

Study plan

Name of study plan: 06 40 45 48 BSTR EPT 2012 K základ

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Power and Process Technology

Garantor of the study branch: prof. Ing. František Hrdlička, CSc.

Program of study: Bachelor of Mechanical Engineering

Type of study: Bachelor combined

Required credits: 276

Elective courses credits: -36

Sum of credits in the plan: 240

Note on the plan: první pokus

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 199

The role of the block: P

Code of the group: 12B-KMENK TZI STR

Name of the group: 01 2012 souhrn skupin 12B*KiP-KMEN pro i od 1 do 6

Requirement credits in the group: In this group you have to gain 156 credits

Requirement courses in the group: In this group you have to complete 37 courses

Credits in the group: 156

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
2371047	Automatic Control	Z,ZK	5	3P+2C	*	P
2182019	Chemistry Radek Šulc, Martin Dostál, Stanislav Solna, Jan Skořilas, Jan Štípek, Martina Hladíková, Jiří Bojas, Martin Mullenko Radek Šulc Radek Šulc (Gar.)	KZ	3	2P+1C	1	P
2141504	Electric Circuits and Electronics Stanislava Papežová, Jan Chyský, Jaroslav Novák, Lukáš Novák, Jiří Šašný Jan Chyský (Gar.)	Z,ZK	4	2P+2L	*	P
2141505	Electrical machines and drives	Z,ZK	4	2P+2L	*	P
2021041	Physics I.	Z,ZK	7	4P+1L	*	P
2021025	Physics II.	Z,ZK	4	1P+2L	3	P
2011021	Constructive Geometry	Z,ZK	6	3P+2C	*	P
2133025	Design	Z	4	0P+4C	*	P
2381054	Enterprise Management and Economics	Z,ZK	4	2P+2C	*	P
2011056	Mathematics I František Mráz	Z,ZK	8	4P+4C	*	P
2011062	Matematika II. Radka Keslerová	Z,ZK	8	4P+4C	*	P
2011009	Mathematics III Marta Čertíková, Jan Valášek, Hynek Čezník, Luděk Beneš, Tomáš Bodnár, Jiří Fürst, Jan Halama, Radka Keslerová, Stanislav Kraus, Radka Keslerová	Z,ZK	5	2P+2C	3	P
2311101	Mechanics I. Pavel Bastl, Michael Valášek, Tomáš Vampola, Zbyněk Šíka, Václav Bauma, Ivo Bukovský, Pavel Steinbauer, Jan Zavel, Martin Nečas, Michael Valášek Michael Valášek (Gar.)	Z,ZK	4	2P+2C	*	P
2311102	Mechanics II. Michael Valášek	Z,ZK	4	2P+2C	*	P
2121500	Fluid Dynamics	Z,ZK	5	3P+2C	*	P
2322029	Materials Science I. Zdeněk Tolde	KZ	3	2P+1L	2	P

