



**RIGA TECHNICAL
UNIVERSITY**

FACULTY OF TRANSPORT AND MECHANICAL ENGINEERING

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

SPRING 2017 BACHELOR COURSES

MTH306 Construction of Machines and Mechanisms

3.00 CP (4.5 ECTS)

Analysis and synthesis of mechanisms. Dynamics, models of dynamic calculation of machines and mechanisms. Principles of projection, planing and desing documentation, technology of assembling. Standartization in machine building. Exploitation reliability, life.

MTH206 Engineering Measurements and Experiments

2.00 CP (3.00 ECTS)

Experimental investigations in engineering. Methods and technical means for measuring physical and mechanical properties of materials (metals, composites). Measurements of dynamical parameters of mechanisms and structures (vibration, noise, temperature, pressure, flow, matter structure, concentration, force, velocity, acceleration). Types of experiments and plans. Automation of experimental investigations. Identification experiments. Methods for computer analysis and mathematical processing of experimental data.

MMP219 Resistance of Materials (for mechanical engineering) Part 1 and Part 2

5.00 CP (7.5 ECTS)

Basic hypotheses. Matematik's model. Calculation chart. Forces. Stress. Deformation. Strain. Compressions. Strength calculation. Strength theory. Torsion. Bend. The experimental tasks. Flexibility grounds. The general principles and theorems. Displacements. Buckling. Dynamic tasks. Impact at. Long term strength. Plate and shell. FEM Method: Bending Beam and Buckling. System stability.

MTM201 Theoretical Mechanics (for mechanical engineers) Part 1 and Part 2

5.00 CP (7.5 ECTS)

Axiomes. Constraints. Simplification and equilibrium of forces systems. Friction of sliding, rotation and turning. Centre of mass. Tensors of inertia. Kinematics and dynamics of particle. Types of motion of a body. Kinematics and dynamics of particle in different frames of reference. General theorems of dynamics. Dynamics of a rigid body. Method of kinetic-static. Balancing. Gyroscope. D'Alembert's principle. Balancing.

MTM205 Engineering Mechanics Problems

3.00 CP (4.5 ECTS)

Use of theoretical laws and engineering methods for investigation of real typical systems. Role of chooses of a precision of calculation of model in a case of incomplete model parameter information. Tasks on static and dynamic loading and mechanical stresses. Problems of optimisation in a pneumatics and electromechanical systems.

MRA320 Methods and Technology of Process Control

3.00 CP (4.5 ECTS)

The essence and types of automation, models of control systems and their classification. Description of process control in different physical systems – mechanical, electrical, thermal, biological etc. Process control and analysis in continuous time and frequency domains. Computer control. Characteristics of discrete time control. Laplace and z-transforms. Process modeling by computers. Electronic control system equipment.

MSE304 Technical Thermodynamics and Heat Exchange

3.00 CP (4.5 ECTS)

The subject deals with the problems of thermal processes in nature and technical equipment. Basic topics: thermodynamic systems - characteristics and parameters. Ideal and real gases. Basic laws of thermodynamics. Specific heat, internal energy, enthalpy, entropy, exergy. Thermodynamic processes and cycles. Water and water steam. Humid air. Gas and steam flows. Steam and gas cycles of thermal machines. Refrigerators and heat pumps. Mechanisms and heat transfer. Steady and unsteady heat conduction. Theory of similarity. Convective heat transfer. Thermal and velocity boundary layers. Complex heat transfer. Heat utilizing equipment. Design of heat exchangers.

MAB205 Basics of Production Engineering

2.00 CP (3.0 ECTS)

Engineering process and its components. Methods of production (machining, cold plastic treatment, electrophysical treatment and other methods). Design of engineering processes. Engineering processes of product assembly.

MAB215 General Metrology

3.00 CP (4.5 ECTS)

Basic terms, metrological characteristics of instruments, evaluation of measurements, errors, error types. Dimensions, their precision and fits.

EEE101 Electricity and Magnetism

2.00 CP (3.0 ECTS)

Electrical charges and electrical field; foundations of relativity, origin of magnetism. Capacity, inductivity and mutual inductivity. Interaction of electrical and magnetic fields, Maxwell's equations. Propagation of electromagnetic waves and energy, skin-effect. Electric and magnetic properties of matters, superconductivity, ferromagnetism

MASTER COURSES

MMP539 Vibrotechnology and Vibromachines (graduate)

4.00 CP (6.0 ECTS)

Typical vibrotechnologies and machines. Fundamentals of the system. Nonlinear effects. Optimal design. Vibroisolation tasks. Optimal vibro-protection of machines and constructions. Complexes. Rotor dynamics. Design and calculations.

MSE535 Non-Standard Sources of Energy (graduate)

3.00 CP (4.5 ECTS)

The subject gives basic knowledge in matters of non-standard and alternative energy sources, sustainable development theory, legislative acts and strategies on different levels that support and promote use of such energy sources and the modernization of utilization technologies. Huge attention is given to energy sources that have been used already for several centuries – solar, wind, running water (oceans, seas, rivers, tidal and ebb energy), biomass. The potential and the level of the utilization technology of every source is carefully evaluated according to technical, economic, environmental aspects. Emphasis is put on efficiency of energy conversion and total profitability. From the same aspects household and industrial waste, sludge from water treatment plants is considered. Interest is also built towards nuclear energy and hydrogen technologies. All sources are evaluated on the level of EU and the Republic of Latvia development plans.

MTH505 Rotary Machines (graduate)

3.00 CP (4.5 ECTS)

Rotating parts of structures, shafts of energy and transportation machinery parts. A key initiative of the dynamic load factor, rotor disbalance. The dynamic calculation methods are analysed. The rotor balancing methods are considered.

MSE541 Theory of Boundary Layer (*graduate*)

4.00 CP (6.0 ECTS)

Study course is planned for extended studies of heat and mass transfer, fluid mechanics and aerodynamic theory and practical applications. The main emphasis is on the convective heat exchange and the related phenomena of flow mechanics. Basic topics: Hydrodynamic and thermal boundary layers. Laminar, transient and turbulent flows. Viscosity, compressible and incompressible flows. Differential equations of flow dynamics and heat mass transfer. Boundary layer evaluation and empirical relationships. Analytical and numerical methods for solving equations. Modelling and simulation methods. Empirical methods of heat exchange and flow mechanics.

MRA253 Basics of Technical Design (*graduate*)

2.00 CP (3.0 ECTS)

Marketing demands, fashion and style. The human potential and willingness to use a particular object (ergonomics). Technical aesthetics. Fundamental concepts of design: composition, form, colour. Laws of the design form development in the historic perspective.