INTERNATIONAL UNIVERSITY

Faculty of Computer Technology and Cybersecurity
Department of Cybersecurity

7M06108

Computer Technology and Cybersecurity

CATALOGUE OF ELECTIVE DISCIPLINES

2023 entry year

2023

The catalogue of elective disciplines for the specialty/AP 7M06108 Computer Technology and Cybersecurity is developed on the basis of the working curriculum of the specialty/AP.

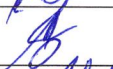The catalogue of elective disciplines was discussed at a meeting of the Cybersecurity department

minutes No. __2__ from «_03_» _11_ 2023

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

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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
1 year						
1	BD	SEC7208	Artificial intelligence and data analytics	2	5	SFT6211 Organization of database management systems
2	BD	SEC7207	Neural networks	2	5	SFT6210 Python programming language
3	BD	SEC7210	IT process integration	2	5	SEC6204 Project Management in Information Security
4	BD	HRD7201	Hardware-technologies for SMART systems	2	5	SEC6252 Smart Technology
5	PD	NET7201	Cloud Resource Management	1	5	SEC6234 Introduction to Cloud Technologies
6	PD	NET7202	Virtualization technologies	1	5	EGR6202 Information Theory
7	PD	SEC7235	Monitoring of information interaction processes	1	5	SEC6244 Identity and Access Management
8	PD	SEC7236	Modeling of computer technology and cybersecurity processes	1	5	MAT6018 Mathematical foundations of information security
2 year						
9	BD	HRD7202	Internet of Things and Big Data Analytics	3	5	SFT6211 Organization of database management systems
10	BD	SFT7201	Machine Learning	3	5	SFT6210 Python programming language
11	PD	SEC7217	DevOps	3	5	SEC6204 Project Management in Information Security
12	PD	SFT7203	Distributed computing using blockchain	3	5	SEC6238 Blockchain Technologies

3 DESCRIPTION OF ELECTIVE DISCIPLINES

Discipline description	
Code of discipline	SEC7208
Name of discipline	Artificial intelligence and data analytics
Number of credits (ECTS)	5
Course, semester	1,2
Department	CYBERSECURITY
Prerequisites	SFT6211 Organization of database management systems
Postrequisites	Research work of a master's student
Brief course description	During the course of studying the discipline, undergraduates will master the basics of machine learning and Python capabilities for data analysis, study the main stages and directions of research in the field of artificial intelligence systems, the basics of machine learning, the basics of Python for data analysis and processing, data-based learning
Expected learning outcomes	As a result of the training, undergraduates will have the skills to manage big data, apply machine learning algorithms, pre-process data arrays, analyze data and present results. They develop solutions based on artificial intelligence for various tasks and industries, conduct technical audits for the potential of implementing AI solutions, and train personnel in specialized programs.

Discipline description	
Code of discipline	SEC7207
Name of discipline	Neural networks
Number of credits (ECTS)	5
Course, semester	1,2
Department	CYBERSECURITY
Prerequisites	SFT6210 Python programming language
Postrequisites	Research work of a master's student
Brief course description	The purpose of mastering the discipline is to study the methods of neural network synthesis and their practical application.
Expected learning outcomes	As a result of the training, undergraduates will be able to solve the problems of pattern recognition, prediction, optimization, associative memory and management in relation to information security systems

Discipline description	
Code of discipline	SEC7210
Name of discipline	IT process integration
Number of credits (ECTS)	5
Course, semester	1,2
Department	CYBERSECURITY
Prerequisites	SEC6204 Project management in information security
Postrequisites	Research work of a master's student
Brief course description	In the course of studying the discipline, undergraduates will apply methods of data and process integration in existing IT systems, and will also use integration projects to build service-oriented and event–oriented architectures.
Expected learning outcomes	They will be able to choose the optimal platforms for solving integration tasks, as well as conduct audit, analysis and optimization of business processes. Solve the problems of determining the optimal-sufficient set and migration path of legacy IT systems based on the construction of ontological models, also conduct comprehensive testing and maintenance of integration solutions.

Discipline description

Code of discipline	HRD7201
Name of discipline	Hardware-technologies for SMART systems
Number of credits (ECTS)	5
Course, semester	1,2
Department	CYBERSECURITY
Prerequisites	SEC6252 Smart technologies
Postrequisites	Research work of a master's student
Brief course description	The main purpose of this discipline is to study and master modern methods and tools of virtualization. During the course, undergraduates perform a number of tasks to deploy their own virtual space and use ready-made virtualization services to create a virtual IT infrastructure.
Expected learning outcomes	They will learn how to fully and partially integrate into virtual spaces

Discipline description

Code of discipline	NET7201
Name of discipline	Cloud Resource Management
Number of credits (ECTS)	5
Course, semester	1,1
Department	CYBERSECURITY
Prerequisites	SEC6234 Introduction to Cloud Technologies
Postrequisites	Research work of a master's student
Brief course description	The discipline is designed to study methods of computing load distribution and storage using cloud services.
Expected learning outcomes	During the course of the discipline, undergraduates will get acquainted with cloud platforms, master the methods of deploying disk spaces, study ways to calculate the distribution and optimization of the load on cloud servers

