



## Faculty of Electronics and Telecommunications

**Note! This is a preliminary list of courses. Changes may occur!**

### SPRING SEMESTER

### BACHELOR COURSES

Code	Course name	CP	ECTS
<a href="#"><u>RTR107</u></a>	<b>Introduction to Computers and Algorithms</b>	<b>2.0</b>	<b>3.0</b>
<p>The study course provides knowledge about computers structure and operation principles. Following topics are covered: counting systems and data storage in computer memory, concept of algorithm, types of algorithm notation, linear, branched and cyclic algorithms, implementation of basic algorithms in Python programming language, text editors for preparing texts and programs, debugging and execution of programs.</p>			
<a href="#"><u>TRT441</u></a>	<b>Computer Technologies in Research</b>	<b>3.0</b>	<b>4.5</b>
<p>The course acquaints students with application possibilities of modern computer technologies in research in engineering sciences. The areas of use of popular application packages and their features are considered. The main attention is paid to mastering of universal mathematically oriented packages MathCad and MATLAB.</p>			
<a href="#"><u>RDE706</u></a>	<b>Transmission Systems</b>	<b>6.0</b>	<b>9.0</b>
<p>The study course deals with transmission systems (TS), their evolution and application in modern telecommunications networks. Topics include signal digitalisation and transmission, regeneration of a digital signal and its conversion back to the analogue form. Formation and multiplexing of digital streams, as well as network synchronisation are examined. The study course covers the theory of TS, as well as practical measurements in the laboratory. International standards related to TS interfaces are considered. Students are prepared for professional career and further studies at the Master's level.</p>			
<a href="#"><u>RDE709</u></a>	<b>Electrical Measurements in Telecommunications</b>	<b>4.0</b>	<b>6.0</b>
<p>The course provides knowledge and skills about electrical signal measurement methods and principles in the field of electronic communication. The course covers the following measurements: measurement of signal voltage and signal levels; frequency and time interval measurement, measurement and analysis of signal frequency spectrum, attenuation measurement, as well as service quality measurement. Students will obtain knowledge of measuring tools and measuring systems, as well as learn about measurement and valuation methods of the quality of electronic communication services.</p>			
<a href="#"><u>RAE701</u></a>	<b>Digital Devices of Telecommunications Systems</b>	<b>4.0</b>	<b>6.0</b>
<p>This course is intended for the study of the basic knowledge (key terms, operating principles, typical applications), related to computer general architecture, the operating principles of computer's main components, the sequence of instruction execution, and the basic programming skills in assembler language. The main topics of the course: types of addresses in processor systems, single-byte microprocessor instruction set and its programming basics, floating-point number formats and associated co-processor, computer memory, memory addressing systems and data protection, command and data pipelining, design features of signal processors and applications.</p>			
<a href="#"><u>RAE348</u></a>	<b>Telecommunications and Computer Networks</b>	<b>3.0</b>	<b>4.5</b>
<p>In this study course students acquire knowledge about architecture and working principles of telecommunication and computer networks. An explanation of ISO OSI 7-layer reference model and TCP/IP protocol stack comparison is provided. Students learn computation principles of Ethernet transmission medium, local computer network design, development and virtualization. Students also gain an understanding of different network types - local, metropolitan, territorial, their differences and available transmission technologies. Students learn how to protect a computer network against loops by using Spanning Tree Algorithm (STA) and STP protocols etc.</p>			
<a href="#"><u>TRT203</u></a>	<b>Semiconductor Devices</b>	<b>3.0</b>	<b>4.5</b>
<p>The study course provides a basic understanding of the principles of operation of a semiconductor device. The basic mechanisms of electrical conduction and parameters for semiconductors are considered. Students are introduced to the principles of semiconductors and sensors.</p>			

