Study plan

Name of study plan: 09 54 59 00 BSTR 2012 A - prezenční anglicky

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Welcome page
Type of study: unknown full-time
Required credits: 305
Elective courses credits: -126
Sum of credits in the plan: 179
Note on the plan: třetí pokus

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 241
The role of the block: P

Code of the group: 12B-KMENA TZI STR
Name of the group: 01 2012 souhrn skupin 12B*AiP-KMEN pro i od 1 do 6
Requirement credits in the group: In this group you have to gain 149 credits
Requirement courses in the group: In this group you have to complete 35 courses
Credits in the group: 149
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E012035	**Algorithmization and Programming** *Petr Sváček, Marta Čertíková, David Trdlička* ***Marta Čertíková*** *Petr Sváček (Gar.)*	KZ	4	1P+2C	*	P
E371047	**Automatic Control** *Jaromír Fišer* ***Jaromír Fišer*** *Jaromír Fišer (Gar.)*	Z,ZK	5	3P+1S+0L	Z,L	P
E182019	**Chemistry** *Jaromír Štancl* ***Jaromír Štancl*** *Jaromír Štancl (Gar.)*	KZ	3	2P+1C	*	P
E012037	**Computer Graphics** *Nikola Pajerová, Ivana Linkeová* ***Ivana Linkeová*** *Ivana Linkeová (Gar.)*	KZ	3	1P+1C	*	P
E372041	**Computer Support for Study**	KZ	3	1P+1C	*	P
E011021	**Constructive Geometry** ***Ivana Linkeová***	Z,ZK	6	3P+2C	Z	P
E141504	**Electrical Circuits and Electronics** *Jan Chyský, Martin Novák* ***Martin Novák*** *Jan Chyský (Gar.)*	Z,ZK	4	2P+0C+2L	*	P
E141505	**Electrical Machines and Drives** *Jan Chyský, Martin Novák, Jaroslav Novák* ***Martin Novák*** *Jaroslav Novák (Gar.)*	Z,ZK	4	2P+0C+2L	*	P
E131002	**Engineering Design II** *Martin Dub*	Z,ZK	4	2P+3C	2	P
E133013	**Engineering Design III.** *František Lopot, Jan Hoidekr* ***Jan Hoidekr*** *Jan Hoidekr (Gar.)*	Z	2	0P+2C	*	P
E133014	**Engineering Design IV.** *František Lopot, Jan Hoidekr* ***Jan Hoidekr*** *Jan Hoidekr (Gar.)*	Z	2	0P+2C+0L	*	P
E153005	**Fundamentals of Energy Conversions**	Z	1	1P+1C	*	P
E131512	**Machine Elements and Mechanisms I.** ***František Lopot***	Z,ZK	6	3P+2C	*	P
E381054	**Management and Economics of the Enterprise** *Michal Kavan* ***Michal Kavan*** *Michal Kavan (Gar.)*	Z,ZK	4	2P+2C	*	P
E322029	**Materials Science I.** *Jakub Horník, Veronika Mazáčová* ***Jakub Horník*** *Jakub Horník (Gar.)*	KZ	3	2P+0C+1L	L	P
E321039	**Materials Science II.** *Jakub Horník, Veronika Mazáčová, Jana Sobotová* ***Jakub Horník*** *Jakub Horník (Gar.)*	Z,ZK	4	2P+2L	*	P
E011056	**Mathematics I.**	Z,ZK	8	4P+4C	Z	P

E011062	**Mathematics II** ***Stanislav Kračmar***	Z,ZK	8	4P+4C	*	P
E011009	**Mathematics III.** *Olga Majlingová, Stanislav Kračmar* ***Stanislav Kračmar*** *(Gar.)*	Z,ZK	5	2P+2C	*	P
E372083	**Measurement in Engineering** *Martin Novák* ***Martin Novák*** *Martin Novák (Gar.)*	KZ	3	1P+0C+2L	*	P
E311101	**Mechanics I.** *Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Nečas, Zdeněk Neusser, Jan Pelikán, Pavel Steinbauer, Zbyněk Šika, ...* ***Zbyněk Šika*** *Zbyněk Šika (Gar.)*	Z,ZK	4	2P+2C	*	P
E311102	**Mechanics II.** *Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Nečas, Zdeněk Neusser, Jan Pelikán, Pavel Steinbauer, Zbyněk Šika, ...* ***Václav Bauma*** *Václav Bauma (Gar.)*	Z,ZK	4	2P+2C	*	P
E181026	**Momentum, Heat and Mass Transfer** *Martin Dostál, Vojtěch Bělohlav* ***Martin Dostál*** *Martin Dostál (Gar.)*	Z,ZK	5	3P+1C	*	P
E011049	**Numerical Mathematics** *Petr Sváček, Marta Čertíková, David Trdlička, Jan Karel* ***Petr Sváček*** *Petr Sváček (Gar.)*	Z,ZK	4	2P+2C	*	P
E021041	**Physics I.**	Z,ZK	7	4P+1C	*	P
E021025	**Physics II.**	Z,ZK	4	1P+2C	*	P
E331068	**Technology I.**	Z,ZK	5	2P+2C	*	P
E341014	**Technology II.**	Z,ZK	5	2P+2L	*	P

Characteristics of the courses of this group of Study Plan: Code=12B-KMENA TZI STR Name=01 2012 souhrn skupin 12B*AiP-KMEN pro i od 1 do 6

E012035	Algorithmization and Programming	KZ	4

Programming in MATLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrices, vectors and operations. Writting M-script. Input and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systems of linear equations. Scripts and functions. Structure of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Structures. Algorithmization of simple programs: minimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of systems of linear equations.

