cisco products.
6. Methods of assessment	Weekly quizzes and assignments; Mid-term and End-term examination;
7. Reading list	<ol style="list-style-type: none"> <li>1. Computer Networks, Global Edition 6th Edition 2021- Andrew Tanenbaum, David Wetherall.</li> <li>2. Computer Networks: A Systems Approach (The Morgan Kaufmann Series in Networking) 6th Edition 2021- Larry L. Peterson, Bruce S. Davie.</li> <li>3. Computer Networking: A Top-Down Approach, 6Th Edn, 2021</li> <li>4. Mayers Mike. CompTIA A+ Certification : All-in-One Exam Guide / M. Mayers, S. Jernigan. - 10 ed. - San Francisco : McGraw-Hill Education, 2019. - 1524 p. - ISBN 978-1-260-45403-1 : 25500.00. 004 - K64</li> <li>5. Lecture slides (available on moodle.astanait.edu.kz);</li> <li>6. Cisco Networking Academy Program CCNA 1 and 2 Companion Guide</li> <li>7. CCNA 200-301 Official Cert Guide Volume 1</li> </ol>
8. Resources	Online journals, article, papers, books and internet resources (Cisco Networking Academy).
9. Course policy	<p><b>Course and university policies include:</b></p> <p><b>Attendance:</b> Students are expected to attend all scheduled class sessions with all required reading and supplementary materials. Readings are to be completed prior to class.</p> <p>The student won't obtain additional points for course attendance, but the attendance is important to pass the course. In case the student is not able to attend the classes for some reasons, he/she must inform the teacher in advance and the student itself is responsible for learning all materials, which were given during unattended lessons.</p> <p>In case if the student did not attend more than 30% of the classes without any reasonable excuses, the teacher has a right to mark him as "not graded", and the student wouldn't be admitted to the exam. In other words,</p>

	<p>students must participate in at least <b>70%</b> of all class time, otherwise he/she fails the course.</p> <p><b>Preparation for Class:</b> Class participation is a very important part of the learning process in this course. Although not explicitly grade, students will be evaluated on the <b>QUALITY</b> of their contributions and insights. Quality comments possess one or more of the following properties:</p> <ul style="list-style-type: none"> <li>- Offers a different and unique, but relevant, perspective;</li> <li>- Contributes to moving the discussion and analysis forward;</li> <li>- Builds on other comments.</li> </ul> <p><b>Class work:</b> The duration of each lecture and practical lesson is 50 minutes for offline class. Students are expected to complete all readings and assignments ahead of time, attend class regularly and participate in class discussions. In case of systemic student's misconduct, the student would be dispensed from the classes.</p> <p><b>Being late on class:</b> When students come to class late, it can disrupt the flow of a lecture or discussion, distract other students, impede learning, and generally erode class morale. Moreover, if left unchecked, lateness can become chronic and spread throughout the class. By the policy of this course, students who come late to class for more than 5 minutes are not allowed to get in to class and consequently, they will be marked as "absent" for the specific hour.</p> <p><b>Home work / Assignments:</b> The assignments are designed to acquaint students with the theoretical knowledge and practical skills required for the course. The textbook readings will be supplemented with materials collected from recent professional articles and journals. In case of using someone's work (papers, articles, any publications), all works must be properly cited. Failure to cite work will be resulted as a cheating from the students and may be a subject of additional disciplinary measures.</p> <p><b>Late assignments:</b> Most assignments will be discussed in class on the due date, therefore late assignments will not receive credit. It is expected that all work will be submitted on time. Failure to pass assignments in on time will result in 0% for the assignment. In other words, no late submissions are allowed. All gradings are based using a percentage grading scale.</p> <p><i>In the event of some extraordinary event, students should notify the teacher and request an extension of the deadline. If approved, a new date will be given to the student depending upon the circumstances.</i></p> <p><b>Mid-term examination / End-term examination:</b> Two examinations will be held throughout the course and consist of two parts together. The first part is a multiple-choice test, which covers the most theoretical part the course. The second part is multiple-choice test for practical questions of covered materials in the course.</p> <p><b>Final exam:</b> The final exam for the course includes two parts with overall two hours duration. The first part is a multiple-choice test which covers the</p>
--	--

most theoretical part of the course. The second part is practical questions where it is expected from the students to work with practical problems.

**Laptops and mobile devices** can only be used for classroom purposes when directed by the teacher. Misuse of laptops or handheld devices will be considered a breach of discipline and appropriate action will be initiated by the teacher.

