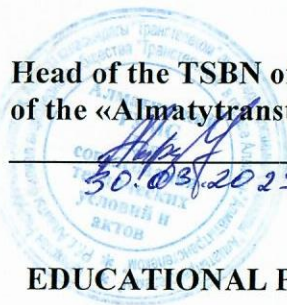


Head of the TSN of FOCL  
of the «Almaty transtelecom» branch  
Myrzabayev A A.



**CATALOG OF ELECTIVE SUBJECTS**

**EDUCATIONAL PROGRAM:** 7M06234- Radio engineering, electronics and telecommunications

**Degree to be conferred:** master

**Period of study:** 2 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- Professional competencies	BD	EC	Mathematical processing of measurement results in RET	270	9	1	LO 8	Formation of a complex of knowledge about mathematical methods and computing tools that convert the results of observations into optimal numerical values, best approximated to true values and convenient for practical use in radio engineering, electronics and telecommunications. Active methods of brainstorming training	Bachelor's degree disciplines	Scientific foundations of modeling in infocommunication technologies, Final certification
			Methods of ensuring electromagnetic compatibility of radio-electronic means				LO 7	The study of the basic physical provisions of electromagnetic compatibility (EMC), the characteristics of external electromagnetic influences, as well as the basic issues of eliminating the destabilizing effect of external influences on electronic equipment, which are extremely important for understanding the design and operation of promising systems operating in a complex electromagnetic environment. Considering that the EMC requirements are mandatory and are confirmed by certification tests, the knowledge gained during the study of this discipline will be necessary for developers of promising equipment. During the training, knowledge control is provided in the form of homework, control papers and an exam		

1	2	3	4	5	6	7	8	9	10	11
Module 2- Economic and managerial competencies	BD	EC	Strategic management	180	6	2	LO 1	Formation of undergraduates" basic theoretical knowledge and basic practical skills in the field of strategic management of enterprises and organizations, strategic analysis of the external and internal environment of the company, the company"s competitive strategy and corporate management strategy. Active learning methods are used - brainstorming, group work	Basic disciplines of the bachelor's cycle	Final certification
			Business research				LO 1	Mastering theory by undergraduates, as well as developing practical skills in business research and analytics, life cycle analysis of the development of promising technologies. The scientific and technical aspects of the project are being studied. Active teaching methods used in the discipline - individual task	Basic disciplines of the bachelor's cycle	Final certification
Module 5- Professional competencies	PD	EC	The current state of the RET	180	6	3	LO 6	To study the relevance of the use of telecommunication systems in the development of the world economy, the current state and prospects for the development of ground-based radio systems, space-based navigation and communication tools, the prospects of nanoelectronics, functional electronics, modern types of microprocessors and signal processors, network technologies and electronic communications, the introduction of modern telecommunications and optical communication means. Teaching methods - group discussions	Design and technical operation of VSP/Reliability of VOLS, Artificial intelligence technologies/Sensor networks, Mobile multichannel GSM technologies/Services of cellular communication companies	Final certification
			Scientific and technical problems of RET				LO 6	The study of relatively modern problems of the development of RET, which make it possible to navigate in scientific works and advanced achievements over the last decade, as well as modern achievements and problems of nanoelectronics, which has been developing rapidly in the Republic of Kazakhstan recently. The teaching methods are: group discussions and brainstorming	Design and technical operation of VSP/Reliability of VOLS, Artificial intelligence technologies/Sensor networks, Mobile multichannel GSM technologies/Services of cellular communication companies	Final certification