E371047	Automatic Control	Z,ZK	5

Automatic controllers are important part of many industrial processes. The goal of this course is to introduce students into basic knowledge of automatic control theory and practice like transfer functions, open versus closed loop control, design of controllers and frequency based analysis of control systems. The course also concentrates on logic control and control via programmable logic controllers. Some seminaries are arranged in laboratories where practical skills and control engineering methods are trained. Students begin to work with MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes).

E182019	Chemistry	KZ	3

General chemistry from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties of matter, thermodynamics, phase equilibrium, chemical reactions, reaction engineering), the remaining 1/3 is devoted to organic chemistry (hydrocarbons, polymers) and biochemistry. Laboratory practice is oriented upon the material properties measurement.

E012037	Computer Graphics	KZ	3

The subject is focused on the mathematical theory of the curves and surfaces in computer graphics and their visualisation. The Rhinoceros - NURBS modelling for Windows is used to demonstrate the geometrical properties of the curves and surfaces.

E372041	Computer Support for Study	KZ	3

The course introduces students into creating technical and professional documents on computers or Web and into realizing technical computations with the use of computers. Students gain practical skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating and presenting a web page.

E011021	Constructive Geometry	Z,ZK	6

The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.

E141504	Electrical Circuits and Electronics	Z,ZK	4

Introduction into theory of electrical circuits, analysis special types of electrical circuits as DC and AC. Transient states in circuits with accumulators of energy. Using Symbolic-Complex method and Fourier transformation for analysis AC circuits supplied with harmonic signal. El. Power and Energy. Introduction into electronics. Principle and typical parameters of basic semiconductor components. Application in electronic circuits (rectifier, stabilizer, power control, operational amplifier). Analogue and digital circuits. Principle of analogue and digital signal processing. Logical circuits, converters, microprocessor.

E141505	Electrical Machines and Drives	Z,ZK	4

AC el. curcuits. Electrical power and energy. Calculation, measurement, power factor. Magnetic circuit, materials, hysteresis loop. Electromagnet. Transformer, principle, construction, 3-phase transformer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed-torque characteristic, speed control. Synchronous machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characteristic. Low-voltage instruments. Low-voltage distribution system.

E131002	Engineering Design II	Z,ZK	4

Theoretical fundamentals of GPS (Geometrical Product Specification). Students will get critical knowledge about ISO system of limits and fits, tolerancing, surface texture, geometrical tolerance, dimensional loops, tolerancing of angles and cones, tolerancing of threads. Integral part of course is a project where students apply and practice their knowledge from lectures.

E133013	Engineering Design III.	Z	2
E133014	Engineering Design IV.	Z	2

Information about general principles of a new technical product design, stages of development of a new product, the designer fundamental assignment is to propose a rivalrous product including. Designing of a dribling jig. A drilling jig is a device by means of which holes on many duplicate parts may be drilled exactly alike.