2321039	Materials Science II. <i>Veronika Mazáková, Vladimír Mára, Marie Horváthová, Jakub Horník, Jiří Janovec, Zdeňka Jeníková, Petr Zuna, Jana Sobotová, Jiří Cejp, Zdeněk Tolde Jana Sobotová (Gar.)</i>	Z,ZK	4	2P+2L	*	P
2011049	Numerical Mathematics <i>Radka Keslerová</i>	Z,ZK	4	2P+2C	4	P
2012037	Computer Graphics	KZ	3	1P+1C	*	P
2372041	Computer Support for Study <i>Vladimír Hlaváček, Goran Simeunović, Matouš Cejnek Ivo Bukovský Vladimír Hlaváček (Gar.)</i>	KZ	3	1P+1C	*	P
2181026	Momentum, Mass and Heat Transfer <i>Tomáš Jirout</i>	Z,ZK	5	3P+1C	*	P
2132001	Engineering Design I.	KZ	2	1P+2C	1	P
2131002	Engineering Design II	Z,ZK	4	2P+3C	2	P
2133013	Engineering Design III. <i>František Lopot František Lopot (Gar.)</i>	Z	2	0P+2C	Z	P
2133014	Engineering Design IV. <i>Roman Uhlíř</i>	Z	2	0P+2C	L	P
2372083	Measurement in Engineering <i>Martin Novák, Vladimír Hlaváček Martin Novák Martin Novák (Gar.)</i>	KZ	3	1P+2L	*	P
K331068	Technology I <i>Milan Nmec, Irena Kubelková, Aleš Herman, Bohumír Bednář Aleš Herman Milan Nmec (Gar.)</i>	Z,ZK	5	16B	*	P
K341014	Technology II.	Z,ZK	5	8KP+8KC	*	P
2121023	Thermodynamics	Z,ZK	5	3P+2C	*	P
2131005	History of Technology	ZK	3	2P+0C	1	P
2012035	Algorithmization and Programming Fundamentals <i>Marta Čertíková, Olga Majlingová, Vladimír Prokop, Petr Svátek, Jan Karel, Jiří Holman, Marek Pátý, Vladimír Hřík, Pavel Moses, Radka Keslerová Petr Svátek (Gar.)</i>	KZ	4	1P+2C	*	P
2153005	Fundamentals of Energy Conversions <i>Matěj Vodík, Pavel Zách, Václav Dostál, Ondřej Bartoš, Pavlína Zimmermannová, Tomáš Dlouhý, Michal Kolovratník, Pavel Novák, Jan Havlík, Tomáš Dlouhý (Gar.)</i>	Z	1	1P+1C	*	P
2383001	Fundamentals of Law <i>František Klimeš František Klimeš František Klimeš (Gar.)</i>	Z	2	1P+1C	*	P
2131512	Machine Elements and Mechanisms I. <i>František Lopot, Jan Kanaval, Roman Uhlíř, Zdeněk Špíro, Jiří Houkal, Jaroslav Kříka, Eliška Cézová, Martin Dub, Karel Petr František Lopot (Gar.)</i>	Z,ZK	6	3P+2C	*	P
2131026	Machine Elements and Mechanisms II	ZK	3	3P+0C	*	P

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

2371047	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 seminars 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.
2182019	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.
2141504	Electric 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. EI. 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.
2141505	Electrical machines and drives	Z,ZK	4	AC el. circuits. 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.
2021041	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. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.
2021025	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 nature 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.
2011021	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.

2133025	Design Design, design calculations and their applications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and clutches.	Z	4
2381054	Enterprise Management and Economics The course is designed to give students the understanding of economic principles. The economical part of the course is consisted from: explanation of relationship between costs and revenues, expenses and income, concept of investment and calculations per product, presentation how to assemble a basic operating budget and explanation of the basic structure of the financial statements. The management introduces the basic managerial functions and their contents, the uses of network analysis in project management, with the application of multi-criteria decision, the basics of marketing and strategic management.	Z,ZK	4
2011056	Mathematics I Introduction to linear algebra, analytic geometry of straight lines and planes in E ³ , calculus of functions of one variable	Z,ZK	8
2011062	Matematika II. 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.	Z,ZK	8
2011009	Mathematics III An introductory course in ordinary differential equation and infinite series.	Z,ZK	5
2311101	Mechanics I.	Z,ZK	4
2311102	Mechanics II. 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. Transmission mechanisms with gears. Strutting and seeing in mechanisms. Cable mechanisms.	Z,ZK	4
2121500	Fluid Dynamics The basic course in fluid dynamics deals with fundamental laws of hydrostatics and hydrodynamics and their application on the basic problems, as 1D flow in ducts, estimation of pressure losses, simplified solution of unsteady flow. Basic information on more complicated problems (laminar and turbulent flow, boundary layer theory, flow separation) are introduced as well.	Z,ZK	5
2322029	Materials Science I. 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.	KZ	3
2321039	Materials Science II. 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.	Z,ZK	4
2011049	Numerical Mathematics Numerical solution of systems of linear equations, iterative methods. Numerical solution of nonlinear algebraic equations. Least squares method. Numerical solution of ordinary differential equations, initial and boundary value problems. Numerical solution of basic linear partial differential equations by finite difference method.	Z,ZK	4
2012037	Computer Graphics	KZ	3
2372041	Computer Support for Study 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 technical-based WWW page.	KZ	3
2181026	Momentum, Mass and Heat Transfer 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.	Z,ZK	5
2132001	Engineering Design I. Basic of technical representation, dimensioning and tolerancing	KZ	2
2131002	Engineering Design II Principles of ISO GPS (Geometrical Products 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.	Z,ZK	4
2133013	Engineering Design III. Design of assembly unit (draft drawing, detail drawing, assembly drawing, technical report)	Z	2
2133014	Engineering Design IV.	Z	2
2372083	Measurement in Engineering Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments.	KZ	3
K331068	Technology I 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. Brasing. Surface treatment.	Z,ZK	5
K341014	Technology II.	Z,ZK	5
2121023	Thermodynamics The course deal with a basic engineering approach to classical thermodynamics, heat transfer and compressible flow through nozzles and diffusers. Basic concepts and principles are introduced, and they are applied mostly to systems behaving as ideal gases or typical vapours. Basic notions associated with ideal mixtures are studied with an emphasis on psychometrics. Heat transfer covers fundamentals of conduction, convection and radiation. Heat exchangers are treated as an engineering application. Exercises and labs are devoted to practical problems and experimental technique.	Z,ZK	5
2131005	History of Technology Development of human knowledge in the domain of science and technology in the retrospective of the development of our civilization. Emphasis is given upon new branches of technology with special attention to the contribution of mining, iron metallurgy, power engineering, transportation and of the machine industry in the narrower sense of the word.	ZK	3
2012035	Algorithmization and Programming Fundamentals Programming in MATLAB and C programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrices, vectors and operations. Writing 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. C programming language. 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.	KZ	4

