ХАЛЫҚАРАЛЫҚ АҚПАРАТТЫҚ ТЕХНОЛОГИЯЛАР УНИВЕРСИТЕТІ
МЕЖДУНАРОДНЫЙ УНИВЕРСИТЕТ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ
INTERNATIONAL UNIVERSITY

Faculty of Computer Technology and Cybersecurity

Department of "Radio engineering, electronics and telecommunications"

APPROVED BY
Vice-rector for academic affairs,
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(Signature) (Full name)
"14" 03 2023

B059 – Communications and communication technology

6B06203 – Mobile telecommunication technologies
(Name of Academic Program)

CATALOGUE OF ELECTIVE DISCIPLINES

for 2023 year enrollment

2023

The catalogue of elective disciplines for the specialty/AP 6B06203 – Mobile telecommunication technologies 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 department of "Radio engineering, electronics and telecommunications"

minutes No. 7 from "09" 02 2023.

Head of Department _____ Bakhtiyarova, Ye.A. C.T.S.
signature Full name, position, degree

CED compiler _____ Kabatayeva R.S., PhD
signature Full name, position, degree

The catalogue of elective disciplines was approved at a meeting of the Academic Council of "International Information Technology University" JSC minutes No. 3 from « 14 » 03 2023.

Head of the Department _____ A. Ajibayeva
for Educational and Methodological Affairs

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	Sem	Number of credits	Prerequisites
Basic disciplines					
Elective disciplines					
3rd year					
Elective group - 1	EEC 6641	Programming in C++ (1)	5	4	Information and communication technology (in English)
	EEC 6642	Programming in Phyton (1)			Information and communication technology (in English)
	EEC 6643	Programming in Java (1)			Information and communication technology (in English)
Elective group - 2	EEC 6644	Programming in C++ (2)	6	4	Programming in C++ (1)
	EEC 6645	Programming in Phyton (2)			Programming in Phyton (1)
	EEC 6646	Programming in Java (2)			Programming in Java (1)
2nd year					
Elective group - 3	EEC 6608	Computer and mathematical modeling	4	4	Information and communication technology (in English)
	EGR 6600	Engineering and computer graphics			Information and communication technology (in English)
Profile disciplines					
Elective disciplines					
3rd year					
Elective group - 4	EEC 6652	Theory and technology of radio navigation and radar systems	6	4	Radio engineering devices
	EEC 6653	Fiber-optic communication systems			Theory of electromagnetic wave transmission
4th year					
Elective group - 5	EEC 6607	Programming in microprocessor systems	7	4	Theory of electrical circuits
	EEC 6654	Application of artificial intelligence in wireless communication systems			Radio engineering devices
	EEC 6655	Development on IOS/Android			Programming in Java (2)
Elective group - 6	EEC 6656	Approaches to 6G	8	4	Radio engineering devices
	EEC 6657	Organization and protection of information security in mobile networks			Radio engineering devices

3 DESCRIPTION OF ELECTIVE DISCIPLINES

Basic disciplines

Description of discipline 1

Description of discipline 1	
Code of discipline	EEC 6641
Name of discipline	**Programming in C++ (1)**
Number of credits (ECTS)	4 (1+0+2)
Course, semester	3 course, 5 sem
Department	Radioengineering. Electronics and Telecommunications
Course author (s)	Senior-lecturer. Kamal R.Zh.
Prerequisites	Information and communication technology (in English)
Postrequisites	Programming in C++ (2)
The aim of study of a discipline	Course Objectives: • provide the student with basic knowledge in the field of imperative programming and algorithms; • to provide the student with sufficient knowledge in these areas so that he can be prepared to take advanced courses in these areas; • provide the student with the knowledge in these areas necessary to continue his/her main course of study in science or engineering; • to develop the student's analytical approach to solving problems both in science and in "everyday life"; • to develop in the student an understanding of the role of science in our modern society, as well as in the past and in the future.
Brief course description (main sections)	History of C++. Variables and types. Block diagram. Building blocks. Declaring variables. Operators. Iterative operators (cycles). Arrays. Multidimensional arrays. Character sequences. Functions. Recursion. Recursive function. Data structures. Pointers. Files. Pointers and arrays. Sorting. Sorting. Classes.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Students who have studied the course "Programming in C++ (1)" will be able to solve the following professional tasks • to formulate the basic concepts and principles for solving problems related to computer science; • determine the types of variables for solving practical problems; • compare and contrast different ways of solving a problem after testing the program; • explain the developed program documentation; • List data structures, operators, and basic algorithmic constructs in C++.