E153005	Fundamentals of Energy Conversions	Z	1
The subject FEC clarify the reasons, procedures and consequences of energy conversions from sources to applications. 1. Introduction. Energy, forms and transformations of energy. Structure of primary sources to cover world energy consumption. World reserves, advances and depletion of primary energy sources. Situation on the World, EU and Czechia 2. Fossil fuels, their types and properties. Secondary fuels. Combustion of fossil fuels. Combustion equipment and their efficiency. Ecological consequences of combustion. 3. I. and II. TD law. Thermal cycles. Carnot's comparison cycle. Thermal efficiency. 4. Rankine steam cycle, thermal and real efficiency. Steam circulation carnotization. Survey of steam turbines. 5 Brighton cycle, application. Internal heat transfer, carnotization. thermal and real efficiency. Combine cycle power plant. 6. Cooling cycles, heat pumps, organic Rankine cycles. Types, working fluid, efficiency x CoF. 7. Engines with internal combustion (Otto, Diesel, Atkinson, Miller, etc), Stirling cycle, Family of Kalina cycles. 8. Renewable sources, application, importance, problems). Direct transformation (heat->Electr.). Special applications.		
E131512	Machine Elements and Mechanisms I.	Z,ZK	6
Joints and joining elements (screwed, clamped, splined, welded, riveted, soldered and adhesive joints; joints with use of feathers, pins, tenons, cotters, keys). Mechanical transmissions (belt, chain, friction, gear drives). Seminars are devoted to practical individual solution of simple design projects - tasks with motion screws, preloaded connecting bolts, clamped, pressed, splined and key joints between shafts and hubs and tasks with welded and riveted joints. Sketching of machine elements and their simple assembly units is also indispensable seminar work. Supporting systemes, mechanical joints, material joints, joining elements, mechanical transmissions, dimensioning, loading capacity, durability, reliability.		
E381054	Management and Economics of the Enterprise	Z,ZK	4
The study subject is intended for a wide range of students from all over the world who have successfully studied it for many previous years. The teaching goal is to acquaint technically educated foreign students with the basic procedures, methodologies and practice of management and economics of a modern, especially engineering company. The teaching concerns both the areas of finance, marketing and operational-production management and economics. The focus is on a prosperous enterprise operating within the framework of Lean Six Sigma and Industry 4.0. In addition to lectures and exercises, students also learn to be independent in their individual presentations, dedicated to the assigned professional topics of advanced business management.		
E322029	Materials Science I.	KZ	3
History and present state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deformation, recrystallization and fracture of materials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, iron-carbon phase diagram.			
E321039	Materials Science II.	Z,ZK	4
Fundamentals of metallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and thermo-mechanical processing, technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.			
E011056	Mathematics I.	Z,ZK	8
In the course, greater emphasis is placed on the theoretical basis of the concepts discussed and on the derivation of basic relationships and connections between concepts. Students will also get to know the procedures for solving problems with parametric input. In addition, students will gain extended knowledge in some thematic areas: eigennumbers and eigenvectors of a matrix, Taylor polynomial, integral as a limit function, integration of some special functions.			
E011062	Mathematics II	Z,ZK	8
Open and closed set, boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.			
E011009	Mathematics III.	Z,ZK	5
An introductory course in ordinary differential equation and infinite series.			
E372083	Measurement in Engineering	KZ	3
Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments.			
E311101	Mechanics I.	Z,ZK	4
Modeling of mechanical systems. Determination of force. Constraints and equilibrium of a point. Moment and Torque. Body constraints in 2D. Replacement and balance of general planar system of forces. The balance of the body in the plane - numerically. Body constraints in 3D. Replacement and general spatial equilibrium of a system of forces. The balance of the body in 3D. MBS - Multi Body Systems. Static determinancy and mobility, composition. Analytical solution of equilibrium for MBS systems. Truss systems. Center of gravity. Internal forces. The balance of the body and of multibody systems with friction. Mechanical work. Power. Efficiency. Equilibrium position.			
E311102	Mechanics II.	Z,ZK	4
Kinematics of point and of rigid bodies. Transformation matrix. Kinematics of concurrent movements. Motion: translation, rotation, general planar motion, spherical motion, screw motion, general spatial motion. Composition of mechanisms. Basic planar mechanisms. Analytical methods in kinematics of mechanisms - Trigonometric and vector method. Graphical methods in kinematics. Basic theory of gearing. Transmition mechanisms with geers. Strutting and seezing in mechanisms. Cable mechanisms.			
E181026	Momentum, Heat and Mass Transfer	Z,ZK	5
Fundamentals of transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanical energy equation. Residence time distributions in continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and thermal radiation. Multicomponent systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.			
E011049	Numerical Mathematics	Z,ZK	4
E021041	Physics I.	Z,ZK	7
Kinematics and dynamics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic properties of bodies. Oscillations, waves. Fluid mechanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Conductors, semiconductors, insulators. Magnetic field. Magnetic materials. Electromagnetic field. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.			
E021025	Physics II.	Z,ZK	4
Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction of radiation with matter. Photoelectric effect. Wave-particle mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.			
E331068	Technology I.	Z,ZK	5
Foundry properties of metals. Treatment. Pouring. Casting solidification. Moulding and core making. Thermal treatment. Plastic deformation. Division of forming processes. Semi-products, heating-up. Cutting. Cold and hot forming. Welds. Weldability. Weldment testing. Thermal cutting. Brazing. Surface treatments.			
E341014	Technology II.	Z,ZK	5
Mechanics of chip formation, cutting processes, finishing operations, non-traditional machining processes. Production rates calculation, machining economics. Automation of processes, programming of manufacture. Engineering metrology. Assembly techniques. Introduction to process planing.			

Code of the group: 12B*A*P-ZT12
Name of the group: 03 2012 anglicky ZT v pořadí 12

Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 6
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E333038	**Fundamentals of Technology I.**	Z	3	1P+1C	*	P

Characteristics of the courses of this group of Study Plan: Code=12B*A*P-ZT12 Name=03 2012 anglicky ZT v pořadí 12

E333038	Fundamentals of Technology I.	Z	3
The study of manufacturing processes forms a core subject area for a majority of mechanical enginnering stdents. It contains basic concept of three manufacturing technologies such as casting, forming and welding, including basic terms, methods and materials.			

