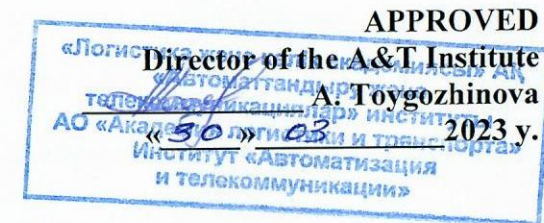
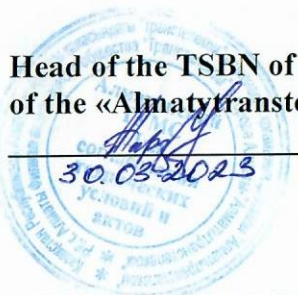


Head of the TSBN of FOCL
of the «Almaty transtelecom» branch
Myrzabayev A. A.



CATALOG OF ELECTIVE SUBJECTS

EDUCATIONAL PROGRAM: 6B06209-Radio engineering, electronics and telecommunications

Degree to be conferred: bachelor

Period of study: 4 years old

Year of admission: 2023 y.

Module	Cycle	Component	Name of discipline	Overall labor intensity		Term	Learning outcomes	Brief description of the discipline	Prerequisites	Postrequests
				in academic hours	in academic credits					
1	2	3	4	5	6	7	8	9	10	11
Module 5- Ecology and life safety	GED	EC 1	Ecology and life safety	150	5	3	LO 2	The study of the basic environmental concepts, environmental problems and approaches to their solution, sources and types of environmental pollution by enterprises, the principles of standardizing the quality of atmospheric air and water, the main provisions of legislation in various fields, natural and man-made emergencies, their causes, methods of prevention and protection . Teaching methods - analysis of specific situations (case-study).	Basic school knowledge of ecology	Labor protection
Module 1- General education subjects		EC 2	Scientific research methods				LO 11	Obtaining theoretical and applied knowledge by students on the methods of scientific research of problems in the field of study, training of specialists with the skills of cognitive activity in the field of science, the formation of deep ideas about the content of scientific activity, its methods and forms of knowledge	Socio-political knowledge module	Educational practice, Industrial practice 1, Industrial practice 2, Final certification
Module 3- Economic and managerial competencies		EC 3	Basics of economics and entrepreneurship				LO 2	He studies the activities of enterprises in various types of markets, the model of equilibrium and functioning of the market, state regulation of prices and tariffs. Considers the concept of entrepreneurship and the limits of its legal regulation, the conditions for the development of entrepreneurship, organizational and legal forms of doing business, business planning, entrepreneurial secrecy, social responsibility of. Active learning methods: case methods; business role-playing games, group work	Socio-political knowledge module	Managerial Economics, Time Management

		EC 4	Basics of law and anti-corruption culture				LO 12	Improving the public and individual legal awareness and legal culture of students, as well as the formation of a system of knowledge and civil position to combat corruption as an anti-social phenomenon. As a result of studying the course, the student must master the fundamental concepts of law, the constitutional structure of the state power of the Republic of Kazakhstan, the rights and freedoms of citizens enshrined in the Constitution, the mechanism and protection of the legitimate interests of a person in case of their violation	Socio-political knowledge module	Managerial Economics, Time Management
Module 4-IT competencies	BD	EC 5	Fundamentals of computer networks and telecommunications (Cisco + Huawei)	180	6	4	LO 3	Mastering the principles of building and functioning of local, regional, global computer networks and mobile telecommunications by students, as well as gaining practical skills in working with their information resources, working with Cisco and Huawei networks, SD-WAN and SDN. Active learning methods - "simulator" learning methods, i.e. aimed at the formation of special knowledge, skills: situational tasks, error detection method, project method, case method, open and closed tests	Information and communication technologies, Fundamentals of computer modeling	Robot control systems/Software testing, Multiservice telecommunication networks/Broadband access systems, Video surveillance and alarm systems/Security monitoring systems, Information security tools in telecommunication systems, Computer-aided design systems in Telecommunications, Production Practice 1, Production Practice 2, Introduction to MongoDB, Software - protected infocommunications, Machine Learning A-Z: Python & R in Data Science, Restoration of operability of software and hardware of the infocommunication system and/or its components after failures