**Online lessons** can be used in case if there won't be a chance to make offline traditional lessons. It must not discourage the interest and enthusiasm of students. The main software to run the online lessons is Microsoft Teams for video calls and live webinars, and Moodle ([moodle.astanait.edu.kz](http://moodle.astanait.edu.kz)) as a Learning Management System.

**Cheating and plagiarism** are defined in the Academic conduct policies of the university and include:

1. Submitting work that is not your own papers, assignments, or exams;
2. Copying ideas, words, or graphics from a published or unpublished source without appropriate citation;
3. Submitting or using falsified data;
4. Submitting the same work for credit in two courses without prior consent of both instructors.

Any student who is found cheating or plagiarizing on any work for this course will receive 0 (zero) for that work and further actions will also be taken regarding academic conduct policies of the university.

**Academic Conduct Policies of the university:** The full texts of all the academic conduct code will be posted to the students using Learning Management System ([moodle.astanait.edu.kz](http://moodle.astanait.edu.kz)).

**Contacting the Instructor (Teacher):** The easiest and the most reliable way to get in touch with the teacher is by email. Students must feel free to send emails if they have a question related to the course. The teacher will respond as soon as he can but not always instantaneously. Besides that, students are also welcome to arrange one-to-one meeting with the teacher during office hours to discuss the class.

### 3. Course Content

#	Abbreviation	Meaning
1	TSIS	Teacher-supervised independent work
2	SIS	Students' independent work

#### 3.1 Lecture, practical/seminar/laboratory session plans

Week No	Course Topic	Lectures (H/W)	Practice sessions (H/W)	Lab. sessions (H/W)	TSIS (H/W)	SIS (H/W)

1	Communication in a Connected World. Network Components, Types, and Connections. Wireless and Mobile Networks. Build a Home Network	2	3	0	1	9
2	Communication Principles. Network Media. The Access Layer. The Internet Protocol.	2	3	0	1	9
3	IPv4 Addressing. IPv6 Addressing. <u>Dynamic Addressing with DHCP.</u>	2	3	0	1	9
4	Gateways to Other Networks	2	3	0	1	9
5	Address Resolution	2	3	0	1	9
6	Routing Between Networks	2	3	0	1	9
7	Transport Layer. Application Layer Services. The Client-Server Relationship. Network Application Services. DNS. Web Client Servers.	2	3	0	1	9
8	FTP Clients and Servers. Virtual Terminals. Email and Messaging.	2	3	0	1	9
9	Network Testing Utilities.	2	3	0	1	9
10	Troubleshooting Commands. Summary.	2	3	0	1	9
<b>Total hours: 150</b>		<b>20</b>	<b>30</b>	<b>0</b>	<b>10</b>	<b>90</b>

### 3.2 List of assignments for Student Independent Study

Nº	Assignments (topics) for Independent study	Hours	Recommended literature and other sources (links)	Form of submission
1	2	3	4	5
1	Wireless Standards. Set Up a Home Router	9	Books, internet resources	Labs
2	The IPv4 Address Structure.	9	Books, internet resources	Labs
3	Dynamic Addressing with DHCP.	9	Books, internet resources	Labs
4	Network Address Translation (NAT)	9	Books, internet resources	Labs
5	The Address Resolution Protocol (ARP) Process	9	Books, internet resources	Labs
6	Local and Remote Network Segments	9	Books, internet resources	Labs
7	Domain Name System. Web Clients and Servers	9	Books, internet resources	Labs
8	Application Layer Services.	9	Books, internet resources	Labs
9	Troubleshooting Commands.	9	Books, internet resources	Labs

10	Network Testing Utilities Summary.	9	Books, internet resources	Labs
----	---------------------------------------	---	---------------------------	------

#### 4. Student performance evaluation system for the course

Period	Assignments	Number of points	Total
1 <sup>st</sup> attestation	Assignment 1 (week 1) Assignment 2 (week 2) Assignment 3 (week 3) Assignment 4 (week 4) Assignment 5 (week 5)	20 20 20 20 20	100
	<b>Midterm grade is average of all assignments in 5 weeks</b>		
	* Each assignment is a combination of tasks including Labs, practical assessments and other forms of submission depending on the topic of the week.		
2 <sup>nd</sup> attestation	Assignment 6 (week 6) Assignment 7 (week 7) Assignment 8 (week 8) Assignment 9 (week 9) Assignment 10 (week 10)	20 20 20 20 20	100
	<b>End-term grade is average of all assignments in 5 weeks</b>		
	* Each assignment is a combination of tasks including Labs, practical assessments and other forms of submission depending on the topic of the week.		
Final exam	<b>Final Exam (on Moodle system)</b>		100
<b>Total</b>	<b>0,3 * 1<sup>st</sup> Att + 0,3 * 2<sup>nd</sup> Att + 0,4*Final</b>		<b>100</b>

Achievement level as per course curriculum shall be assessed according to the evaluation chart adopted by the academic credit system.

