Courses taught in foreign languages in academic year 2019/20

Content

Institute:	Faculty of Mechanical Engineering
Course title:	**Applied Physics**
Course code:	UTM/P089
ECTS:	3
Level of course:	bachelor
Teacher:	Novotný Jan, PhDr., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	1/1 per week
Completion:	Exam
Course goal:	Good knowledge of physics is the basic prerequisite for understanding and design of technical equipment. The aim of the course is to deepen and level up students' secondary school knowledge, to be able to study successfully technical subject.
Abstract:	1. Experimental and theoretical physics. Models and modelling in physics. Vector Calculus introduction: adding and subtraction of vectors. 2. Mass point (primary element) kinematics: reference-coordinate systems, displacement, speed, velocity, acceleration, straight-line, curvilinear and harmonic motions. 3. Kinematic quantities relations, graphs. 4. Mass point dynamics: laws of motion. Forces effects, work, energy, force impulse, momentum. 5. Rigid body (solid): forces and moments equilibrium, rotational motion, moment of momentum, inertia moment, energy. Sliding friction, rolling resistance, physical pendulum. 6. Matters deformation: elastic and plastic deformations, strain-stress diagram explanation. Loading of solids: tension, shear and torque. Hooke's law, Young's modulus, Poisson's ratio. 7. Perfectly and imperfectly elastic impacts: force impulse, momentum, momentum moment, energy. 8. Liquids. Hydrostatics: Pascal's law and Archimedean principle and hydrostatic paradox and their technical application. Hydrodynamics of ideal liquid, Bernoulli's equation, hydrodynamics paradox.. 9. Ideal and real liquids. Movement of bodies in liquids. Aeromechanics, atmospheric pressure and pressure measurements. Technical application: compressors, vacuum pump, turbines, aviation. 10. Kinetic theory of gases, velocity distribution, root-mean-square speed of molecules. Pressure of gases. Ideal gas fundamental equation. 11. Electricity - Electrostatics, Electrical field strength E, Electric current, Single electrical circuit, Ohm s law for electrical circuit part. 12. Formation of the image, Plane mirror, Concave spherical mirror, Lenses, Dioptric power
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**CAD**
Course code:	USE/P080
ECTS:	3
Level of course:	bachelor
Teacher:	Martin Svoboda, Ing., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/0 per week
Completion:	exam
Course goal:	The aim of the course is to introduce CAD systems in the branch of mechanical engineering, to explain the principles of engineering projection and drawing, to learn the creation of 2D engineering drawing in AutoCAD system and to outline the creation of 3D drawing and solid modelling in Autodesk Inventor system.
Abstract:	1. Introduction, requirements. Basic terms. CAD systems - benefits, classification, utilization. 2. AutoCAD - yesterday and today, HW, SW, formats, environment, drawing window, procedure of drawing creation, handling, motion in a drawing. 3. AutoCAD - command selection, command line, short-cut menu, model and paper space, status bar, switches. 4. AutoCAD - object selection, coordinate systems, layers a object attributes, object snap, zoom and pan functions. 5. AutoCAD - basic functions - line, circle, trim/extend, offset. 6. AutoCAD - basic functions - delete, mirror, rotate. 7. AutoCAD - advanced functions - rectangle, polygon, spline, arc, ellipse, polyline. 8. AutoCAD - advanced functions - copy, move, array, scale, break. 9. AutoCAD - advanced functions - chamfer, trim, hatch, explode, inquiry. 10. AutoCAD - text style settings, writing of single line text and multiline text. 11. AutoCAD - dimension style settings, fundamentals of dimensioning. 12. AutoCAD - operations with blocks - creation, insertion, export. 13. AutoCAD - printing, data export, other frequently used and effective functions
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**CNC Programing**
Course code:	UTM / P111
ECTS:	3
Level of course:	bachelor
Teacher:	Pavel Kraus, Ing.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/0 per week
Completion:	exam
Course goal:	The aim of the course is to outline the usage of 3Ddrawing and solid modelling in SolidWorks system, to explain the connections between machine, workpiece, CNC system etc., to approach the numerical control and to develop the processing knowledge for CAM system, practical demonstration of CNC systems and CNC machining.