Description of discipline 1

Description of discipline 1	
Code of discipline	EEC 6642
Name of discipline	**Programming in Phyton (1)**
Number of credits (ECTS)	4 (1+0+2)
Course, semester	3 course, 5 sem
Department	Radioengineering. Electronics and telecommunications
Course author (s)	Senior-lecturer. Kamal R.Zh.
Prerequisites	Information and communication technology (in English)
Postrequisites	Programming in Phyton(2)
The aim of study of a discipline	The goal of this course is to teach the student the basics of computer programming using Python. We will cover the basics of how you can

	build a program based on a series of simple instructions in Python. The course has no prerequisites and does not include any math material other than the most elementary.
Brief course description (main sections)	This course teaches the basics of Python 3 programming. We'll start at the very beginning with variables, conditions, and loops, and move on to some intermediate stuff like keyword parameters, list comprehensions, lambda expressions, and class inheritance.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	As a result of mastering the discipline, the student must: Be able to write relatively advanced, well structured computer programs in Python Be familiar with the principles and methods of optimization Performance of Numeric Python Applications

Description of discipline 1

Description of discipline 1	
Code of discipline	EEC 6643
Name of discipline	**Programming in Java (1)**
Number of credits (ECTS)	4 ECTS (1 + 0 + 2)
Course, semester	3 course, 5 sem
Department	Radioengineering. Electronics and telecommunications
Course author (s)	Senior-lecturer. Kamal R.Zh
Prerequisites	Information and communication technology (in English)
Postrequisites	Programming in Java (2)
The aim of study of a discipline	Learn front-end development from determining the functionality of websites to web page layout and back-end development using modern web technologies.
Brief course description (main sections)	The course content covers the following web technologies: REST API, JAX RS, Hibernate ORM, Spring MVC Framework, Spring Security, Tomcat Server, Servlet API, JSP. During the semester, students will learn the development of enterprise systems in the Java programming language, as well as the correct use of servlets and JSP. Students must understand the MVC pattern while developing a secure web application. Students will be able to practice real web projects and assignments. In addition, students will be able to explore new trending technologies through research.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Upon successful completion of the course, students will be able to: – analyze advanced web technologies to solve various types of problems, – explain and justify the use of java web development tools for specific purposes – know the Java programming language, the basics of servlets and JSP (Java Server Pages). – ORM library hibernation. – develop secure corporate server-client web applications. implement a solution to the problem using the selected algorithms in a familiar software and analytical environment

Description of discipline 2

Description of discipline 2	
Code of discipline	EEC 6644
Name of discipline	**Programming in C++ (2)**

Number of credits (ECTS)	4
Course, semester	3, 6
Department	Radioengineering. Electronics and telecommunications
Course author (s)	Senior-lecturer. Kamal R.Zh.
Prerequisites	Programming in C++ (1)
Postrequisites	Programming in embedded systems, Diploma project
The aim of study of a discipline	Course Objectives: • provide the student with the knowledge in these areas necessary to continue his/her main course of study in science or engineering; • develop the student's analytical approach to solving problems both in science and in "everyday life"; • to develop in the student an understanding of the role of science in our modern society, as well as in the past and in the future.
Brief course description (main sections)	This course is a continuation of the C++ Programming (1) course. In it, we continue to get acquainted with the possibilities of the C ++ language. The course covers: - C++ integer types - pairs and tuples - function templates - inheritance and polymorphism - iterators and standard algorithms - distribution of code across multiple files
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Students who have studied the course "Programming in C ++ (2)" will be able to solve the following professional tasks • compare and contrast different ways of solving a problem after testing the program; • explain the developed program documentation; • List data structures, operators, and basic algorithmic constructs in C++. • Be able to write relatively advanced, good structured computer programs in C++.

Description of discipline 2

Description of discipline 2	
Code of discipline	EEC 6645
Name of discipline	**Programming in Phyton (2)**
Number of credits (ECTS)	4
Course, semester	3, 6
Department	Radioengineering. Electronics and telecommunications
Course author (s)	Senior-lecturer. Kamal R.Zh.
Prerequisites	Programming in Phyton (1)
Postrequisites	Programming in embedded systems, Diploma project
The aim of study of a discipline	Learn to write relatively advanced, well-structured computer programs in Python; be familiar with the principles and techniques for optimizing the performance of numerical Python applications; have understanding of parallel computing and how parallel applications can be written in Python; experiment with developing GPU-accelerated Python applications; develop applications in Python, using big data services such as Hadoop and Spark.

