ХАЛЫҚАРАЛЫҚ АҚПАРАТТЫҚ ТЕХНОЛОГИЯЛАР УНИВЕРСИТЕТІ
МЕЖДУНАРОДНЫЙ УНИВЕРСИТЕТ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ
INTERNATIONAL UNIVERSITY OF INFORMATION TECHNOLOGY

Faculty of Computer Technology and Cybersecurity

Department of Computer Engineering and Information Security

APPROVED BY
Vice-rector for academic affairs,
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_____ Umarov T.F.
"31" 03 2021

6B06303
(Code of Academic Program)

Network Security
(Name of Academic Program)

CATALOGUE OF ELECTIVE DISCIPLINES

2021 entry year

2021

The catalogue of elective disciplines for the specialty/AP 6B06303 - Network Security is developed on the basis of the working curriculum of the specialty/AP.

The catalogue of elective disciplines was discussed at a meeting of the Computer Engineering and Information Security department

minutes No. 7 from "15" 02 2021

~~Acting~~ Head of Dep _____ M.T. Ipalakova

CED compilers _____ S.T. Amanzholova

_____ A.O. Sagymbekova

The catalogue of elective disciplines was approved at a meeting of the Academic Council of JSC IITU

minutes No. 4 from "30" 03 2021

Head of the Department
of Academic Affairs _____ A.K. Mustafina

1 TERMS AND ABBREVIATIONS

1. 1 Academic program is a single set of basic characteristics of education, including goals, results and content of training, the organization of educational process, ways and methods for their implementation and criteria for assessing learning outcomes. The content of academic program of higher education consists of three cycles of disciplines - general education disciplines (hereinafter - GED), basic disciplines (hereinafter - BD) and core disciplines (hereinafter - CD). The cycle of GED includes disciplines of the compulsory component (hereinafter - CC), the university component (hereinafter - UC) and (or) the component of choice (hereinafter - COC). BD and CD include disciplines of UC and COC.

1. 2 Catalogue of elective disciplines (CED) is a systematic annotated list of all COC disciplines, for the entire training period, containing a brief description indicating the purpose of study, a summary of main sections and expected learning outcomes. CED reflects the prerequisites and postrequisites of each academic discipline. It should provide the students with the possibility of an alternative choice of elective disciplines for the formation of an individual educational trajectory.

On the basis of academic program and CED, the students develop individual curricula with the help of advisers.

1. 3 Individual curriculum (IC) is a curriculum formed by the students independently with the help of an adviser for each academic year on the basis of the academic program, the catalogue of elective disciplines or modules;

IC defines an individual educational trajectory of each student separately. It includes disciplines and types of educational activities (internship, experimental research, forms of final certification) of the compulsory component (CC), the university component (UC) and the component of choice (COC).

1. 4 Advisor is a teacher who performs the functions of an academic mentor of a student (according to the appropriate academic program), and assists in choosing a learning path (creating an individual curriculum) and mastering the academic program during the training period.

1. 5 The university component is a list of compulsory educational disciplines determined by the university independently for the mastering of the academic program.

1. 6 The component of choice is a list of academic disciplines and the corresponding minimum amounts of academic credits offered by the university and independently chosen by students in any academic period, taking into account their prerequisites and postrequisites.

1. 7 Elective disciplines are educational disciplines that are a part of the university component and the component of choice in the framework of established academic credits, introduced by organizations of education reflecting the individual preparation of students and taking into account the specifics of socio-economic development, the needs of a particular region and established scientific schools.

1. 8 Postrequisites are the disciplines and (or) modules and other types of academic work, the study of which requires knowledge, skills and competencies acquired at the end of the study of this discipline and (or) modules;

1. 9 Prerequisites are the disciplines and (or) modules and other types of educational work containing knowledge, abilities, skills and competencies necessary for the mastering of the studied discipline and (or) modules;

1. 10 Competencies are the ability of the practical use of acquired knowledge and skills in professional activities.

2 ELECTIVE DISCIPLINES

№	Cycle of discipline	Code of discipline	Name of discipline	Semester	Number of credits	Prerequisites
			3 *year*			
1	BD	SFT6206	Development of corporate applications on the Django framework	6	6	SFT6202Object-Oriented programming language (Java)
2	PD	SFT6204	Python programming language	5	5	SFT6202Object-Oriented programming language (Java)
3	PD	NET6203	Security and automation of corporate networks	4	5	NET6303Basics of routing, switching and wireless networks
4	PD	NET6204	DevNet	4	5	NET6201Computer Networking Basics
			4 *year*			
5	PD	NET6205	Connecting Networks	7	6	NET6201Computer Networking Basics
6	PD	SEC6207	Analytics of Information Security Center	7	6	SEC6201 Computer Information Protection Technologies
7	PD	SEC6208	Practical pentesting	7	6	SEC6202Security of operating systems
8	PD	SEC6209	Network security	7	6	NET6203 Security and automation of corporate networks