Code of the group: 12B*A*P-TV
Name of the group: 04 2012 bakalářský povinný tělocvik anglicky
Requirement credits in the group: In this group you have to gain 3 credits
Requirement courses in the group: In this group you have to complete 3 courses
Credits in the group: 3
Note on the group:

Code of the group: 12BSA5P-ME3
Name of the group: 07 2012 ME3 pro STR anglicky
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 6
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E311108	**Mechanics III.** ***Tomáš Vampola***	Z,ZK	6	2P+2C	*	P

Characteristics of the courses of this group of Study Plan: Code=12BSA5P-ME3 Name=07 2012 ME3 pro STR anglicky

E311108	Mechanics III.	Z,ZK	6
Modeling. Dynamics of systems of particles. Dynamics of body. Mass distribution in a body. Inertia tensor. D'Alembert principle. Inertial effects of motion. Balancing of rotating bodies. Free body diagram method. Newton-Euler equations. Dynamics of multibody systems. Vibrations of systems with 1 DOF. Free oscillations. Forced oscillations excited by harmonic force and rotating unbalanced mass. Kinematic excitation. Oscillation of systems with two DOFs, torsional oscillation. Hertz theory of impact.			

Code of the group: 12BSA6P-CMS2
Name of the group: 08 2012 CMS2 pro STR anglicky
Requirement credits in the group: In this group you have to gain at least 77 credits (at most 2)
Requirement courses in the group: In this group you have to complete at least 2 courses
Credits in the group: 77
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E133025	**Design** *František Lopot, Daniel Hadraba* ***František Lopot*** *František Lopot (Gar.)*	Z	4	0P+4C	*	P
E131026	**Machine Elements and Mechanisms II.** *František Lopot, Daniel Hadraba* ***František Lopot*** *František Lopot (Gar.)*	ZK	3	3P+0C+0L	*	P

Characteristics of the courses of this group of Study Plan: Code=12BSA6P-CMS2 Name=08 2012 CMS2 pro STR anglicky

E133025	Design	Z	4
Design, design calculations and their aplications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and clutches.			
E131026	Machine Elements and Mechanisms II.	ZK	3
Preliminary design, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.			

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 32
The role of the block: PV

Code of the group: 12B*A4Q-BZJ
Name of the group: 06 2012 bakalářské zkoušky z jazyků anglicky
Requirement credits in the group: In this group you have to gain 2 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 2
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
2041061	**English-Bachelor Exam** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová, Michele Le Blanc Ilona Šimice (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041066	**Czech - Bachelor Exam** *Michaela Schusová, Jaroslava Kommová, Petr Laurich **Jaroslava Kommová***	ZK	2	0P+2C	*	PV
2041063	**French - Bachelor Exam /FME** *Michaela Schusová, Dušana Jirovská **Eliška Vítková** Dušana Jirovská (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041062	**German - Bachelor Exam / FME** *Michaela Schusová, Jaroslava Kommová, Petr Laurich, Eliška Vítková **Jaroslava Kommová** Jaroslava Kommová (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041065	**Russian - Bachelor Exam / FME** *Michaela Schusová, Hana Volejníková, Dušana Jirovská **Eliška Vítková** Dušana Jirovská (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041064	**Spanish - Bachelor Exam / FME** *Michaela Schusová, Jaime Andrés Villagómez **Eliška Vítková** Jaime Andrés Villagómez (Gar.)*	Z,ZK	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12B*A4Q-BZJ Name=06 2012 bakalářské zkoušky z jazyků anglicky

2041061	English-Bachelor Exam	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041066	Czech - Bachelor Exam	ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041063	French - Bachelor Exam /FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041062	German - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041065	Russian - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041064	Spanish - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			

Code of the group: 12BSA6Q-OP
Name of the group: 09 2012 BSTR 6. sem oborové projekty anglicky
Requirement credits in the group: In this group you have to gain 10 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 10
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E152091	**Project**	KZ	2	0P+2C	*	PV
E362091	**Project**	KZ	2	0P+2C		PV
E372091	**Project**	KZ	2	0P+2C	*	PV
E182091	**Project**	KZ	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BSA6Q-OP Name=09 2012 BSTR 6. sem oborové projekty anglicky

E152091	Project	KZ	2

E362091	Project	KZ	2
E372091	Project	KZ	2
An individual project from the branch of specialization (instrumentation, control engineering, informatics), or individual work, related to another subject.			
E182091	Project	KZ	2
Absolvent se seznámí se základy oboru Procesní technika.			

