RIGA TECHNICAL UNIVERSITY

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
RTR107	**Introduction to Computers and Algorithms**	**2.0 CP**	**3.0 ECTS**
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.			
TRT441	**Computer Technologies in Research**	**3.0 CP**	**4.5 ECTS**
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.			
TRT215	**Fundamentals of Circuit Theory**	**3.0 CP**	**4.5 ECTS**
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.			
RDE709	**Electrical Measurements in Telecommunications**	**4.0 CP**	**6.0 ECTS**
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.			
RAE306	**Digital Switching Systems**	**4.0 CP**	**6.0 ECTS**
In this study course students are introduced with digital switching systems that are reviewed from the perspective of circuit and packet switched networks. Study course provides students with an in-depth understanding of telecommunication network operational principles, hence increasing students' professional and theoretical knowledge in the telecommunication industry..			
RAE348	**Telecommunications and Computer Networks**	**3.0 CP**	**4.5 ECTS**
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.			
TRT203	**Semiconductor Devices**	**3.0 CP**	**4.5 ECTS**
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.			
REA709	**Active Electronic Systems**	**3.0 CP**	**4.5 ECTS**
Within the study course, students learn the principles of operation, main parameters and design methodology of low-frequency power amplifiers used in practice, as well as power electronics circuits. Students learn to use computer simulation programs for electronic circuit analysis and component selection. During laboratory work, important skills in working with measuring equipment are acquired. Special emphasis is placed on independent planning of experiments and analysis of results. Students learn to use the possibilities of modern measuring instruments to prepare high-quality technical reports.			

RRE102	Electricity and Magnetism	2.0 CP	3.0 ECTS
In the study course students are introduced to the concepts of scalar and vector quantities and fields, electric and magnetic fields in empty space and space with matter. Special attention is paid to the basic laws of electrical and magnetic circuits, time-varying electromagnetic fields and waves. The acquired knowledge allows students to orientate in electrical, magnetic and electromagnetic phenomena, giving an idea of the practical applications of observed phenomena.			

RRI349	Analogue and Digital Integrated Circuits	3.0 CP	4.5 ECTS
The study course introduces students in-depth to the use of passive and active components (operational amplifiers, etc.) to process analogue signals, types of sensors and their signal pre-processing, conversion of analogue and digital signals. Students gain insight into the power supply features of these devices, coupling with digital integrated circuits and microcontrollers, data transmission in small-scale interfaces, control of output devices. This knowledge is useful in the development of various electronic devices.			

TRT207	Transport Electronic Systems	3.0 CP	4.5 ECTS
Radio navigation, radar and communication systems for transport. Dim, remote and global positioning systems and their accuracy. Passive and active radar systems. Telecommunications and radio systems. Signals used in the transport electronic systems, their processing and frequency ranges. Transport management systems, automotive, aviation and rail electronic systems.			

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

MASTER COURSES

(available only to graduate students)

Code	Course name	CP	ECTS
RAE555	**Teletraffic Theory**	**3.0 CP**	**4.5 ECTS**
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.			
RAE475	**Telecommunications and Computer Networks**	**5.0 CP**	**7.5 ECTS**
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.			
RAE553	**Signaling Systems and Protocols**	**3.0 CP**	**4.5 ECTS**
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.			
RDE701	**Telecommunications Theory (special course)**	**5.0 CP**	**7.5 ECTS**
The following main topics are covered in this special course: entire analytic functions and their application insignal sampling, approximation and restoration; properties of Fourier transform; signal mutiplexing 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.			
RDE432	**Transmission Systems (special course)**	**4.0 CP**	**6.0 ECTS**
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.			
RTR532	**Simulation of Functional and Logical Circuits**	**4.0 CP**	**6.0 ECTS**
Design and simulation environments for the systems of great complexity (SIMULINK, Ptolemy etc.). FPGA design environments (Quartus II and ISE). Design of complicated systems using MATLAB/SIMULINK. Introduction into VHDL and Verilog languages. FPGA Development Boards (Kits). Digital circuits design using Quartus II environment..			
REA707	**Digital Electronic Systems Design**	**3.0 CP**	**4.5 ECTS**
Study course allows obtaining of analytical and practical skills in the process of analysis and design of digital electronic systems. The material is based on sequential explanation of design process, finally focusing on the Register Transfer Level design procedure, creating the basis for FPGA programming courses. Theoretical knowledge obtained during lectures is applied to solution of practical exercises- design of digital electronic systems. The following approach will give students the possibility to solve digital electronics testing and design problems and will serve as the foundation for further studies.			
RRI702	**Application of Microprocessors and Microcontrollers**	**3.0 CP**	**4.5 ECTS**
The study course is dedicated to microprocessor and microcontroller technologies and their use, it is designed as an initial study course for students without prior knowledge. During the study course students will learn the basic principles of architecture, development cycle, algorithms for solving entry-level tasks, as well as practical initial skills for working with the integrated development environment Code Composer Studio, and strengthen the acquired knowledge during laboratory work with MSP type layout boards.			
RRI707	**Electronic Systems for Data Transmission**	**3.0 CP**	**4.5 ECTS**
The aim of the course is to introduce students to various data transmission media, operation of protocols, most used board, equipment and building-scale interfaces, protection techniques, RFID and other identification technologies.			

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