		EC 6	Cloud Infrastructure Basics				LO 3	Mastering the technology of creating a cloud service, working with existing cloud services, students will learn how to use cloud computing and will be ready to use cloud computing technology in solving problems of optimizing IT processes. Within the framework of the discipline, interactive teaching methods, the calculation-analytical method, the case-task method, game methods are used	Information and communication technologies, Fundamentals of computer modeling	Robot control systems/Software testing, Multiservice telecommunication networks/Broadband access systems, Video surveillance and alarm systems/Security monitoring systems, Information security tools in telecommunication systems, Computer-aided design systems in Telecommunications, Production Practice 1, Production Practice 2, Introduction to MongoDB, Software - protected infocommunications, Machine Learning A-Z: Python & R in Data Science, Restoration of operability of software and hardware of the infocommunication system and/or its components after failures
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Module 7- General Engineering competencies	BD	EC 7	Robot control systems	180	6	5	LO 3, LO 6	Mastering the basics of robotics, designing robots based on the Arduino complex and programming in the Arduino IDE development environment. Teaching methods are: problem solving, holding thematic colloquia, brainstorming seminars	Engineering Mathematics, Fundamentals of Computer Modeling, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of Cloud Infrastructure, Digital Electronics/Digital Devices and Microprocessors	Computer-aided Design Systems in Telemechanics, Introduction to MongoDB, Machine Learning from A to Z: Python & Run Data Science
		EC 8	Software testing				LO 3	Formation of knowledge and skills on software quality control - verification and testing of software products. Active learning methods: case methods; business role-playing games, group work	Engineering Mathematics, Fundamentals of Computer Modeling, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of Cloud Infrastructure, Digital Electronics/Digital Devices and Microprocessors	Computer-aided Design Systems in Telemechanics, Introduction to MongoDB, Machine Learning from A to Z: Python & Run Data Science

Module 8- Telecommunication Technologies	BD	EC 9	Multiservice telecommunication networks	180	6	6	LO 4	Mastering competencies in the field of building modern urban multiservice networks and IP / MPLS networks using wired communication. Within the framework of the discipline, interactive methods of teaching case-learning are used	Fundamentals of Telecommunications, Communication Theory, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of cloud infrastructure, Production practice 1	Multichannel digital transmission systems, Production practice 2, Restoration of operability of software and hardware of the infocommunication system and/or its components after failures
		EC 10	Broadband access systems				LO 4	Formation of students' knowledge in the features of building modern networks and systems of broadband access (BBA), providing a variety of communication services to both fixed and mobile subscribers, as well as the features of the technical characteristics of BBA of various standards. Methods of active learning are applied: calculation-analytical method, case-task method, game methods	Fundamentals of Telecommunications, Communication Theory, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of cloud infrastructure, Production practice 1	Multichannel digital transmission systems, Production practice 2, Restoration of operability of software and hardware of the infocommunication system and/or its components after failures

Module 8- Telecommunication Technologies	BD	EC 11	Video surveillance and security alarm systems	180	6	6	LO 7	Students study the purpose and functions of video surveillance, structural diagrams and characteristics of equipment that is part of video surveillance systems. Application of methodologies and techniques for designing video surveillance systems, obtaining practical skills in the development of security equipment using television	Fundamentals of Electronic Radio Engineering, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Basics of Cloud infrastructure	Production practice 2, Reliability of telecommunication systems/Standardization and metrology in telecommunications, Final certification
		EC 12	Security monitoring systems				LO 7	Formation of students' requirements for the development of design and technical documentation, as well as rules for the design of design works; methods of calculation and design of parts, assemblies and devices of video information systems in accordance with the terms of reference; criteria for selecting source data for the calculation and design of parts, assemblies and devices of video information systems. Application of methods of development and design of design works, in the design of radio engineering systems using design automation tools. Form of control - delivery of an individual task	Fundamentals of Electronic Radio Engineering, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Basics of Cloud infrastructure	Production practice 2, Reliability of telecommunication systems/Standardization and metrology in telecommunications, Final certification