Code of the group: 12BSA6Q-PP
Name of the group: 10 2012 BSTR 6. sem prezentace projektů anglicky
Requirement credits in the group: In this group you have to gain 20 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 20
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E153091	**Project Presentation**	Z	4	4B	*	PV
E363091	**Project Presentation**	Z	4	4B		PV
E373091	**Project Presentation**	Z	4	4B	*	PV
E183091	**Project Presentation**	Z	4	0P+4C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BSA6Q-PP Name=10 2012 BSTR 6. sem prezentace projektů anglicky

E153091	Project Presentation	Z	4
E363091	Project Presentation	Z	4
E373091	Project Presentation	Z	4
Presentation of the project prepared for the subject E372091. Report in pdf format and prepared presentation (MS Powerpoint, Impress) required. Presentation, discussion (questions of another students and their supervisors).			
E183091	Project Presentation	Z	4
Preparation and presentation of a given project theme.			

Name of the block: Elective courses
Minimal number of credits of the block: 32
The role of the block: V

Code of the group: 12BSA*V-ALFA
Name of the group: 02 2012 ALFA volitelné pro STR anglicky
Requirement credits in the group: In this group you have to gain 32 credits
Requirement courses in the group: In this group you have to complete 12 courses
Credits in the group: 32
Note on the group:

Code of the group: 12B*A*V-DOP SEMI
Name of the group: 05 2012 doporučené semináře anglicky
Requirement credits in the group:
Requirement courses in the group:
Credits in the group: 0
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E026002	**Physics I. - Seminary** *Zdeněk Kohout, Zuzana Budinská, Petr Ducháček, Jan Novák, Miroslav Jílek, Daniel Tischler, Rudolf Sýkora Zdeněk Kohout (Gar.)*	Z	2	0P+2C	*	V
E026003	**Physics II. - Seminary** *Petr Ducháček, Jan Novák, Rudolf Sýkora* ***Petr Ducháček***	Z	2	0P+2C	*	V

Characteristics of the courses of this group of Study Plan: Code=12B*A*V-DOP SEMI Name=05 2012 doporučené semináře anglicky

E026002	Physics I. - Seminary	Z	2
Solving of problems corresponding to the lectures of Physics I.			

E026003	Physics II. - Seminary	Z	2

The subject is intended for students who need more detailed practising and improvement (including knowledge from former physics courses, or high-school knowledge) necessary for successful finishing Physics II course.The instructions are analogical to seminars with a short corresponding theoretical background. The link between physical concepts and methods of solution of typical problems is underlying.

Code of the group: 12B*A1V-DOP ZJK
Name of the group: 12 2012 doporučené základní jazykové kurzy anglicky
Requirement credits in the group:
Requirement courses in the group:
Credits in the group: 0
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
E046117	**Czech - Advanced** ***Jaroslava Kommová***	Z	2	0+2	Z	v
E046125	**Czech - Lower Intermediate** ***Jaroslava Kommová***	Z	2	0+2	Z	v
E046128	**Czech - Upper Intermediate** *Hana Volejníková, Petr Laurich* ***Jaroslava Kommová***	Z	2	0+2	L	v
E046118	**Czech Advanced** *Hana Volejníková, Petr Laurich* ***Jaroslava Kommová***	Z	2	0+2	L	v
E046120	**Czech for Beginners II.** ***Jaroslava Kommová***	Z	2	0+2	*	v
E046119	**Czech Language for Beginners I.** ***Jaroslava Kommová***	Z	2	0+2	*	v
E046126	**Czech Lower Intermediate** *Hana Volejníková, Petr Laurich* ***Petr Laurich***	Z	2	0+2	L	v
E046127	**Czech Upper Intermediate** ***Jaroslava Kommová***	Z	2	0+2	Z	v
E046078	**German - Lower Intermediate Course** ***Jaroslava Kommová***	Z	2	0+2	Z	v
E046079	**German Lower Intermediate** *Michaela Schusová, Jaroslava Kommová, Petr Laurich, Eliška Vítková* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	Z	2	0+2	L	v
E046080	**German Upper Intermediate** ***Eliška Vítková***	Z	2	0+2	Z	v
E046081	**German Upper Intermediate** *Michaela Schusová, Jaroslava Kommová, Petr Laurich, Eliška Vítková* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	Z	2	0+2	L	v
E046082	**German Advanced**	Z	2	0+2	Z	v
E046083	**German Advanced** *Jaroslava Kommová, Petr Laurich* ***Jaroslava Kommová***	Z	2	0+2	L	v
E046076	***Jaroslava Kommová***	Z	2	0+2	Z	v
E046077	**German Beginners** *Jaroslava Kommová* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	Z	2	0+2	L	v

Characteristics of the courses of this group of Study Plan: Code=12B*A1V-DOP ZJK Name=12 2012 doporučené základní jazykové kurzy anglicky

E046117	Czech - Advanced	Z	2

Comprehension of spoken language as well as lectures in Czech on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.

E046125	Czech - Lower Intermediate	Z	2

Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.

E046128	Czech - Upper Intermediate	Z	2

Mapped to the Common European Framework of Reference Level A2-B1. The aim is to extend language skills taking into consideration professional Czech and common professional terminology. Comprehension of standard Czech speech and conversation about topics of everyday life - at school, at work, during free time, on intermediate level. Broadening the knowledge technical language.