3 DESCRIPTION OF ELECTIVE DISCIPLINES

Discipline description	
Code of discipline	SFT6206
Name of discipline	Development of corporate applications on the Django framework
Number of credits (ECTS)	6
Course, semester	3,6
Department	CE&IS
Prerequisites	SFT6202Object-Oriented programming language (Java)
Postrequisites	Diploma project
Brief course description	Django is a full-featured server-side web framework written in Python. The Django framework handles a large number of tasks and increased workloads. It is used to create: CRM systems, CMS, Communication platforms, room reservation services, document management platforms. The course examines the creation of modern web applications on this framework.
Expected learning outcomes	- design and build Django web applications -test Django web applications -apply built-in security framework for web application

Discipline description	
Code of discipline	SFT6204
Name of discipline	Python programming language
Number of credits (ECTS)	5
Course, semester	3,5
Department	CE&IS
Prerequisites	SFT6202Object-Oriented programming language (Java)
Postrequisites	Diploma project
Brief course description	This course is designed to familiarize students with the Python programming language and its libraries. The structure of the course focuses on procedural programming, algorithm design, application work forms (libraries), object-oriented programming, creating web and database applications, and data preprocessing using pandas and numpy. In addition, this course provides students with an understanding of the use of lax variable types.
Expected learning outcomes	Code, test, build, and debug full-featured and complex applications in the Python programming language.

Discipline description	
Code of discipline	NET6203
Name of discipline	Security and automation of corporate networks
Number of credits (ECTS)	4
Course, semester	3,5
Department	CE&IS
Prerequisites	NET6303Basics of routing, switching and wireless networks
Postrequisites	Diploma project
Brief course description	This course describes the architectures and aspects related to the design, security, operation, and troubleshooting of corporate networks. It covers wide area network (WAN) technologies and quality of service (QoS) mechanisms used for secure remote access, as well as the implementation of software-defined networking, virtualization, and automation concepts that support the digitalization of networks.

Expected learning outcomes	Ability to work with routers and switches using OSPF in point-to-point and multiple-access networks. Eliminate network security threats with access control lists and security best practices. Develop critical thinking and problem solving skills with real equipment. Know about virtualization, SDN, and how APIs and configuration management tools can automate the network.

Discipline description	
Code of discipline	NET6204
Name of discipline	DevNet
Number of credits (ECTS)	4
Course, semester	3, 5
Department	CE&IS
Prerequisites	NET6201Computer Networking Basics
Postrequisites	Diploma project
Brief course description	This course introduces the methodologies and tools of modern software development applied to IT and network operations. It covers a complete overview of the domain, including microservices, testing, containers, and DevOps, as well as secure infrastructure automation through application programming interfaces (APIs).
Expected learning outcomes	Gain hands-on, up-to-date lab experience, including Python programming, using GIT and common data formats (JSON, XML, and YAML), deploying applications as containers, using continuous integration / continuous deployment (CI / CD) pipelines, and infrastructure automation using code. Skills development for entry-level software development and infrastructure automation

Discipline description	
Code of discipline	NET6205
Name of discipline	Connecting Networks
Number of credits (ECTS)	6
Course, semester	4, 7
Department	CE&IS
Prerequisites	NET6201Computer Networking Basics
Postrequisites	Diploma project
Brief course description	This course focuses on the LAN and WAN technologies and network services required in a complex network. Students will learn and configure HDLC, PPP, PPPoE, IPSec/GRE, MPLS, Segment Routing, etc.
Expected learning outcomes	- integrate several LAN technologies and protocols from previous networking courses - implement WAN interconnection - provide security solutions for IP networks - manage networks in a unified manner

Discipline description	
Code of discipline	SEC6207
Name of discipline	Analytics of Information Security Center
Number of credits (ECTS)	6

Course, semester	4, 7
Department	CE&IS
Prerequisites	SEC6201 Computer Information Protection Technologies
Postrequisites	Diploma project
Brief course description	This course introduces security concepts, attack techniques, and security monitoring. The course enables students to understand security concepts and begin to learn the basic security techniques used by the Trust Center to search for threats on the network using a variety of popular security tools for real network infrastructure.
Expected learning outcomes	Explain how to investigate enterprise endpoint vulnerabilities and attacks. Respond to network security alerts. Work with log files Analyze data on intrusion into the enterprise network. Apply incident response models to manage security incidents in the enterprise.

Discipline description	
Code of discipline	SEC6208
Name of discipline	Practical pentesting
Number of credits (ECTS)	6
Course, semester	4, 7
Department	CE&IS
Prerequisites	SEC6202Security of operating systems
Postrequisites	Diploma project
Brief course description	This course is tightly integrated with a laboratory component that introduces students to various aspects of practical exploit techniques for software and networks on Windows, Linux, and Android operating systems. The course also teaches students about various important practical attacks on OSI layers and how to eliminate them.
Expected learning outcomes	Have a basic knowledge of shell coding and exploit development. Have a working knowledge of conducting systematic penetration testing against a target Search, analyze and execute a specific exploit Have basic knowledge of finding software bugs Working knowledge of the Metasploit Framework

Discipline description	
Code of discipline	SEC6209
Name of discipline	Network security
Number of credits (ECTS)	6
Course, semester	4, 7
Department	CE&IS
Prerequisites	NET6203 Security and automation of corporate networks
Postrequisites	Diploma project
Brief course description	This course introduces the fundamental principles of security concepts and skills required to troubleshoot and monitor computer networks and ensure the integrity of devices and data.
Expected learning outcomes	Design, implement and maintain the security of network devices and data.