



**RIGA TECHNICAL  
UNIVERSITY**

## **FACULTY OF ELECTRONICS AND TELECOMMUNICATIONS**

**Please note! This is a preliminary list of courses for the Autumn semester of study year 2018/2019. Changes may occur!**

### **MASTER COURSES**

#### **RAE472 Digital Switching Systems**

3.00 CP (4.50 ECTS)

This course is partly based on CCNP SWITCH 642-813 Official Certification Guide.

Introduction to OSI system Layer 2 and multilayer switch operation. Basic VLAN concepts. End-to-end VLAN. VLAN channel. Ethernet application in campus network. Inter VLAN communication through Layer 3 routing. Switch port aggregation with EtherChannel. Spanning tree protocol. Multilayer switching with CEF. Voice VLAN. Catalyst and ASR switches. Enterprise network, Ethernet carrier environment. Switching in optical networks.

#### **RAE473 Computer Technologies in Telecommunications**

3.00 CP (4.5 ECTS)

The objective of the course is to enable students to construct software by means of systematic object-oriented analysis and design. The course covers the methods for object-oriented analysis and modelling of application domains and software systems. The analysis includes description of objects and their structuring and functional specifications. The design will include the system modelling with layering and partitioning.

#### **RDE417 Physics of Optical Information Processing**

4.00 CP (6.00 ECTS)

The course is designed to introduce students to the fundamentals of optoelectronic and optical communications. Topics cover waveguide optics, nanophotonics, metamaterials, holography, optical information processing, laser technology and nonlinear optics, atmospheric laser communications, FOTS information multiplexing and computer simulation.

#### **RAE553 Signalling Systems and Protocols**

3.00 CP (4.50 ECTS)

The rapid development of telecommunications branches required specialists, who would be able to analyse current situation, forecast development directions, make long-term responsible solutions about favourable signalling/protocol system selection.

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.

Within the framework of the course, students are acquainted with fundamental telecommunications signalings and protocols, analyse its historical development with some essential drawbacks, expand their personal vision for future task solutions in future.

#### **RAE475 Telecommunications and Computer Networks**

5.00 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.

### **RDE418 Telecommunications Theory (special course )**

4.00 CP (6.00 ECTS)

Electric communication theory (special course) for M.Sc.students of RTU is intended to deepen their knowledge of signal sampling and approximation, of linear system theory basing on entire analytic function theory, as well as of other communication technology theoretical problems. Theory of entire analytic functions is a valuable tool in communication theory and practice because entire analytic functions in the complex plane correspond to the functions with limited spectra on the real axis. The latter are just functions which describe signals transmitted over the bandlimited communication channels. In this way it turns out that the well known sampling (Kotelnikov) theorem is merely the special case of Lagrange's interpolation formula of entire analytic functions enabling also other sampling possibilities including nonuniform sampling. Similarly, other new possibilities appear in signal approximation and in approximation error evaluation, as well as in signal restoration if only a partial information about the signal is known. Signal multiplexing in CDMA systems and the main branches of quantum information including quantum communications (mainly quantum cryptography) and quantum computers. 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.

### **RDE419 Fibre Optic Transmission Systems**

5.00 CP (7.50 ECTS)

Topics covered include FOTS element classification, optical fibre, cables, manufacturing, parameter system, loss mechanism, optical connections, optical waveguide electrostatics, irradiating and receiving modules, multiplexers, demultiplexers, parameter measurements, optical sensors. International standards related to optical communication systems are discussed. Students are prepared both for practical work with optical elements and further studies at doctoral study programmes.

### **RDE432 Transmission Systems (special course)**

4.00 CP (6.00 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.

### **RDE701 Telecommunications Software**

4.00 CP (6.00 ECTS)

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### **RDE703 Microwave Telecommunications Systems**

5.00 CP (7.50 ECTS)

Topics covered by the course include microwave propagation, radio communication, attenuation factor, radio link components: antennae, feeder, receiver and transmitter; analogue and digital radio systems, noise immunity, communication stability and grade of service, satellite and mobile systems, short range radio systems for telephone communication.