Letter Grade	Numerical equivalent	Percentage	Grade according to the traditional system
A	4,0	95-100	Excellent
A-	3,67	90-94	
B+	3,33	85-89	
B	3,0	80-84	Good

B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	
C-	1,67	60-64	
D+	1,33	55-59	Satisfactory
D	1,0	50-54	
FX	0	25-49	
F	0	0-24	Fail

Based on the specific grade for each assignment, and the final grade, following criteria must be satisfied:

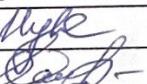
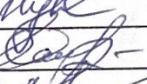
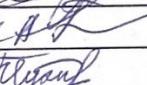
Grade	Criteria to be satisfied
90-100	<ul style="list-style-type: none"> <li>- Work would be worthy of further dissemination under appropriate conditions</li> <li>- Mastery of advanced methods and techniques at a level beyond that explicitly taught</li> <li>- Ability to synthesize and employ in an original way idea from across the subject</li> <li>- Outstanding command of critical analysis and judgment</li> </ul>
80-89	<ul style="list-style-type: none"> <li>- Excellent range and depth of attainment of intended outcomes</li> <li>- Mastery of a wide range of methods and techniques</li> <li>- Evidence of study and originality of what has been taught</li> <li>- Able to display a command of critical analysis and judgement</li> </ul>
70-79	<ul style="list-style-type: none"> <li>- Attained all the intended learning outcomes for a unit</li> <li>- Able to use well a range of methods and techniques to come to conclusions</li> <li>- Able to employ critical analysis and judgement</li> </ul>
60-69	<ul style="list-style-type: none"> <li>- Some limitations in attainment of learning objectives, but has managed to grasp most of them</li> <li>- Able to use most of the methods and techniques taught</li> <li>- Evidence of study and comprehension of what has been taught but grasp insecure</li> <li>- Some grasp of the issues and concepts underlying the techniques and material taught, but weak and incomplete</li> </ul>
50-59	<ul style="list-style-type: none"> <li>- Attainment of only a minority of the learning outcomes</li> <li>- Able to demonstrate a clear but limited use of some of the basic methods and techniques taught</li> <li>- Weak and incomplete grasp of what has been taught</li> <li>- Deficient understanding of the issues and concepts underlying the techniques and material taught</li> </ul>
25-49	<ul style="list-style-type: none"> <li>- Attainment of nearly all the intended learning outcomes deficient</li> <li>- Lack of ability to use at all or the right methods and techniques taught</li> <li>- Inadequately and incoherently presented</li> <li>- Wholly deficient grasp of what has been taught</li> <li>- Lack of understanding of the issues and concepts underlying the techniques and material taught</li> </ul>
0-24	No significant assessable material, absent or assessment missing a must pass component

### 3. Methodological Guidelines

Assessment is administered continuously throughout the course. The students are rated against their performance in continuous rating administered throughout the semester (60%) and summative rating done during the examination session (40%), total 100%. Continuous rating is students' on-going performance in class and independent work. Class work is assessed for attendance, laboratory works' defense and in-class assessments.

- **TSIS (Teacher Supervised Student Independent Study)** -comprises presentation to be done by students independently and checked by Instructor.
- **Mid-term and End-term** is a review of the topics covered and assessment of each student's knowledge. The form of the midterm and endterm exams is complex.
- **Final assessment** for the course "Model Based Design" includes a number of questions and problems to be answered and solved. If final examination will be online then at the completion of the exam, all works must be submitted as single PDF file in the Learning Management System ([moodle.astanait.edu.kz](http://moodle.astanait.edu.kz)). No late submissions are allowed in the exam. If final examination will be offline then at the completion of the exam, all works (hard copies of exam solution papers) must be given to the Instructor.

#### 4. Lecturer (lecturers) approvals

Full name	Job title	Date	Signature
Nurzhaubayeva Gulsaya	Senior Lecturer	29.08.2024	
Yessenbek Sanida	Senior Lecturer	29.08.2024	
Kuttybek Azhar	Senior Lecturer	29.08.2024	
Mukhtarova Zamira	Instructor	29.08.2024	