Module 7- General Engineering competencies	BD	EC 13	Digital electronics	180	6	3	LO1	Formation of students' ideas about digital electronics, the basics of digital circuitry, the principles of operation and design of digital devices. The course deals with the basic methods of description and synthesis of logic circuits, modern tools for the development of digital devices	Engineering Mathematics	Educational practice, Robot control systems/Software testing, Multichannel digital Transmission systems, Robot Control Systems/Softwar e testing, Digital transceivers, Software- protected infocommunicati ons, Restoration of operability of software and hardware of the infocommunicati on system and/or its components after failures
		EC 14	Digital devices and microprocesso rs				LO 1	It is focused on studying the theoretical and practical foundations of the functioning of digital devices and microprocessors in order to create circuit diagrams of communication devices and infocommunication technology. Within the framework of the discipline, interactive teaching methods, a calculation-analytical method, and a case-task method are used. The form of control is a creative exam	Engineering Mathematics	Educational practice, Robot control systems/Software testing, Multichannel digital Transmission systems, Robot Control Systems/Softwar e testing, Digital transceivers, Software- protected infocommunicati ons, Restoration of operability of software and hardware of the infocommunicati on system and/or its components after failures

Module 8- Telecommunication Technologies	BD	EC 15	Mobile communication technologies	180	6	3	LO 3	It is focused on teaching students complex technical thinking by analyzing the principles of construction and operation of modern electronic systems and communication networks with mobile objects, as well as familiarizing students with standards in the field of modern mobile communication systems, such as LTE, 5G. Within the framework of the discipline, interactive methods of teaching case-learning, discussion are used	Engineering Mathematics, Applied Physics	Fundamentals of radio engineering and electronics, Digital receiving and transmitting devices
		EC 16	Radio communication networks and systems				LO 7	It is focused on teaching students the general principles of the construction and functioning of radio communication systems and networks, familiarization with the basic circuit principles of equipment implementation, the study of linear paths based on radio lines, the development of methods for calculating the parameters of paths organized by means of equipment of radio communication systems (SRS)	Engineering Mathematics, Applied Physics	Fundamentals of radio engineering and electronics, Digital receiving and transmitting devices
	PD	EC 17	Theory of electromagnetic wave transmission and antenna-feeder devices	180	6	5	LO 8	Formation of the student's understanding of the principles of operation of radio-telecommunication data transmission networks, development of basic skills and skills for calculating the basic parameters of antenna-feeder devices. Within the framework of the discipline, interactive teaching methods, computational and analytical method, case-task method, game methods are used	Applied Physics, Fundamentals of Radio Engineering and Electronics	Telecommunication guiding systems, Digital receiving and transmitting devices
		EC 18	Mobile telecommunications				LO 8	Formation of an idea about the development of transport networks and data transmission networks, including mobile communication networks and systems; development of skills in designing and planning mobile communication networks and systems. Within the framework of the discipline, interactive teaching methods, computational and analytical method, and the method of case tasks are used. Guest lectures of top managers are provided	Applied Physics, Fundamentals of Radio Engineering and Electronics	Telecommunication guiding systems, Digital receiving and transmitting devices