Brief course description (main sections)	In this course, we will cover a number of advanced techniques improve the performance of programs on including the use of parallel computing and GPU acceleration. We will also look at how Python can Use for analysis big using frameworks such as Apache Hadoop and Apache Spark. Students will have the opportunity use these methods and gain hands-on experience development of advanced applications in Python.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	As a result of mastering the discipline, the student must: Be able to write relatively advanced, well structured computer programs in Python Be familiar with the principles and methods of optimization Performance of Numeric Python Applications Understand parallel computing and how parallel applications can be written in Python Experiment with developing Python applications with GPU acceleration Develop applications in Python using big data services like Hadoop and Spark

Description of discipline 2

Description of discipline 2	
Code of discipline	EEC 6646
Name of discipline	**Programming in Java (2)**
Number of credits (ECTS)	4
Course, semester	3, 6
Department	Radioengineering. Electronics and telecommunications
Course author (s)	Senior-lecturer. Kamal R.Zh.
Prerequisites	Programming in Java (1)
Postrequisites	Programming in embedded systems, Diploma project
The aim of study of a discipline	The course will introduce students to object-oriented programming using Java. Students are expected to know the basics of scalar types (integers, strings, booleans) and fundamental control structures in procedural programming (loops, assignment statements, conditionals). Finally, it will include a brief introduction to the Java Framework and Java JDBC.
Brief course description (main sections)	This course has been designed to introduce the student to the Java language. Java GUI, Java Database will be studied in this course. The unique architecture of Java allows programmers to develop a single application that can run seamlessly and reliably across multiple platforms. In this hands-on course, students gain extensive experience with Java and its object-oriented features. Students learn how to build robust console and graphical applications as well as store and retrieve data from relational databases.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Build robust console and graphical applications Understand the concept of OOP, as well as the purpose and principles of use inheritance, polymorphism, encapsulation and method overloading. Determine the classes, objects, class members, and relationships between them that are necessary for a particular problem. Build Java applications using robust OOP techniques (eg interfaces and APIs) and proper program structuring (eg use of access control identifiers, automatic documentation via comments, error exception handling).

Description of discipline 3

Description of discipline 3	
Code of discipline	EEC 6608
Name of discipline	**Computer and mathematical modeling**
Number of credits (ECTS)	4 ECTS (1+0+2)
Course, semester	2, 4
Department	Radio engineering, electronics and telecommunications
Course author (s)	Ibraeva Zh.B.
Prerequisites	Information and communication technology (in English)
Postrequisites	Digital signal processing
The aim of study of a discipline	Teach students the basics of mathematical modeling, programming in the Matlab package for organizing technical calculations.
Brief course description (main sections)	The discipline provides for the study of the basics of mathematical and computer modeling using the MATLAB package. Skills of data visualization, sound system support are acquired. Problems with matrices, vectors, lists, with program structures such as loops and branches are solved.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by studnts)	As a result of studying the course, students should be able to: • Present the criteria for creating mathematical modeling; • Display graphs of elements of one-dimensional and two-dimensional arrays; • Calculate using Matlab mathematical functions; • Assess the benefits of using difference and differential equations depending on the model.

Description of discipline 3

Description of discipline 3	
Code of discipline	EGR 6600
Name of discipline	**Engineering and computer graphics**
Number of credits (ECTS)	4 ECTS (1+0+2)
Course, semester	2, 4
Department	Radio engineering, electronics and telecommunications
Course author (s)	Ibraeva Zh.B.
Prerequisites	Information and communication technology (in English)
Postrequisites	Computer systems in radio engineering
The aim of study of a discipline	study of the theoretical foundations for the implementation and reading of engineering drawings in the specialty (radio engineering diagrams)
Brief course description (main sections)	The discipline is designed to give the student practical methods for constructing technical drawings for solving engineering problems.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	As a result of studying this discipline, students should: • understand the theoretical foundations of building images - complex and axonometric; • apply the rules for the execution and design of drawings; • be able to perform various geometric constructions and projection images using the AutoCAD system.

