RIGA TECHNICAL UNIVERSITY

FACULTY OF POWER AND ELECTRICAL ENGINEERING

Please note! This is a preliminary list of courses for the study year 2017/2018. Changes may occur!

Autumn 2017

BACHELOR COURSES

EEI352 Programming languages
3.00 CP (4.50 ECTS)
Features of programming in electric technologies. Basics of languages Pascal,C and C++. Simple program in the language C++. C++ programs development and .running. Necessary regulations for program C++ running. Construction of classes. Members of classes. Indices of classes. Work with classes. Constructors and destructors. Defining of parameters for constructors. Overloading operators. Meaning of inicialising. Control, constructors and destructors in industrial electronics structure and loading. Necessary provisions for C++ programme loading. Designing of classes. Class members. Class pointers.

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EEP201 Theoretical Basis of Electrical Drives
6.00 CP (9.0 ECTS)
Mechanic of electrical drives (ED), static and dynamic properties of electrical motors, its characteristics and regimes, transient processes of ED, adjustment of speed, torque and position in ED, energetic of ED, choice of motors power, a special modes of ED, basics of automatic regulation and control: classification, mathematical representation, dynamic links and structure schemes, criteria of stability.

EEP273 Basics of Regulation Theory
2.00 CP (3.0 ECTS)
The regulation tasks in analog electrical engineering systems. Feed-back loops, typical junctions, its characteristics, modeling, transient to the frequency characteristics. Estimation of stability. Closed-loop systems. Transient processes. Improving of quality indicators. Regulators. Analogue and numerical simulation. Numerical control.

EEP473 Basics of Production Systems Automation
3.00 CP (4.5 ECTS)
The subject is meant for full and part-time study, the type of RTU students of bachelor study program "Computer control of electrical technologies". Examines the production process automation system for the establishment of principles. Deals with automation system parameter identification, forecasting, sensors, information processing technology, transformation and transmission, automatable sites linking to a computer and microprocessor control systems, computerized automation system programming, continuous process control systems.

DAI201 Electrical Measurements
3.00 CP (4.5 ECTS)
Measuring process, ways of performing measurements and methods.Measuring errors and estimation of measurement result. Characteristics and structures of means of measuring. Measures, measure transducters and electromechanical measuring instruments. Bridge and conpensational schemes. Electronic, analogue and digital measuring instruments. Measuring of resistance, inductivity, capacity, current, voltage, power, energy, phase shift, frequency and signal parametres.

MASTER COURSES

EEP433 Automated Electrical Drive *(graduate)*
3.00 CP (4.50 ECTS)
Electrical drives and automation by usage of the DC, AC induction and synchronous type motors. Tracking drives, programmable, adaptive and self-organizing systems. Electric magnets, electric-magnetic clutches. Choice of the motors and its protection. Reliability of the systems.

EEP504 Microprocessors - based Automation Systems *(graduate)*
3.00 CP (4.5 ECTS)
The course has been composed for any student who has elementary knowledge in the field of electrical engineering and programming and wish to gain basic practical skills of utilization of microcontrollers MSP430. The course briefly discusses basic design features of microcontrollers MSP430 in the context of various architectures of microprocessors, microcontrollers and peripheral devices. The most significant part of the course is devoted to the programming of MSP430 – including the programming of digital I/O, watchdog and arithmetical operations. The course is based on practical studies and assumes active individual training of the students in the laboratory or at home.

EEP524 Design of Power Electronics Systems *(graduate)*
3.00 CP (4.5 ECTS)
The subject is proposed for full and part-time RTU academic master study program „Computerized Control of Electrical Technologies" students. The power electronics system main converter design and calculation are considered. It is desribed the design and calculation of controllable rectifier, net inverter, DC pulse converter and autonomous inverter power and control schemes.

EEP570 Elements of Automatics *(graduate)*
9.00 CP (13.5 ECTS)
Sensors for measurement of electrical and non-electric parameters. Measurements schemes. Synthesis of logical parts of measurement schemes. Functional converters. Characteristics of technical parameters. Indicators of reliability level of the schemes.

EEP572 The Control Systems of Power Electronics Equipment *(graduate)*
5.00 CP (7.50 ECTS)
Electronic elements of control systems. Saw-teeth mode voltage, forming of firing pulses. Achieving of the time delay in control systems, phase shifting control, synchronization with network, generators for clock pulses, diversification devices, Pulse Width Modulators, microprocessor based control systems for frequency converters.

EEP574 Commutated Converters Part 1 and Part 2 *(graduate)*
5.00 CP (7.50 ECTS)
The subject provides in-depth knowledge in microeconomics and macroeconomics. Particular attention is paid to a deeper understanding of demand and supply, consumer choice and public choice theories. The types of economic development policy and economic development problems under conditions of globalization and international integration are analysed.

EEP582 Control Technique with Microprocessor Controllers *(graduate)*
3.00 CP (4.5 ECTS)
Process control systems with one and two tanks of capacities. Control loops. Industrial measurement equipment for flow, pressure, level and temperature. Controlled valves, programmable controllers, functions, P, PI, PID control loops, optimal setting techniques.

EEP583 Industrial Frequency Converters and Inverters *(graduate)*
2.00 CP (3.00 ECTS)
Historical overview of AC drive systems development. Mechanical and electrical characteristics of DC and AC drive systems with different speed control methods. Variable frequency AC drives, typical applications and characteristics. Inverters and frequency converters with pulse width modulation techniques. Scalar and vector-oriented control methods of frequency converters.

EEP584 Theory of Electronic Converters of Electrical Energy *(graduate)*
4.00 CP (6.00 ECTS)
General theory of energy conversion. Rectifiers and line-frequqncy controlled inverters. Autonomous inverters. Current-source, voltage-source and resonance mode inverters. Modulation methods. BUCK and BOOST converters. Frequency converters with high-frequency links. Matrix type converters. Cycloconverters.

EEP585 Simulation of Electrical Processes *(graduate)*
5.00 CP (7.50 ECTS)
The subject is devoted to simulation of electrical circuits. Principles of composing of differential equation systems for electrical equipment, of their numerical calculation, and its features in MATLAB are given in the first significant part of the course. The second part is devoted to PSPICE circuit description language and to the features of its practical utilization. The theoretical part of the course deals with solutions of ordinary differential equation systems and basics principles of PSPICE. The practical (most important) part of the course includes various examples of simulation of electrical equipment.