Abstract:	Modeling in SolidWorks NC, CNC, DNC, ISO Code Using of CAM system CNC systems CNC machining
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Degradation of material**
Course code:	UTM / P101
ECTS:	5
Level of course:	Bachelor, Master
Teacher:	Sylvia Kuśmierczak, Ing., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/1 per week
Completion:	exam , semestral project
Course goal:	The course approaches the issue of material degradation and introduces students with the classification of degradation processes, to give their reasons and their consequences. Student information obtained in this field.
Abstract:	1. Classification of degradation processes 2. Fractures materials: theoretical strength, the influence of defects etc. 3. Fatigue of materials: fatigue static, dynamic fatigue creep 4. Wear materials: abrasion, adhesion, erosion, cavitation 5. Degradation of sudden temperature changes, chemical decomposition at high temperatures. 6. Degradation radiation: UV degradation, radiation damage Materials resistant to certain types of degradation.
Notice:	*The course will be opened with the attendence of 5 students min.* *For this course are required to have passed an examination of subjects Material Science I, II.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Electrical Experiments**
Course code:	USE / P105
ECTS:	3
Level of course:	bachelor
Teacher:	Vladislav Síťař, Ing., Bc.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	0/3 per week
Completion:	credit
Course goal:	The aim of course is familiarization of students with the basic electrical variables measurement. Students are acquainted with the electric measurement apparatuses and their application within laboratory experiments in the field of electrical circuit theory.
Abstract:	1. Laboratory safety rules 2. Apparatuses and elements for electric variables measurements 3. DC voltage and current measurement 4. AC voltage and current measurement 5. Voltage and current measurement in non-harmonic circuits 6. Measurement the frequency dependence of measuring instruments 7. Analysis of ideal passive elements behaviour 8. Quantity measurement of ideal passive elements 9. Verification the voltage and current divider rules 10. Verification the Kirchhoff's laws 11. Measurement the V/I characteristics of diodes 12. Power measurement in AC circuits
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Model of Energy Flows**
Course code:	UTM/P104
ECTS:	4
Level of course:	bachelor
Teacher:	Tomáš Vysloužil, Ing., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	0/4 per week
Completion:	Pre-exam credit
Course goal:	The aim of the course is to introduce students with the basic principles of the finite element method and its practical application to various problems in the power industry. Course is orientated on software systems COMSOL.
Abstract:	1) Introduction to COMSOL. Creating 2D and 3D geometry, use of symmetry in modelling. 2) Methods of setting boundary conditions and loads. Creating a finite-element model. 3) Evaluation and processing of the result Solutions 4) Heat Transfer 5) Fluid flow 6) Electricity 7) Electrostatics 8) The magnetic field
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**The Physics of Metals**
Course code:	UTM/P114
ECTS:	5
Level of course:	bachelor
Teacher:	Jan Novotný, Dr., Ph.D..
Term:	summer, winter - the course will be opened only by signing in a minimum of 3 students.
Language of instruction:	English
Lectures/exercises:	2/2 per week
Completion:	exam
Course goal:	Good knowledge of physics of metals as the basic prerequisite for understanding and design of technical materials. Subjects presents a definitive account of a major field of modern physics and will be of value to both experimental and theoretical solid state physicists and metallurgists seeking a clear explanation of the physical phenomena occurring in metals
Abstract:	Internal structure of metals and alloys Fundamentals of crystallography Dislocations and between dislocations and plastic deformation during forming Ways of strengthening metals. Precipitation hardened alloy Solidification of metals and their alloys Grain boundaries: definition and description. Properties of grain boundaries. Diffusion Chemical treatment of metal surfaces and diffusion processes in metal heat treatment Ways and nature of the surface wear of materials. Violation of the fracture, the mechanism of fracture, fracture types and their origin.
Notice:	*The course will be opened with the attendence of 3 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Technical English**
Course code:	USE/ P098
ECTS:	3
Level of course:	Bachelor, Master
Teacher:	Marčíková Simona, Mgr.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/0 per week
Completion:	exam
Course goal:	This course covers essentials of technical language skills and aims to encourage fluency and active use of grammar and communicative structures in oral and written ways.