E046118	Czech Advanced	Z	2

Mapped to the level of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken Czech as well as lectures given in Czech without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehension of popular-scientific and scientific articles or texts from student´s field of studies without difficulties. Grammar structures on advanced level.

E046120	Czech for Beginners II.	Z	2

Mapped to the Common European Framework of Reference Level A1 Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language).

E046119	Czech Language for Beginners I.	Z	2

Basic vocabulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (professional language)

E046126	Czech Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
E046127	Czech Upper Intermediate	Z	2
Understanding standard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, briefly explain one´s opinions and plans. Reading and understanding general and technical texts.			
E046078	German - Lower Intermediate Course	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
E046079	German Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
E046080	German Upper Intermediate	Z	2
Understanding standard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability to describe experoences and events, briefly explain one´s opinions and plans.			
E046081	German Upper Intermediate	Z	2
Mapped to the level of Common European Framework of Reference:A2 - B1 Understanding standard speech about familiar topics, that a students comes across at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, explain one´s opinions and plans. Reading and understanding general and technical texts.			
E046082	German Advanced	Z	2
Comprehension of spoken language as well as lectures in German on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			
E046083	German Advanced	Z	2
Mapped to the level of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken German as well as lectures given in German without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehension of popular-scientific and scientific articles or texts from student´s field of studies without difficulties. Grammar structures on advanced level.			
E046076		Z	2
E046077	German Beginners	Z	2
Mapped to the Common European Framework of Reference level A1. Basic vocabulary of everyday lifein a written and spoken form. understanding and use of basic expressions of general scientific terminology.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
2041061	English-Bachelor Exam	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041062	German - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041063	French - Bachelor Exam /FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041064	Spanish - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041065	Russian - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041066	Czech - Bachelor Exam	ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
E011009	Mathematics III.	Z,ZK	5
An introductory course in ordinary differential equation and infinite series.			
E011021	Constructive Geometry	Z,ZK	6
The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.			
E011049	Numerical Mathematics	Z,ZK	4
E011056	Mathematics I.	Z,ZK	8
In the course, greater emphasis is placed on the theoretical basis of the concepts discussed and on the derivation of basic relationships and connections between concepts. Students will also get to know the procedures for solving problems with parametric input. In addition, students will gain extended knowledge in some thematic areas: eigennumbers and eigenvectors of a matrix, Taylor polynomial, integral as a limit function, integration of some special functions.			
E011062	Mathematics II	Z,ZK	8
Open and closed set, boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.			

E012035	Algorithmization and Programming	KZ	4
Programming in MATLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrices, vectors and operations. Writting M-script. Input and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systems of linear equations. Scripts and functions. Structure of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Structures. Algorithmization of simple programs: minimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of systems of linear equations.			
E012037	Computer Graphics	KZ	3
The subject is focused on the mathematical theory of the curves and surfaces in computer graphics and their visualisation. The Rhinoceros - NURBS modelling for Windows is used to demonstrate the geometrical properties of the curves and surfaces.			
E021025	Physics II.	Z,ZK	4
Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction of radiation with matter. Photoelectric effect. Wave-particle mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.			
E021041	Physics I.	Z,ZK	7
Kinematics and dynamics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic properties of bodies. Oscillations, waves. Fluid mechanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Conductors, semiconductors, insulators. Magnetic field. Magnetic materials. Electromagnetic field. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.			
E026002	Physics I. - Seminary	Z	2
Solving of problems corresponding to the lectures of Physics I.			
E026003	Physics II. - Seminary	Z	2
The subject is intended for students who need more detailed practising and improvement (including knowledge from former physics courses, or high-school knowledge) necessary for successful finishing Physics II course.The instructions are analogical to seminars with a short corresponding theoretical background. The link between physical concepts and methods of solution of typical problems is underlying.			
E046076		Z	2
E046077	German Beginners	Z	2
Mapped to the Common European Framework of Reference level A1. Basic vocabulary of everyday lifein a written and spoken form. understanding and use of basic expressions of general scientific terminology.			
E046078	German - Lower Intermediate Course	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
E046079	German Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement of professional language.			
E046080	German Upper Intermediate	Z	2
Understanding standard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability to describe experoences and events, briefly explain one´s opinions and plans.			
E046081	German Upper Intermediate	Z	2
Mapped to the level of Common European Framework of Reference:A2 - B1 Understanding standard speech about familiar topics, that a students comes across at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, explain one´s opinions and plans. Reading and understanding general and technical texts.			
E046082	German Advanced	Z	2
Comprehension of spoken language as well as lectures in German on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			
E046083	German Advanced	Z	2
Mapped to the level of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken German as well as lectures given in German without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehension of popular-scientific and scientific articles or texts from student´s field of studies without difficulties. Grammar structures on advanced level.			
E046117	Czech - Advanced	Z	2
Comprehension of spoken language as well as lectures in Czech on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			
E046118	Czech Advanced	Z	2
Mapped to the level of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken Czech as well as lectures given in Czech without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehension of popular-scientific and scientific articles or texts from student´s field of studies without difficulties. Grammar structures on advanced level.			
E046119	Czech Language for Beginners I.	Z	2
Basic vocabulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (professional language)			
E046120	Czech for Beginners II.	Z	2
Mapped to the Common European Framework of Reference Level A1 Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language).			
E046125	Czech - Lower Intermediate	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
E046126	Czech Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
E046127	Czech Upper Intermediate	Z	2
Understanding standard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, briefly explain one´s opinions and plans. Reading and understanding general and technical texts.			
E046128	Czech - Upper Intermediate	Z	2
Mapped to the Common European Framework of Reference Level A2-B1. The aim is to extend language skills taking into consideration professional Czech and common professional terminology. Comprehension of standard Czech speech and conversation about topics of everyday life - at school, at work, during free time, on intermediate level. Broadening the knowledge technical language.			

