



**RĪGAS TEHNISKĀ  
UNIVERSITĀTE**

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**Study programme "Telecommunication technologies and data transmission engineering"**

**Main attributes**

Title	Telecommunication technologies and data transmission engineering
Identification code	EBG0
Education classification code	43523
Level and type	Academic Bachelor Study
Higher education study field	Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Control and Computer Science
Head of the study field	Agris Nikitenko
Deputy head of the study field	Jurģis Poriņš
Department responsible	Faculty of Electronics and Telecommunications
Head of the study programme	Lilīta Ģeģere
Professional classification code	
The type of study programme	Full time
Language	Latvian, English
Accreditation	31.05.2013 - 31.12.2023; Accreditation certificate No 2022/07
Volume (credit points)	120.0
Duration of studies (years)	Full time studies - 3,0
Degree or/and qualification to be obtained	Bachelor Degree of Engineering Science in Electrical Science
Qualification level to be obtained	The 6th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	General Secondary or Vocational Secondary Education

**Description**

Abstract	An engineering degree opens up a wide range of career opportunities that can foster development in both the business and technology worlds. Telecommunications technology and data transmission engineering practice with communications systems and large-scale data networks that display, process, store and transmit analog and digital information. For many years, the telecommunication and data transmission sectors are one of the fastest-growing industries in the world. Therefore, the study program is designed to meet the growing demand for qualified specialists in this rapidly developing industry. The study program introduces methods, theories, principles, and technologies to solve topical problems of signal transmission and reception, information security aspects, compatibility, interconnection, and coexistence of various communication networks, as well as the design of communication systems. Students gain competitive knowledge of modern communication technologies, telecommunication and data transmission systems, computer networks, basics of programming languages, mobile network architecture, etc. Both the study program and the academic staff are open to innovation and modern interactive teaching methods. The study program regularly includes new university-level study courses in perspective directions, as well invites experienced foreign guest lecturers.
Aim	The study program aims to provide students with the acquisition of theoretical knowledge and research skills in the field of engineering, which is based on theoretical principles in the fields of telecommunication technology and data transmission; to prepare innovative-minded specialists focused on the introduction of new technologies and knowledge with internationally competitive academic education. The aims and tasks of the study program are formulated based on surveys of the needs and requirements of stakeholders (potential employers, universities, students, society, and scientific institutions) to graduate.

Tasks	<p>General tasks of the study program:</p> <ol style="list-style-type: none"> <li>1. To provide competitive education in the fields of telecommunication technologies and data transmission in accordance with the level of bachelor's studies and international standards;</li> <li>2. To provide the basics of fundamental sciences necessary for the acquisition of theoretical study courses in the field;</li> <li>3. To ensure the acquisition of specialized knowledge characteristic of the study program and the ability to apply it for the formulation and solution of tasks in telecommunication technology and data transmission engineering;</li> <li>4. To provide students with knowledge about the use of computer tools in the analysis, modeling, design, and programming of individual modules;</li> <li>5. To ensure the development and changes of the content of the study program, implementation of the study process, scientific research work, following changes in the field of telecommunication and data transmission, international practice, science;</li> <li>6. To provide students with comprehensive internationally competitive knowledge and develop competence following the market-defined requirements for telecommunications and communications engineers, preparing for practical work in the design, development, and maintenance of communications systems, large-scale data transmission, and processing;</li> <li>7. To develop students' skills to perform high-quality acquisition, selection, analysis of necessary information, use for decision-making, as well as solving problems in the telecommunication and data transmission sector;</li> <li>8. To promote students' interest in further supplementation of academic knowledge and further studies, to develop research skills, and to promote their practical use;</li> <li>9. To stimulate the interest of students in the processes taking place in society, to stimulate their development towards a positive, modern, responsible, ethical and capable personality able to act independently and make decisions;</li> <li>10. To promote international mobility and participation in projects.</li> </ol>
Learning outcomes	<p>Graduate of the academic bachelor study program:</p> <ol style="list-style-type: none"> <li>1. Knows the basics of fundamental sciences necessary for the acquisition of theoretical study courses in the field;</li> <li>2. Manages the content of basic study courses of the telecommunication and data transmission subsector at the level necessary for the acquisition of specialized study courses and innovations in the field;</li> <li>3. Knows at the level of understanding: telecommunication and computer networks, main technologies and standards, principles of operation of telecommunication equipment, design methods of telecommunication networks and systems, data transmission systems and their main concepts, basics of operation of telecommunication equipment and networks and measurement methods;</li> <li>4. Is able to work with scientific, technical, and methodological literature available in a foreign language;</li> <li>5. Is able to use theoretical knowledge to formulate and solve specific tasks in the telecommunication and data transmission sub-sector;</li> <li>6. Is able to perform experimental data processing in the analysis of the features of the operation of telecommunication and data transmission systems;</li> <li>7. Able to develop applications and algorithms for solving specific tasks;</li> <li>8. Able to systematize related information, summarize, interpret and analyze the results of measurements and calculations, prepare summarized reports, present them;</li> <li>9. Is able to apply current technologies and software in the process of designing telecommunication and data transmission systems;</li> <li>10. Is able to perform an analysis of the situation regarding current problems in telecommunications data transmission systems and their solutions, based on the study of literature and information available on the Internet;</li> <li>11. Able to perform diagnostics of telecommunications networks and equipment, and evaluation of the main operating parameters;</li> <li>12. Is able to work individually and in a team, to continue learning and educating in the field of telecommunications and data transmission systems, to act in a sustainable, ethical and responsible manner so as not to cause harm to society and the environment.</li> </ol>
Final/state examination procedure, assessment	<p>The acquisition of the program concludes with a final exam, which includes the development of an independent bachelor's thesis and public defense in an open session of the Final Examination Commission (FEC) on-site or using secure video conferencing and online meeting e-platform.</p> <p>The development and defense of the bachelor's thesis is part of the final exam on the academic curriculum, the purpose of which is to test the student's abilities and skills to independently solve problems and work in the field. The bachelor's thesis is an analytical study with elements of scientific work in the field of telecommunications and data transmission systems on a relevant topic, selected by the student individually and approved by the scientific advisor.</p> <p>The FEC consists of the head of the commission and at least two members of the commission. Students' knowledge, skills, and competencies are collectively assessed by the FEC in a closed session on a 10-grade scale, based on the author's report, the quality of answers to questions related to the developed work and remarks of supervisor and reviewer, as well as considering the assessment of the supervisor and reviewer.</p>
Description of the future employment	<p>Graduates of the study programme can become internationally competitive consultants, designers, technicians, engineers, infrastructure specialists, specialists of telecommunication systems analysis and monitoring, telecommunication technology solution development and implementation specialists, scientists.</p> <p>The knowledge acquired during the studies allows establishing your own company, holding leading positions in private companies or public institutions, as well as managing high-level engineering projects in the required fields of modern technologies.</p> <p>Potential employers:</p> <ul style="list-style-type: none"> <li>• Telecommunications companies;</li> <li>• IT companies;</li> <li>• Higher education institutions;</li> <li>• Scientific research institutions;</li> <li>• Production units in the field.</li> </ul>
Special enrollment requirements	General or vocational secondary education