Abstract:	**I. Introductory part** **winter semester, bachelor** Engineering, The History of Engineering, Civil Engineering, Main Branches of Civil Engineering, Engineering Functions, **II. Main part** **summer semester, bachelor** Material Engineering Properties – General Physical Properties, Material Engineering Properties – Mechanical Properties, Material Engineering Properties – Thermal Properties, Material Testing – Tensile Test, Manufacturing Processes **III. Final part** **winter, summer semester – master** Cast Iron, Non-Ferrous Metals, Corrosion, Plastics, Environmental Engineering
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Corrosion and Protection of Material**
Course code:	UTM/P097
ECTS:	4
Level of course:	Bachelor, Master
Teacher:	Jaroslava Svobodová, Ing., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/1 per week
Completion:	exam , semestral project
Course goal:	The material is exposed to a number of influences in technical practice that cause its deterioration, corrosion and other degradation. Knowledge of the degradation reason and reducing of the environment impact is an important factor in the design of structures, structural components and protection of goods prior to export from the factory. In the automotive and aerospace engineering are still solving this problems. Insight into the influence of environment on the product, material and methods of protection of materials and products are the object of this course.
Abstract:	1. The Gist of the Corrosion 2. Types of Corrosion 3. The Distribution and Types of Corrosion Attack 4. Thermodynamic Stability and Corrosion Nobility of Metals 5. Corrosion Protection Methods 6. Metal coatings Semetral Project – practical exercise
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Manufacturing Technology**
Course code:	UTM/P090
ECTS:	5
Level of course:	Bachelor, Master
Teacher:	Jaroslava Svobodová, Ing., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/1 per week
Completion:	Exam, semestral project
Course goal:	The aim of the course is to obtain knowledge in the manufacturing processes that deal with the production of components used in engineering in the construction machinery and industrial equipment.
Abstract:	1. Introduction into Manufacturing Technology 2. Production Technology of Metals 3. Casting Technology 4. Forming Technology 5. Machining Technology 6. Heat Treatment 7. Semestral Project
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Non-cutting Technologies**
Course code:	UTM/P095
ECTS:	5
Level of course:	Bachelor, Master
Teacher:	Jaroslava Svobodová, Ing., Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	2/1 per week
Completion:	Exam, semestral project
Course goal:	The aim of the course is to explain the principle and technological processes of the non-cutting technologies. We will deal with the basic technologies of casting, progressive casting technology, forming, welding a powder metallurgy.
Abstract:	1. Properties of Metals and Alloys 2. Partition of the Production Processes 3. Casting Methods 4. Casting Technology 5. Progressive Casting Technology 6. Forming – thermo forming and cold forming 7. Technological Forming Processes 8. Welding Technology 9. Welding Methods 10. Powder Metallurgy
Notice:	*The course will be opened with the attendence of 5 students min.*

Faculty/Institute:	Faculty of Mechanical Engineering
Course title:	**Technical Drawing**
Course code:	USE/P113
ECTS:	3
Level of course:	bachelor
Teacher:	Ing. Martin Svoboda, Ph.D.
Term:	summer, winter - the course will be opened only by signing in a minimum of 5 students.
Language of instruction:	English
Lectures/exercises:	1/2 per week
Completion:	exam
Course goal:	The subject is an introduction to the creation and reading of the technical documentation, which is the main basis for the realization of the products. Students develop spatial imagination and acquire skills in manual drawing and dimensioning of basic geometric formations and structural components and assembly of components. The aim is to prepare students for the following subjects of structural and technological character.
Abstract:	1. Introduction, requirements, drawing aids. Technical standardization and documentation. 2. Basic imaging methods - overview, rectangular and axonometric projection. 3. Technical drawings - lines, drawing formats, drawing drawings, scales, description field, technical font. 4. Basic rules for rendering machine parts - views, cuts, cross sections. 5. Basic rules for displaying machine parts - showing basic geometric elements of components. 6. Dimensioning - rules, execution, dimensions, dimensions of geometric and structural elements. 7. Tolerance and dimensional accuracy - tolerance writing, unattended dimensions. 8. Tolerance and dimensional accuracy - fitting system, storage, storage order. 9. Geometric accuracy - bases, types of geometric tolerances, meaning. 10. Surface roughness - meaning, current state of prescribing, location of marks. 11. Displays and dimensioning of machine parts and elements - threads, bolts and screw connections, springs, gears and gears. 12. Displays and dimensioning of machine parts and elements - grooving, bearings, sealing rings, centering pits, recesses, glued and solder joints, welds and welds, castings and forgings, heat treatment. 13. Drawing drawings - general principles, positioning, item lists (BOM), semi-finished products and their labeling.
Notice:	*The course will be opened with the attendence of 5 students min.*