Module 8- Telecommunication Technologies	PD	EC 19	Reliability of telecommunication systems	180	6	8	LO 9	Familiarization of students with the main provisions of the theory of reliability, methods of calculating the reliability of technical devices and systems, features of analysis and synthesis of information systems taking into account the requirements of reliability. When studying the discipline, interactive teaching methods, case studies, and discussion are used. Within the framework of the discipline, dual training is provided with field classes at a branch of the department and guest lectures by top managers	Telecommunications guiding systems, Video surveillance and security alarm systems/ Security monitoring systems	Production practice 2, Final certification
		EC 20	Standardization and metrology in telecommunications				LO 9	The study of measuring technologies that combine a set of methods, approaches, software and logical support for the organization of measurements, in accordance with the requirements of regulatory and technical documentation; the state and trends in the development of measuring instruments and basic methods for measuring the characteristics of electronic circuits and signals, evaluation of their accuracy. Active teaching methods are used: case methods; business role-playing games, group work	Telecommunications guiding systems, Video surveillance and security alarm systems/ Security monitoring systems	Production practice 2, Final certification
	PD	EC 21	NGN post and M2M networks	180	6	7	LO 10	Students will master the technology, architecture, structure, components and models of NGN and post-NGN networks, the basics of their construction and classification of wireless technologies in M2M networks, ways to implement convergent solutions in modern and future M2M wireless networks, ways to ensure the quality of service, prospects for the development of these networks. The teaching methods are: solving problems, conducting thematic colloquiums, seminars "brainstorming"	Telecommunications guiding systems	Production practice 2, Final certification
		EC 22	Digital communication systems				LO 10	The study of digital information processing systems, the main functional nodes of digital communication stations, the principles of separation and multiplexing of information, analysis of the characteristics of digital communication channels. Active learning methods are used - "simulator" training methods, situational tasks, error detection method, project method, case method, open and closed tests	Telecommunications guiding systems	Production practice 2, Final certification

Module 3- Economic and managerial competencies	EC 23	Managerial Economics (Minor 1)	90	3	5	LO 11	Formation of the conceptual apparatus and development of economic analysis skills using modern models and laws of economic science, consideration of economic problems and tasks facing the head of the company. The study of this discipline will allow students to gain and develop knowledge in the field of analytical research of economic, technological and technical parameters of an enterprise, and will also allow them to master the skills of applying special methods of economic justification of management decisions and assessing their consequences. Active learning methods are used - situational tasks, case method	Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture	Final certification
	EC 24	Time - management (Minor 2)				LO 11	Formation of students' general ideas about the essence and types of time management, principles and methods of time resource management for more successful professional activities. Active learning methods are used - situational tasks, case method	Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture	Final certification
Module 4-IT competencies	EC 25	Introduction to MongoDB (Minor 1)	90	3	6	LO 10	Formation of students' ability to process large amounts of data (MongoDB) to solve professional problems, effectively apply methods, technologies and tools for analyzing big data in professional activities. Methods of active learning are applied - group work	Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of Cloud Infrastructure, Robot Management Systems/Software testing	Final certification
	EC 26	Machine Learning A-Z: Python & R in Data Science (Minor 2)				LO 10	Introducing students to the field of Data Science and Machine Learning, which covers data visualization, data analysis, libraries and open source tools. Methods of active learning are applied - group work	Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of Cloud Infrastructure, Robot Management Systems/Software testing	Final certification

Module 4-IT competencies	EC 27	Software-protected infocommunications (Minor 1)	90	3	7	LO 10	To teach students the basic principles and methods of information security in modern infocommunication systems, approaches to the construction, maintenance and analysis of secure automated systems, as well as to promote the formation of a scientific worldview and the development of systems thinking. Interactive teaching methods - case methods	Information security tools in Telecommunication systems, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of Cloud Infrastructure, Digital Electronics/Digital Devices and Microprocessors	Final certification
	EC 28	Restoring the functionality of the software and hardware of the infocommunication system and/or its components after a failure (Minor 2)				LO 10	The study of the principles of construction and architecture of modern operating systems and environments that provide the organization of computing processes in corporate information systems for economic, managerial, industrial, scientific and other purposes. Interactive teaching methods - game methods	Information security tools in Telecommunication systems, Fundamentals of Computer Networks and Telecommunications (Cisco +Huawei)/ Fundamentals of Cloud Infrastructure, Digital Electronics/Digital Devices and Microprocessors	Final certification
Total			2040	68					

Head of the Department "ICT"



D.T. Kasymova