Opportunity to continue studies	Bachelor's degree entitles to continue academic or professional studies at the Master study programme of the same or related science branch or sub-section.
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Courses

No	Code	Name	Credit points
<b>A</b>		<b>Compulsory Study Courses</b>	<b>77.0</b>
1	DMF101	Mathematics	9.0
2	MFA101	Physics	6.0
3	DIM205	Supplementary Mathematics (for electrical engineering)	2.0
4	DMS212	Probability Theory and Mathematical Statistics	2.0
5	SDD701	Innovative Product Development and Entrepreneurship	4.0
6	RDE710	Introduction to Electronics and Telecommunications Branch	4.0
7	ICA301	Civil Defence	1.0
8	RAE261	Digital Electronics and Computer Architecture	3.0
9	RAE362	Digital Devices and Systems	3.0
10	RDE709	Electrical Measurements in Telecommunications	4.0
11	RDE708	Telecommunications Systems	6.0
12	RAE701	Digital Devices of Telecommunications Systems	4.0
13	RDE707	Telecommunications Theory	6.0
14	RDE706	Transmission Systems	6.0
15	RAE306	Digital Switching Systems	4.0
16	RDE302	Transmission Media	6.0
17	RAE202	Computer Technologies in Telecommunications	3.0
18	RAE348	Telecommunications and Computer Networks	3.0
19	VAS038	Environment and Climate Roadmap	1.0
<b>B</b>		<b>Compulsory Elective Study Courses</b>	<b>29.0</b>
<b>B.1</b>		<b>Study courses on the current achievements in the field</b>	<b>24.0</b>
1	RAE700	Teletraffic Theory	4.0
2	RAE359	Distributed Systems in Telecommunications	3.0
3	TRT215	Fundamentals of Circuit Theory	3.0
4	RRE102	Electricity and Magnetism	2.0
5	REA103	Fundamentals of Materials Science	2.0
6	REA204	Electron Devices	3.0
7	TRT203	Semiconductor Devices	3.0
8	TRT273	The Basics of Control Theory	2.0
9	TRT461	The C Programming Language	2.0
10	RDE705	Research Seminars in the Field of Telecommunications	4.0
11	RTR105	Computer Studies (basic course)	3.0
12	RTR207	Computerization of Mathematical Tasks in Electrical Engineering	3.0
13	TRT441	Computer Technologies in Research	3.0
14	TRL244	Computer Networks	2.0
15	TRT313	Real-Time Communication Systems (study project)	2.0
16	RTR107	Introduction to Computers and Algorithms	2.0
17	TRL415	Network Databases and Databanks	3.0
18	TRL326	Network Reliability	3.0
19	TRL534	Computer Network Monitoring, Diagnostics and Maintenance	3.0
20	RDE711	Mobile Network Architecture	4.0
21	RTR805	Fundamentals of DC Circuits	2.0
22	RTR806	Fundamentals of AC Circuits	3.0
<b>B.2</b>		<b>Humanities and Social Sciences Study Courses</b>	<b>2.0</b>
1	HSP380	United Europe and Latvia	2.0
2	HSP379	Political System of Latvia	2.0
3	HSP376	Sociology of Personalities and Small Groups	2.0
4	HSP375	Sociology of Management	2.0
5	HSP377	General Sociology	2.0
6	HPS120	Basics of Communication	2.0
<b>B6</b>		<b>Languages</b>	<b>3.0</b>
1	HVD101	The English Language	2.0
2	HVD230	The English Language	1.0
3	HVD108	The German Language	2.0
4	HVD226	The German Language	1.0
5	HVD119	The French Language	2.0
<b>C</b>		<b>Free Elective Study Courses</b>	<b>4.0</b>

E		<b>Final Examination</b>	<b>10.0</b>
1	<a href="#">RDE001</a>	Bachelor Thesis	10.0