Profile disciplines

Description of discipline 4

	Description of discipline 4
Name of discipline	EEC 6652
Number of credits (ECTS)	**Theory and technology of radio navigation and radar systems**
Course, semester	4 ECTS (1+0+2)
Department	3, 6
Course author (s)	RET
Prerequisites	Bakhtiyarova E.A.
Postrequisites	Radio engineering devices
The aim of study of a discipline	Diploma design
Brief course description (main sections)	Studying the principles and methods of radar and radio navigation, scattering properties of objects, the basics of the statistical theory of detection and estimation of radio signal parameters; establishing the relationship between the tactical and technical characteristics of the radar and RNS, taking into account real operating conditions; studying the methods of ranging and angle measuring, measuring the radial velocity of the target and the angular velocity of the line of sight, as well as the secondary processing of radar and radio navigation information; familiarity with the development trends in the theory and technology of radar and radio navigation.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	The course is a study of theoretical and methodological foundations, principles of building a generalized structure of radar systems and complexes; study of the structure of radar facilities, methods for surveying space and measuring the coordinates of targets, studying methods for increasing the protection of radar stations from active and passive interference, block diagrams of typical radar stations for guidance and target designation, the basics of the statistical theory of multi-channel detection and measurement of radar signal parameters against the background of external correlated interference, the synthesis and analysis of noise-protected high-precision algorithms and devices for measuring the angular and time-frequency parameters of radar signals are considered.
Name of discipline	1. Know the theoretical foundations of radar, methods for measuring target coordinates, methods for constructing optimal filters for radar signals, block diagrams of ground and airborne radars for various purposes, and methods for combating interference of various origins. 2. Be able to calculate the performance characteristics of ground and airborne radar equipment, draw up a functional diagram of any radar systems, select a signal for a radar of one purpose or another, and evaluate the effectiveness of electronic suppression or protection of radars and RNS. 3. Possess the skills of choosing methods of electronic countermeasures for radars and RNS or methods of protecting them from interference

Description of discipline 4

Description of discipline 4	
Code of discipline	EEC 6653
Name of discipline	**Fiber-optic communication systems**
Number of credits (ECTS)	6(1+1+2)
Course, semester	3rd year, 6th semester
Department	Radio engineering, electronics and telecommunications

Course author (s)	Luganskaya Saule
Prerequisites	TPEV 2213 Theory of electromagnetic wave transmission
Postrequisites	UPS 3227 Signal generation and processing devices
The aim of study of a discipline	Physical fundamentals of optical and optoelectronic components, their parameters and characteristics, a comprehensive overview of the principles of optical fiber operation, the basics of designing and using fiber–optic technology in communication systems.
Brief course description (main sections)	The material of the discipline is presented in a consistent manner and has the following structure: introduction to fiber-optic systems, definition and fundamental principles of FOCS, theory of fiber-optic transmission, structure of optical cable, active and passive components of FOCS, fundamentals of FOCS design, technologies using fiber optics.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	*to know*: the structure of fiber-optic communication systems; principles of construction of fiber-optic transmission systems; typical elements of fiber-optic transmission systems. *Be able to*: calculate the parameters of the components of fiber-optic communication systems; work with devices for testing VSP, basic technologies and standards using optical fibers.

Description of discipline 5

Description of discipline 5	
Code of discipline	EEC 6607
Name of discipline	**Programming in microprocessor systems**
Number of credits(ECTS)	4 ECTS (1+0+2)
Course, semester	4, 7
Department	RET
Course author (s)	Japparkulov B.K.
Prerequisites	Theory of electrical circuits
Postrequisites	Broadcasting and television
The aim of study of a discipline	The purpose of the discipline is the theoretical and practical training of students in the field of microprocessor technology used in radio engineering and telecommunications.
Brief course description (main sections)	The course studies the analysis, synthesis and research of typical microprocessor electronic circuits, architecture of the microcontroller core, work with built-in peripheral modules, digital data transfer interfaces, issues of developing software for microcontrollers as elements of embedded systems for various purposes.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	As a result of studying the course, students should be able to: describe the current state of the level and directions of development of microprocessor systems, understand the general structure and architecture of widely known microprocessors, use modern development tools and debugging tools, explain the basic concepts of programming microprocessor systems, write programs for microprocessor systems in C.

Description of discipline 5

Description of discipline 5	
Code of discipline	EEC 6654
Name of discipline	**Application of artificial intelligence in wireless communication systems**