2153005	Fundamentals of Energy Conversions	Z	1
2383001	Fundamentals of Law	Z	2
Basic orientation in legal system is a necessary part of professional equipment of each expert with university degree. The aim of this course is to provide a view into the Czech Legal Order, particular sources of law and system of law (branch of law), using tutorials, lectures, specialised literature and significant legal regulations. It is necessary for students to know our legal institutions, that will be regularly in touch with, especially during their professional career and to learn how to work with the collection of laws. At the same time the course leads students to know some practical habits and processes while putting the law on, especially in domain of contracts and other important legal relationships and to make them ready to prepare professional presentations and to understand basic structures between law and engineering			
2131512	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.			
2131026	Machine Elements and Mechanisms II	ZK	3
Preliminary design, design calculations and application of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.			

Code of the group: 12B*K*P-ZT12

Name of the group: 04 2012 kombinované ZT v po adí 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
K333038	Fundamentals of Technology I.	Z	3	8B	*	P

Characteristics of the courses of this group of Study Plan: Code=12B*K*P-ZT12 Name=04 2012 kombinované ZT v po adí 12

K333038	Fundamentals of Technology I.	Z	3
Production processes in engineering production. Technology of engineering production. Materials in engineering. Concepts of steel and cast iron, technical metals. Production of pig iron and steel. Casting: modeling devices, molding materials, molding and castings. Foundry alloys. Overview of basic casting technology. Forming technology. Hot and cold forging. Free and drop forging. Rolling. Production of pipes. Bulk and sheet metal forming. Welding technology. The characteristics of the various types of welding. Fusion welding: Flame welding and arc welding with coated electrodes. Thermal cutting.			

Code of the group: 12BS*7P-EPT

Name of the group: 12 2012 BSTR 7.sem povinné EPT

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 4 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
2151165	Hydraulic and Pneumatic Machines Michal Kolovratník, Pavel Novák, Jan Melichar Pavel Novák Pavel Novák (Gar.)	Z,ZK	5	2P+2C	*	P
2151090	Industry power and heating plant Michal Kolovratník, František Hrdlička, Lukáš Pila Monika Vitvarová František Hrdlička (Gar.)	Z,ZK	5	2P+2C	*	P
2151554	Thermal Turbines Ondřej Bartoš	Z,ZK	5	2P+2C	*	P
2151559	Heat Exchangers and Boilers Pavel Skopec	Z,ZK	5	2P+2C	*	P

Characteristics of the courses of this group of Study Plan: Code=12BS*7P-EPT Name=12 2012 BSTR 7.sem povinné EPT

