

**PSUTI, RU**  
**DESCRIPTION OF THE PROMENG Curricula/Module**

TITLE OF THE MODULE	Code
Fundamentals of Digital Communication	-

Teacher(s)	Department
<b>Coordinating:</b> Kharitonova Anna A.  <b>Others:</b> Nikolaev Boris I., Chingaeva Anna M.	theoretical bases of radio engineering and communications

Study cycle	Level of the module	Type of the module
Second semester		Compulsory

Form of delivery	Duration	Langage(s)
Lecture and laboratory works	16 weeks	Russian

Prerequisites	
<b>Prerequisites:</b> probability theory, information theory, theoretical foundations of communication	<b>Co-requisites (if necessary):</b>

Credits of the module	Total student workload	Contact hours	Individual work hours
2	98	48	50

<b>Aim of the module (course unit): competences foreseen by the study programme</b>		
To learn the theoretical bases for the construction of digital communications systems. The aim of the subject is the development of modern methods of coding digital modulation and demodulation. The student must have an understanding of the construction of digital communication systems with multiple users.		
Learning outcomes of module (course unit)	Teaching/learning methods	Assessment methods
After the successful completion of the course students will be able to navigate the modern digital communication systems. Know and understand the first 2 levels of interaction communication devices - and the physical channel. Oriented in terms of a discrete communication channel, a digital signal. Know the current methods of digital modulation and demodulation coding.	Auditorium	Exam

Themes	Contact work hours						Time and tasks for individual work		
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
1. A functional diagram of a digital communication system. The concept of the digital signal.	2						2	2	The concept of digital signal destination basic block diagram. The repetition of the concepts of a random event, the distribution function of the probability density
2. Digital representation of the analog signal	4				3		7	7	Analog-to-digital conversion, Nyquist theorem, pulse-code modulation
3. Fast Fourier transform, discrete Fourier transform	2						2	2	
4. Types of digital modulations	4				3		7	7	CAM-2 QAM-4 (8.16, 64), FM-2 (4, 8), FM-2, ISF, MMS
5. Nyquists theorem	2								The proof of the theorem, applications.
6. Channels of communication. optimal reception	2								Classification channels. correlation receiver
7. The encoder in digital communication systems. Error Coding	2				3		5	5	Convolutional codes, code Viterbi, block codes
8. Modern types of digital modulations	4				3		7	7	OFDM, CDMA
9. Systems with multiple users	2								TDM, FDM, CDMA
10. Technology and standards of modern digital communications	8	3			4		15	14	GSM, WLAN, space systems, WiMAX, Bluetooth
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Assessment strategy	Weight in %	Deadlines	Assessment criteria
laboratory works	35	Work during the semester	
Individual case study + research report	15	Work during the semester	
Exam	50	End of a carricula	Correct answers

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or intrenet link
<b>Compulsory literature</b>				
Прокис Дж.	2000	Цифровая связь		Москва «Радио и связь»
Кловский Д.Д.	2009	Теория электрической связи		Москва «Радиотехника»
Николаев Б.И., Чингаева А.М. Харитоновна А.А.	2013	Основы цифровой связи		
<b>Additional literature</b>				
Бернард Скляр	2003	Цифровая связь. Теоретические основы и практическое применение		Москва «Вильямс»