E131002	Engineering Design II	Z,ZK	4
Theoretical fundamentals of GPS (Geometrical Product Specification). Students will get critical knowledge about ISO system of limits and fits, tolerancing, surface texture, geometrical tolerance, dimensional loops, tolerancing of angles and cones, tolerancing of threads. Integral part of course is a project where students apply and practice their knowledge from lectures.			
E131026	Machine Elements and Mechanisms II.	ZK	3
Preliminary design, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.			
E131512	Machine Elements and Mechanisms I.	Z,ZK	6
Joints and joining elements (screwed, clamped, splined, welded, riveted, soldered and adhesive joints; joints with use of feathers, pins, tenons, cotters, keys). Mechanical transmissions (belt, chain, friction, gear drives). Seminars are devoted to practical individual solution of simple design projects - tasks with motion screws, preloaded connecting bolts, clamped, pressed, splined and key joints between shafts and hubs and tasks with welded and riveted joints. Sketching of machine elements and their simple assembly units is also indispensable seminar work. Supporting systemes, mechanical joints, material joints, joining elements, mechanical transmissions, dimensioning, loading capacity, durability, reliability.			
E133013	Engineering Design III.	Z	2
E133014	Engineering Design IV.	Z	2
Information about general principles of a new technical product design, stages of development of a new product, the designer fundamental assignment is to propose a rivalrous product including. Designing of a dribling jig. A drilling jig is a device by means of which holes on many duplicate parts may be drilled exactly alike.			
E133025	Design	Z	4
Design, design calculations and their aplications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and clutches.			
E141504	Electrical Circuits and Electronics	Z,ZK	4
Introduction into theory of electrical circuits, analysis special types of electrical circuits as DC and AC. Transient states in circuits with accumulators of energy. Using Symbolic-Complex method and Fourier transformation for analysis AC circuits supplied with harmonic signal. El. Power and Energy. Introduction into electronics. Principle and typical parameters of basic semiconductor components. Application in electronic circuits (rectifier, stabilizer, power control, operational amplifier). Analogue and digital circuits. Principle of analogue and digital signal processing. Logical circuits, converters, microprocessor.			
E141505	Electrical Machines and Drives	Z,ZK	4
AC el. curcuits. Electrical power and energy. Calculation, measurement, power factor. Magnetic circuit, materials, hysteresis loop. Electromagnet. Transformer, principle, construction, 3-phase transformer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed-torque characteristic, speed control. Synchronous machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characteristic. Low-voltage instruments. Low-voltage distribution system.			
E152091	Project	KZ	2
E153005	Fundamentals of Energy Conversions	Z	1
The subject FEC clarify the reasons, procedures and consequences of energy conversions from sources to applications. 1. Introduction. Energy, forms and transformations of energy. Structure of primary sources to cover world energy consumption. World reserves, advances and depletion of primary energy sources. Situation on the World, EU and Czechia 2. Fossil fuels, their types and properties. Secondary fuels. Combustion of fossil fuels. Combustion equipment and their efficiency. Ecological consequences of combustion. 3. I. and II. TD law. Thermal cycles. Carnot's comparison cycle. Thermal efficiency. 4. Rankine steam cycle, thermal and real efficiency. Steam circulation carnotization. Survey of steam turbines. 5 Brighton cycle, application. Internal heat transfer, carnotization. thermal and real efficiency. Combine cycle power plant. 6. Cooling cycles, heat pumps, organic Rankine cycles. Types, working fluid, efficiency x CoF. 7. Engines with internal combustion (Otto, Diesel, Atkinson, Miller, etc), Stirling cycle, Family of Kalina cycles. 8. Renewable sources, application, importance, problems). Direct transformation (heat->Electr.). Special applications.			
E153091	Project Presentation	Z	4
E181026	Momentum, Heat and Mass Transfer	Z,ZK	5
Fundamentals of transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanical energy equation. Residence time distributions in continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and thermal radiation. Multicomponent systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.			
E182019	Chemistry	KZ	3
General chemistry from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties of matter, thermodynamics, phase equilibrium, chemical reactions, reaction engineering), the remaining 1/3 is devoted to organic chemistry (hydrocarbons, polymers) and biochemistry. Laboratory practice is oriented upon the material properties measurement.			
E182091	Project	KZ	2
Absolvent se seznámí se základy oboru Procesní technika.			
E183091	Project Presentation	Z	4
Preparation and presentation of a given project theme.			
E311101	Mechanics I.	Z,ZK	4
Modeling of mechanical systems. Determination of force. Constraints and equilibrium of a point. Moment and Torque. Body constraints in 2D. Replacement and balance of general planar system of forces. The balance of the body in the plane - numerically. Body constraints in 3D. Replacement and general spatial equilibrium of a system of forces. The balance of the body in 3D. MBS - Multi Body Systems. Static determinancy and mobility, composition. Analytical solution of equilibrium for MBS systems. Truss systems. Center of gravity. Internal forces. The balance of the body and of multibody systems with friction. Mechanical work. Power. Efficiency. Equilibrium position.			
E311102	Mechanics II.	Z,ZK	4
Kinematics of point and of rigid bodies. Transformation matrix. Kinematics of concurrent movements. Motion: translation, rotation, general planar motion, spherical motion, screw motion, general spatial motion. Composition of mechanisms. Basic planar mechanisms. Analytical methods in kinematics of mechanisms - Trigonometric and vector method. Graphical methods in kinematics. Basic theory of gearing. Transmition mechanisms with geers. Strutting and seezing in mechanisms. Cable mechanisms.			
E311108	Mechanics III.	Z,ZK	6
Modeling. Dynamics of systems of particles. Dynamics of body. Mass distribution in a body. Inertia tensor. D'Alembert principle. Inertial effects of motion. Balancing of rotating bodies. Free body diagram method. Newton-Euler equations. Dynamics of multibody systems. Vibrations of systems with 1 DOF. Free oscillations. Forced oscillations excited by harmonic force and rotating unbalanced mass. Kinematic excitation. Oscillation of systems with two DOFs, torsional oscillation. Hertz theory of impact.			
E321039	Materials Science II.	Z,ZK	4
Fundamentals of metallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and thermo-mechanical processing, technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.			
E322029	Materials Science I.	KZ	3
History and present state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deformation, recrystallization and fracture of materials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, iron-carbon phase diagram.			