Number of credits (ECTS)	4 ECTS (1+0+2)
Course, semester	4 course, 7 semester
Department	Radio engineering, electronics and telecommunications
Course author (s)	Kazieva G.S. Associate Prof., Ph.D., room 314, +77071048710, galkaz_21 @mail.ru.
Prerequisites	The discipline "Application of artificial intelligence in wireless communication systems" is based on the theoretical foundations of such disciplines as: "Mathematics", "Physics", "Theory of electrical circuits", "Fundamentals of radio engineering and telecommunications", "Theory of transmission of electromagnetic waves", "Antenna- feeder devices and RRV", "Radio engineering devices", etc.
Postrequisites	Knowledge in this discipline is necessary to study the following disciplines: "Radio engineering devices", "Satellite communication systems", "Intelligent systems in telecommunications"
The aim of study of a discipline	Obtaining basic professional knowledge and skills in the field of intelligent networks in wireless communication systems. The discipline makes it possible to develop an adequate idea of the advanced achievements of the last decade. Course objectives: To acquire knowledge on the use of artificial intelligence in wireless communication systems (radar, direction finding and radio navigation) for subsequent use in the creation and application of artificial intelligence in wireless communication systems
Brief course description (main sections)	The discipline is studied in lectures, practical and laboratory classes. In the process of studying the course, methods and technologies for using artificial intelligence in wireless communication systems are mastered. The course includes information about the satellite systems existing in the world that use artificial intelligence. , wireless access technology of intelligent transport systems. .Expert systems are also considered when using artificial intelligence in wireless communication systems.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Learning outcomes. As a result of studying the course, students should: Know: methods and technologies used in the production of works with the help of artificial intelligence, types of modern equipment; Be able to: apply artificial intelligence equipment and technologies to solve a wide range of wireless communication problems and methods for processing results; Have an idea: about the development of science in the field of artificial intelligence in wireless communication in modern conditions of informatization and computerization of society.

Description of discipline 5

Description of discipline 5	
Code of discipline	EEC 6655
Name of discipline	**Development on IOS/Android**
Number of credits (ECTS)	4 ECTS (1 + 0 + 2)
Course, semester	4, 7
Department	РЭТ
Course author (s)	Bakhtiyarova E.A.
Prerequisites	Java Programming (2)
Postrequisites	Diploma design

The aim of study of a discipline	Studying the development of mobile applications for the IOS / Android platform).
Brief course description (main sections)	The course is an introduction to mobile application programming using the latest IOS/Android technologies. During this course, students will learn how to use development tools such as XCode, design interfaces and interactions, and evaluate their usability. Topics include Activity Lifecycle, Resources, Layouts, Intents for Multiple Activities, Menus, Fragments and Dialogs, Action Bar, Adapters, Saving Data with Shared Preferences, SQLite, and Content Providers. The emphasis is on the practical use of these components in applications. Includes an essential team project. Students will also learn how to properly design application architecture and how to work with complex data coming from a local database or remote API.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	1. Demonstrate the basic concepts and techniques for developing apps for IOS/Android phone. 2. Be able to use the SDK and other development tools. 3. Write programs in Swift 4. Demonstrate the basic concepts of IOS/Android phone features and capabilities. 5. Development of mobile application architecture 6. Development of complex IOS/Android applications 7. Understand Java programming as it relates to developing applications for the IOS/Android platform. 8. Demonstrate how to obtain additional resources and security information required for various different types of IOS/Android application features and services (maps, SMS, email, etc.). 9. Demonstrate how to work with database functions in IOS/Android mobile application. 10. Making network requests and processing the response 11. Storing and retrieving data in applications Making network requests and processing the response 12. Storing and Retrieving Data in iOS Apps

Description of discipline 6

Description of discipline 6	
Code of discipline	EEC 6656
Name of discipline	**Approaches to 6G**
Number of credits (ECTS)	4 ECTS (1+0+2)
Course, semester	4 course, 8 semester
Department	Radio engineering, electronics and telecommunications
Course author (s)	Bakhtiyarova E.A.
Prerequisites	Radio engineering devices
Postrequisites	Diploma work
The aim of study of a discipline	The study of the features of the construction of mobile communication systems of the next generation 6G,
Brief course description (main sections)	General principles, methods of signal processing, and new types of services. Comparative analysis with existing mobile communication networks. Studying the issues of sharing network infrastructure by mobile operators, innovative approaches to using the radio frequency spectrum, and the possibility of using unlicensed spectrum, ensuring public security.

Description of discipline 6

Description of discipline 6	
Code of discipline	EEC 6657
Name of discipline	**Organization and protection of information security in mobile networks**
Number of credits (ECTS)	4 ECTS (1 + 0 + 2)
Course, semester	4, 8
Department	RET
Course author (s)	Bakhtiyarova E.A.
Prerequisites	Radio engineering devices
Postrequisites	Diploma design
The aim of study of a discipline	Study of types of threats in mobile communication networks and systems
Brief course description (main sections)	Methods of protection, operation of mobile communication networks, as well as troubleshooting in their operation. Students gain skills in setting up and diagnosing mobile communication networks, learn to analyze risks using various diagnostic techniques, as well as identify and neutralize threats to the infrastructure of mobile communication networks from external networks.