**Syllabus**

**Spring semester 2021-2022**

**On the educational program «6B06102 – Information systems»**

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| Discipline’s code | | Name of the discipline | Individual student work  (ISW) | A number of hours in a week | | | | Number of credits | Individual student work with teacher (ISWT) | |
| **Lectures (L)** | **Practical training (PT)** | **Laboratory (LW)** | |
| AS 3220 | | Network administration | 98 | 15 | – | 30 | | 5 | 6 | |
| Academic information about the course | | | | | | | | | | |
| Type of studying | | **Type of the course** | **Type of the lecture** | | **Type of the practice** | | **The number of ISW** | | | **Type of the final control** |
| Offline / Online | | Theoretical, practical | Problem-oriented | | Learning the theories of networking and configuring network devices | | 3 | | | Written exam |
| Lecturer | | Karyukin Vladislav Igorevich | | | | | Office hour | | | Scheduled |
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| Academic course presentation | | | | | | | | | | |
| Aim of course | **Expected Learning Outcomes (LO)**  As a result of studying the discipline the undergraduate will be able to: | | | | **Indicators of LO achievement (ID)**  (for each LO at least 2 indicators) | | | | | |
| This course aims to study the concepts of Python programming language and understand their practical implementation by solving real-life practical problems of varying complexity.  This course aims at developing the understanding of the networking, Cisco devices’ configuration and troubleshooting and | 1. Know theoretical and methodological concepts of networking | | | | * 1. Ability to build configure network topologies   2. Knowing the features and specifications of all seven layers of the OSI model | | | | | |
| 1. Apply knowledge of working with CISCO network devices | | | | 2.1 Configuring switches and routers 2.2 Developing complex topologies | | | | | |
| 1. Development of the routing configurations | | | | 3.1 Configuring the communication between network devices and hosts in different networks  3.2 Configuring static and dynamic routes | | | | | |
| 1. Configuring the security of devices | | | | 4.1 – creating access control lists to prevent unauthorized traffic in the networks 4.2 – use DHCP and NAT protocols in the networks | | | | | |
| Prerequisites | Information and communication technologies | | | | | | | | | |
| Postrequisites | Cloud technologies | | | | | | | | | |
| Literature | **Main:** Wendell O. “CCNA 200-301 Official Cert Guide Library,” Cisco Press, 2019.[Glen E Clarke](https://www.amazon.com/Glen-E-Clarke/e/B001KD1TU6/ref=dp_byline_cont_book_1) (Author), [Richard Deal](https://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&field-author=Richard+Deal&text=Richard+Deal&sort=relevancerank&search-alias=books) (Author), “CCT/CCNA Routing and Switching All-in-One Exam Guide (Exams 100-490 & 200-301) 1st Edition,”, 2021.Andrew S. Tanenbaum. Computer Networks 5th By Andrew S. Tanenbaum (International Economy Edition) by Andrew S. Tanenbaum David J. Wetherall (2011-01-09). **Additional:** Networking Essentials Lab Manual, Cisco Networking Academy, 2021James Kuros, Keith Ross. Computer Networking: A Top-Down Approach Hardcover – Student Edition, 2016. **Resources**  **-** Software and internet resources: Packet tracer, CISCO CCNA course  **Online availability**: additional study materials, homework assignments and projects can be found in EMCD at univer.kaznu.kz. | | | | | | | | | |
| Academic policy of the course in the context of university moral and ethical values | **Rules of academic conduct**: 1. For each classroom session, you should prepare in advance according to the schedule below. The preparation of the assignment should be completed before the classroom session where the topic is discussed. 2. Academic values: 1. IWS laboratory exercises should be independent, creative. 2. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of knowledge control are inadmissible Students with disabilities can receive consulting assistance by email –  [vladislav.karyukin@gmail.com](mailto:vladislav.karyukin@gmail.com) | | | | | | | | | |
| Evaluation and attestation policy | **Criteria evaluation**: assessment of learning outcomes in relation to descriptors (checking the formation of competencies at midterm control and exams). **Summative evaluation**: assessment of the activity of work in the classroom; assessment of the completed assignment.  The final grade for the discipline is calculated according to the following formula:  , here, BC – boundary control; MT - midterm; FC – final control (exam).  6.5. The scale of assessment is given in the curriculum (syllabus) (especially for 1st year graduates):   |  |  |  |  | | --- | --- | --- | --- | | Evaluation by letter system | Numerical equivalent of points | Points (in %) | Evaluation according to the traditional system | | А | 4,0 | 95-100 | Excellent | | А- | 3,67 | 90-94 | | В+ | 3,33 | 85-89 | Good | | В | 3,0 | 80-84 | | В- | 2,67 | 75-79 | | С+ | 2,33 | 70-74 | | С | 2,0 | 65-69 | Satisfactory | | С- | 1,67 | 60-64 | | D+ | 1,33 | 55-59 | | D | 1,0 | 50-54 | | FX | 0,5 | 25-49 | Unsatisfactory | | F | 0 | 0-24 | | | | | | | | | | |