E331068	Technology I.	Z,ZK	5
Foundry properties of metals. Treatment. Pouring. Casting solidification. Moulding and core making. Thermal treatment. Plastic deformation. Division of forming processes. Semi-products, heating-up. Cutting. Cold and hot forming. Welds. Weldability. Weldment testing. Thermal cutting. Brazing. Surface treatments.			
E333038	Fundamentals of Technology I.	Z	3
The study of manufacturing processes forms a core subject area for a majority of mechanical enginnering stdents. It contains basic concept of three manufacturing technologies such as casting, forming and welding, including basic terms, methods and materials.			
E341014	Technology II.	Z,ZK	5
Mechanics of chip formation, cutting processes, finishing operations, non-traditional machining processes. Production rates calculation, machining economics. Automation of processes, programming of manufacture. Engineering metrology. Assembly techniques. Introduction to process planing.			
E362091	Project	KZ	2
E363091	Project Presentation	Z	4
E371047	Automatic Control	Z,ZK	5
Automatic controllers are important part of many industrial processes. The goal of this course is to introduce students into basic knowledge of automatic control theory and practice like transfer functions, open versus closed loop control, design of controllers and frequency based analysis of control systems. The course also concentrates on logic control and control via programmable logic controllers. Some seminaries are arranged in laboratories where practical skills and control engineering methods are trained. Students begin to work with MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes).			
E372041	Computer Support for Study	KZ	3
The course introduces students into creating technical and professional documents on computers or Web and into realizing technical computations with the use of computers. Students gain practical skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating and presenting a web page.			
E372083	Measurement in Engineering	KZ	3
Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments.			
E372091	Project	KZ	2
An individual project from the branch of specialization (instrumentation, control engineering, informatics), or individual work, related to another subject.			
E373091	Project Presentation	Z	4
Presentation of the project prepared for the subject E372091. Report in pdf format and prepared presentation (MS Powerpoint, Impress) required. Presentation, discussion (questions of another students and their supervisors).			
E381054	Management and Economics of the Enterprise	Z,ZK	4
The study subject is intended for a wide range of students from all over the world who have successfully studied it for many previous years. The teaching goal is to acquaint technically educated foreign students with the basic procedures, methodologies and practice of management and economics of a modern, especially engineering company. The teaching concerns both the areas of finance, marketing and operational-production management and economics. The focus is on a prosperous enterprise operating within the framework of Lean Six Sigma and Industry 4.0. In addition to lectures and exercises, students also learn to be independent in their individual presentations, dedicated to the assigned professional topics of advanced business management.			

For updated information see http://bilakniha.cvut.cz/en/FF.html
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