1	2	3	4	5	6	7	8	9	10	11
Module 5- Professional competencies	PD	EC	Design and technical operation of the VOSP	180	6	2	LO 3, LO 4	The study of the basics of VSP design, the issues necessary for the design of the content of the general explanatory note, estimate documentation and working drawings, calculation of the length of the regeneration site, the list of regulatory and technical documentation required for the design. Much attention is paid to the organization of the construction of the fiber optic cable, all types of laying and installation of the OK, issues of technical operation and organization of maintenance of the fiber optic cable. A special place is occupied by types and means of measurement. The method of teaching is: solving semester work	Bachelor's degree disciplines	The current state of RET/Scientific and technical problems in RET, Final certification
			Reliability of VOLS				LO 3, LO 4	Practical and theoretical training of undergraduates in the field of reliability and the field of measurement methods of VOLS, the physical foundations of metrology and standard measurement methods, the analysis of emerging errors, the main scientific and technical problems, strategies and innovations for the development of measurements in VOLS. Within the framework of the discipline, interactive teaching methods, computational and analytical method, case-task method, game methods are used. The form of control is an exam in the form of an oral survey	Bachelor's degree disciplines	The current state of RET/Scientific and technical problems in RET, Final certification
	PD	EC	Artificial intelligence technologies	180	6	2	LO 7	Formation of the foundations of theoretical knowledge and practical skills of future specialists in the field of basic artificial intelligence strategies: expert systems and artificial neural networks, and the latter is given dominant attention as the most effective strategy with the largest number. Within the framework of the discipline, interactive teaching methods, computational and analytical method, and the method of case tasks are used	Bachelor's degree disciplines	IoT with Big Data processing/Convergence of telecommunications services, Final certification
			Sensor networks				LO 7	It is aimed at familiarizing undergraduates with modern approaches to the construction of wireless sensor networks: their classification, principles of functioning, deployment. The course includes the study of the main modern wireless communication standards, and the construction of wireless network configurations based on them, designed to monitor a variety of parameters and quantities. Methods of active learning are "simulator" training methods, i.e. aimed at the formation of special knowledge, skills, skills: situational tasks, error detection method, project method, case method, open and closed tests	Bachelor's degree disciplines	IoT with Big Data processing/Convergence of telecommunications services, Final certification



1	2	3	4	5	6	7	8	9	10	11
Module 5- Professional competencies	PD	EC	GSM mobile multichannel technologies	180	6	2	LO 5	The methods and methods of building GSM cellular systems, signal modulation methods used in cellular communication systems are considered, special attention is paid to the principles of building cellular communication systems, issues related to channel densification and separation, issues of building traffic channels and management, organization of the terrestrial interface are studied, GSM/GPRS cellular communication systems are considered in detail, CDMA 2000, UMTS/HSDPA, LTE. Within the framework of the discipline, interactive teaching methods, computational and analytical methods and game methods are used	Bachelor's degree disciplines	Final certification
			Services of cellular communication companies				LO 5	It gives an idea of the trends in the development of cellular network technologies, the patterns of their development, modern wireless radio communication technologies, technologies for accessing the transmission medium in cellular systems, as well as the correct choice of the right technology when solving technical problems in production, the technical characteristics of multichannel cellular systems and various services of cellular communication companies. The methods of training are: solving problems and seminars "brainstorming"	Bachelor's degree disciplines	Final certification
	PD	EC	IoT with Big Data processing	270	9	3	LO 7	Formation of undergraduates" skills in the main directions of development of IoT devices with Big Data processing, protocols of information exchange between devices and methods of aggregation and processing of data received from remote devices. During the study, undergraduates gain knowledge about the principles of information collection, its transmission and processing, as well as the skills necessary for the practical construction of the Internet of Things. Active teaching methods: business role-playing games, group work	Artificial intelligence technologies/Sensor networks	Final certification
			Convergence of telecommunications services				LO 8	The study of the issues of combining several previously separate services within one service, the emergence of similarities in the structure of communication networks, in the hardware and software used by them, as well as in the totality of services provided to subscribers and equipment capable of replacing several roles. Within the framework of the discipline, interactive methods of teaching case-learning are used	Artificial intelligence technologies/Sensor networks	Final certification
<b>Total</b>				<b>1440</b>	<b>48</b>					

Head of the Department "ICT"



D.T. Kasymova