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| Week | A name of the topic | LO | ID | Amount of hours | Maximum score | Form of Knowledge Assessment | Form of the lesson  /platform |
| 1 | **L1.** Introduction to Networking | LO1 | ID 1.1. | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 1 | **LW1**. The IOS Operating System | LO1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 2 | **L2.** Transport layer | LO1 | ID 1.2 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 2 | **LW2.** Cisco IOS devices | LO1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 3 | **L3.** Networking layer | LO1 | ID 1.2 | 1 | 0 |  | Offline |
| 3 | **LW3**. The life of a packet | LO1 | ID 1.2 | 2 | 10 | A report in Word file | Offline |
| 3 | **ISWT1.** Consultation on implementation of ISW1. Building the advanced network topology and configuring IP addresses | LO1 | ID 1.1 |  | 25 | Quiz | Offline |
| 4 | **L4.** IP addressing | LO1 | ID 1.1 | 1 | 0 |  | Offline |
| 4 | **LW4**. The cisco troubleshooting methodology | LO1 | ID 1.1  ID 1.2 | 2 | 10 | A report in Word file | Offline |
| 5 | **L5.** Class addresses | LO1 | ID 1.1 | 1 | 0 |  | Offline |
| 5 | **LW5.** Cisco router and switch basics | LO1  LO3 | ID 1.1  ID 3.1  ID 3.2 | 2 | 10 | A report in Word file | Offline |
| 5 | **ISWT2.** The check of ISW1 | LO1 | ID 1.1  ID 1.2  ID 1.3 |  | 25 | Presentation | Offline |
| 5 | **BC 1** |  |  |  | 100 |  |  |
| 6 | **L6.** Classless addresses | LO1 | ID 1.1  ID 1.2 | 1 | 0 |  | Offline |
| 6 | **LW6.** Cisco device management | LO1 | ID 1.1 | 2 | 10 | A report in Word file | Offline |
| 7 | **L7.** Data layer and physical layer | LO1 | ID 1.1 | 1 | 0 |  | Offline |
| 7 | **PT7.** Routing fundamentals | LO1 | ID 1.1  ID 1.2 | 2 | 10 |  | Offline |
| 7 | **ISWT3.** Consultation on doing ISW2. Building the advanced network topology and configuring static and dynamic routing | LO2  LO3 | ID 2.1  ID 2.2  ID 3.1 |  | 25 | Quiz | Offline |
| 8 | **L8.** Network devices | LO1 | ID 1.1 | 1 | 0 |  | Offline |
| 8 | **LW8**. Dynamic routing protocols | LO1 | ID 1.1 | 2 | 10 | A report in Word file | Offline |
| 9 | **L9.** Network troubleshooting | LO1  LO2 | ID 1.1  ID 2.2 | 1 | 0 |  | Offline |
| 9 | **LW9.** Interior gateway protocol (IGP) Fundamentals configuration | LO1 | ID 1.2 | 2 | 10 | A report in Word file | Offline |
| 10 | **L10.** Device management | LO1  LO2 | ID 1.1  ID 2.1  ID 2.2 | 1 | 0 |  | Offline |
| 10 | **LW10.** OSPF configuration | LO3 | ID 3.1  ID 3.2 | 2 | 10 | A report in Word file | Offline |
| 10 | **ISWT4.** The check of ISW2 | LO2  LO3 | ID 2.1  ID 2.2  ID 3.1 |  | 25 | Presentation | Offline |
| 10 | **МТ (Midterm Exam)** |  |  |  | 100 |  | Offline |
| 11 | **L11.** Routing fundamentals | LO1 | ID 1.2 | 1 | 0 |  | Offline |
| 11 | **LW11.** VLAN and Inter-VLAN routing configuration | LO3 | ID 3.1  ID 3.2 | 2 | 10 | A report in Word file | Offline |
| 12 | **L12.** Routing distances | LO3 | ID 3.1  ID 3.2 | 1 | 0 |  | Offline |
| 12 | **LW12.** DHCP configuration | LO4 | ID 4.2 | 2 | 10 | A report in Word file | Offline |
| 13 | **L13.** DHCP configuration | LO4 | ID 4.2 | 1 | 0 |  | Offline |
| 13 | **LW13.** ACL configuration | LO4 | ID 4.1 | 2 | 10 | A report in Word file | Offline |
| 13 | **ISWT5.** Consultation on the implementation of ISW3. Building the advanced network topology and configuring ACLs | LO4 | ID 4.2 |  | 20 | Quiz | Offline |
| 14 | **L14.** Access control lists | LO4 | ID 4.1 | 1 | 0 |  | Offline |
| 14 | **LW14.** NAT configuration | LO4 | ID 4.2 | 2 | 10 | A report in Word file | Offline |
| 15 | **L15.** NAT | LO4 | ID 4.1  ID 4.2 | 1 | 0 |  | Offline |
| 15 | **LW15.** IPv6 configuration | LO2 | ID 2.1  ID 2.2 | 2 | 10 | A report in Word file | Offline |
| 15 | **ISWT6.** The check of ISW3 | LO2  LO4 | ID 2.1  ID 2.2  ID 4.1  ID 4.2 |  | 10 | Presentation | Offline |
|  | **BC 2** |  |  |  | 100 |  |  |

Abbreviations: – QS – questions for self-examination; ST - standard tasks; IT - individual tasks; Q - quiz; IC - intermediate control.

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