<a href="#"><u>REA103</u></a>	<b>Fundamentals of Materials Science</b>	<b>3.0</b>	<b>4.5</b>
<p>In the study course students are introduced to the role of materials in ensuring human existence, simple materials used in technology, composite materials and their applications.. Students are explained different levels of material structure and the relationship to their properties, the practical forms of materials and methods for obtaining them, as well as the technological properties and the life cycle of materials. The acquired knowledge allows students to orientate in a wide range of materials used in the technique and choose the appropriate material for a particular application.</p>			
<a href="#"><u>RDE708</u></a>	<b>Telecommunications Systems</b>	<b>6.0</b>	<b>9.0</b>
<p>The telecommunication systems course gives an overview and basic knowledge about different types of wired, wireless, and fiber optical transmission systems and their main elements. The study course examines the history of telecommunication systems development in the world, Latvia, and future development trends. Laboratory and practical works with modern computer-aided design software are also envisaged.</p>			
<a href="#"><u>TRT215</u></a>	<b>Fundamentals of Circuit Theory</b>	<b>3.0</b>	<b>4.5</b>
<p>This basic course provides foundation knowledge of circuits theory. It aims to master methods for calculating and analysing linear electrical circuits by using Ohm's and Kirschoff's laws. The course also includes application of complex numbers and vector diagrams for calculating linear alternate current circuits. Finally, students are familiarized with concept of two-port networks, their parameters and calculation/transform methods.</p>			

***Note! Full course description available by clicking on the course code***

## MASTER COURSES

*(available only to graduate students)*

Code	Course name	CP	ECTS
<a href="#"><u>RAE555</u></a>	<b>Teletraffic Theory</b>	<b>3.0</b>	<b>4.5</b>
<p>The course covers the experimental systems in relation to telecommunications network systems. Within the framework of the course students will discuss the network management and control methods. Students will be enabled to promote their understanding of the performance of real systems. Important part of the course is evaluation methods as well as current trends and problems in the context of Internet, mobile and broadband communications.</p>			
<a href="#"><u>RAE475</u></a>	<b>Telecommunications and Computer Networks</b>	<b>5.0</b>	<b>7.5</b>
<p>Telecommunications networks and systems as a telecommunication business infrastructure are studied. Skills of using the network control and management technologies and tools, network planning skills, network simulation skills and tools are objectives of this course.</p>			
<a href="#"><u>RAE553</u></a>	<b>Signalling Systems and Protocols</b>	<b>3.0</b>	<b>4.5</b>
<p>The course provides students with the necessary skills for working in the sphere of signalling and communications protocols. Aspects of compatibility, scalability and security are emphasized. Message formats, time and state diagrams of protocols are analysed. Work with protocol analysers in emulation environment provides students with necessary skills for solving problems and preparing for changes in configuration.</p>			
<a href="#"><u>RDE701</u></a>	<b>Telecommunications Theory (special course)</b>	<b>5.0</b>	<b>7.5</b>
<p>The following main topics are covered in this special course: entire analytic functions and their application in signal sampling, approximation and restoration; properties of Fourier transform; signal multiplexing in multichannel systems, CDMA systems; the negentropy principle of information and its meaning for telecommunications; the influence of quantum effects on signal transmission; quantum communications; quantum cryptography; quantum computers; stochastic resonance.</p>			
<a href="#"><u>RDE432</u></a>	<b>Transmission Systems (special course)</b>	<b>4.0</b>	<b>6.0</b>
<p>The course deals with transmission systems (TS) at an advanced level. It includes the theoretical analysis of TS, as well as their practical implementation. In the laboratory students are trained in the practical skills in the area of TS. The following topics are discussed: noise and its influence on transmission quality, regeneration of digital signals, baseband line codes, passband line codes, clock extraction and timing, xDSL technologies.</p>			
<a href="#"><u>RDE703</u></a>	<b>Microwave Telecommunications Systems</b>	<b>5.0</b>	<b>7.5</b>
<p>The study course is designed to gain knowledge about the planning and design of microwave telecommunication systems, frequency bands used for radio lines, microwave propagation, calculation of the radio line equation and other factors that have to be taken into account when designing a microwave link. The course also includes an overview of the relevant ITU-R recommendations and their practical application in the design of a microwave link.</p>			
<a href="#"><u>RAE411</u></a>	<b>Telecommunications Software</b>	<b>4.0</b>	<b>6.0</b>
<p>Modern telecommunications are unimaginable without networking with different protocols and layers, and, accordingly, specific hardware and software resources. The study course is focused on the software part of computer networks and provides knowledge on different programmes and tools to be used for different purposes. These purposes include, but are not limited to, network monitoring, network security, network topology design, and machine learning applications. All these topics are covered by the study course. By the end of the study course, students are expected to have solid skills for further working with networks and traffic software to continue their research or career in this direction.</p>			

***Note! Full course description available by clicking on the course code!***