Discipline description

Code of discipline	NET7202
Name of discipline	Virtualization technologies
Number of credits (ECTS)	5
Course, semester	1,1
Department	CYBERSECURITY
Prerequisites	EGR6202 Information theory
Postrequisites	Research work of a master's student
Brief course description	Familiarization of undergraduates with modern hardware components of SMART systems, mastering methods for solving problems of creating smart devices.
Expected learning outcomes	As a result of mastering the discipline, the ability to perform work on the installation, configuration and maintenance of software, hardware and hardware and their components for various SMART systems.

Discipline description

Code of discipline	SEC7235
Name of discipline	Monitoring of information interaction processes
Number of credits (ECTS)	5
Course, semester	1,1

Department	CYBERSECURITY
Prerequisites	SEC6244 Identity and Access management
Postrequisites	Research work of a master's student
Brief course description	In this discipline, undergraduates will study the processes of information interaction such as network infrastructure management; management of enterprise infrastructure policies; access control of end devices: ensuring the integrity of information assets; ensuring the reliability of Internet resources.
Expected learning outcomes	Knows event monitoring systems designed to automate the process of collecting and analyzing information about events coming from various sources

Discipline description	
Code of discipline	SEC7236
Name of discipline	Modeling of computer technology and cybersecurity processes
Number of credits (ECTS)	5
Course, semester	1,1
Department	CYBERSECURITY
Prerequisites	MAT6018 Mathematical foundations of information security
Postrequisites	Research work of a master's student
Brief course description	In the course of studying the discipline, undergraduates will apply multiphase models of queuing and queuing networks in relation to authentication processes; disclose examples of the implementation of authentication protocols that allow them to explore all possible options for protocols and calculate their main characteristics; consider the issues of creating a model, calculating their characteristics and describes the process of creating a program in the GPSS modeling language.
Expected learning outcomes	He is able to analyze various technologies and protocols of wireless networks to build their models and identify the main characteristics

Discipline description	
Code of discipline	HRD7202
Name of discipline	Internet of Things and Big Data Analytics
Number of credits (ECTS)	5
Course, semester	2,3
Department	CYBERSECURITY
Prerequisites	SFT6211 Organization of database management systems
Postrequisites	Research work of a master's student
Brief course description	This discipline examines the basic principles of the Internet of Things (IoT), their ubiquitous communication infrastructure, global identification of each object, the ability of an object to send and receive data via a personal network or the Internet. The main directions of application of the Internet of Things (IoT) are described.
Expected learning outcomes	Undergraduates know modern international scientific projects based on the Internet of Things (IoT) technology. They know the areas of generating, collecting, transmitting, analyzing and distributing a huge amount of data from numerous sensors of the Internet of Things and learn how to structure and analyze them

Discipline description	
Code of discipline	SFT7201
Name of discipline	Machine learning
Number of credits (ECTS)	5
Course, semester	2,3

Department	CYBERSECURITY
Prerequisites	SFT6210 Python programming language
Postrequisites	Research work of a master's student
Brief course description	During the course of studying the discipline, undergraduates will apply machine learning methods at all stages of the process from scalable clustering methods used for preprocessing the incoming file stream in the infrastructure to reliable and compact models for behavioral analysis that are created based on deep neural networks and work directly on user devices.
Expected learning outcomes	Develops technologies taking into account the serious requirements for machine learning methods

Discipline description

Code of discipline	SEC7217
Name of discipline	DevOps
Number of credits (ECTS)	5
Course, semester	2,3
Department	CYBERSECURITY
Prerequisites	SEC6204 Project management in information security
Postrequisites	Research work of a master's student
Brief course description	During the course of studying the discipline, undergraduates will synchronize the stages of software product development, QA, and will automate their tasks, program and quickly learn new tools. When developing a work plan, undergraduates will be able to determine which architecture to use in the program, how exactly scaling will occur, which orchestration system is best used. Next, they will automate code verification, server configuration, and testing.
Expected learning outcomes	Apply a methodology that helps automate workflows and make them seamless, which allows you to increase the speed and productivity of developers, testers and system administrators

Discipline description

Code of discipline	SFT7203
Name of discipline	Distributed computing using blockchain
Number of credits (ECTS)	5
Course, semester	2,3
Department	CYBERSECURITY
Prerequisites	SEC6238 Blockchain Technologies
Postrequisites	Research work of a master's student
Brief course description	The course is dedicated to the application of blockchain technologies in distributed resources. The course also examines the practical use of blockchain technologies in the creation of applications, when used in conjunction with artificial intelligence technologies, for filtering and identification, and the use of blockchain technologies in big data analysis.
Expected learning outcomes	After successful completion of the course, undergraduates will: -know the principles of blockchain, -use blockchain for storing and transmitting digital data.