2151165	Hydraulic and Pneumatic Machines	Z,ZK	5
Classification and principles of operation of hydraulic machines. Criteria of hydrodynamical similarity. Hydraulic systems. Different types of pumps, construction, capacity control and operation in various conditions. Theory of compression processes. Constructions, calculation, capacity control of compressors, operation with various gases. Refrigerating compressors. Accessories of a compressor stations and plants. Economical and ecological problems of a compressed air production and distribution.			
2151090	Industry power and heating plant	Z,ZK	5
2151554	Thermal Turbines	Z,ZK	5
2151559	Heat Exchangers and Boilers	Z,ZK	5

Code of the group: 12BS*8P-EPT

Name of the group: 15 2012 BSTR 8.sem povinné EPT

Requirement credits in the group: In this group you have to gain 17 credits

Requirement courses in the group: In this group you have to complete 4 courses

Credits in the group: 17

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2151118	Distributed Energy <i>Michal Kolovratník, Jakub Maš uch Jakub Maš uch Michal Kolovratník (Gar.)</i>	Z,ZK	5	2P+2C	*	P
2151117	Design of Power Facilities <i>Monika Vitvarová</i>	Z,ZK	5	2P+2C	*	P
2153006	Technology of Air Protection in Power Engineering <i>Jan Hrdli ka</i>	Z	2	0P+2C	*	P
2151158	Principles of Refrigerating Technology and Heat Pumps <i>Pavlina Zimmermannová, Michal Kolovratník, Ji í Petrák Ji í Petrák (Gar.)</i>	Z,ZK	5	2P+2C	*	P

Characteristics of the courses of this group of Study Plan: Code=12BS*8P-EPT Name=15 2012 BSTR 8.sem povinné EPT

2151118	Distributed Energy	Z,ZK	5
2151117	Design of Power Facilities	Z,ZK	5
2153006	Technology of Air Protection in Power Engineering	Z	2
2151158	Principles of Refrigerating Technology and Heat Pumps	Z,ZK	5

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 45

The role of the block: PV

Code of the group: 12B**1Q-HUM

Name of the group: 03 2012 bakalá ské povinn volitelné humanitární

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 3)

Credits in the group: 2

Note on the group:

Ze skupiny humanitních předmětů nutno je d e n absolvovat

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2383019	Philosophical Issues Of Individual and Science	Z	2	1P+1C	*	PV
2383009	Communication and Dealing with People <i>Jan Horejc Jan Horejc Jan Horejc (Gar.)</i>	Z	2	1P+1C	*	PV
2383008	Managerial Psychology	Z	2	1P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12B**1Q-HUM Name=03 2012 bakalá ské povinn volitelné humanitární

2383019	Philosophical Issues Of Individual and Science	Z	2
2383009	Communication and Dealing with People	Z	2
Goal of the course is to explain to the students, that communication became a part of qualification of every modern employee and manager as well. The base of interpersonal communication is rhetoric, which develops itself from classical school in ancient Greece to modern school in Europe and in the world. Course concerns mainly in the analysis of monologue (presentation) and dialogue (how to deal in trade). Course explains nonverbal communication and methods of self improving of own rhetorical art.			
2383008	Managerial Psychology	Z	2

Code of the group: 12B**4Q-BZJ S+T

Name of the group: 08 2012 bakalá ské zkoušky z jazyk pro STR a TZIS

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 10)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 5)

Credits in the group: 2

Note on the group:

Součástí tohoto bakalářského studijního programu je povinnost vykonat zkoušku z jednoho cizího jazyka. Student ji může vykonat kdykoliv v průběhu studia. Administrativně je předmět přiřazen ke studijnímu plánu čtvrtého semestru druhého ročníku, neboť se předpokládá, že si student během předcházejících semestrů nejprve doplňuje v jazykových kurzech (volitelných předmětech) jazykové znalosti zejména v oblasti odborné terminologie

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 Eliška Vítková, Zuzana Kalinová, Eva Kon elíková, Michaela Schusová, Eva Pavlincová, Ilona Šimice, Nina Procházková Ayyub, Hana Volejníková, Veronika Kratochvílová Nina Procházková Ayyub	Z,ZK	2	0P+2C	*	PV
2041063	French - Bachelor Exam /FME Dušana Jirovská Eliška Vítková Eliška Vítková (Gar.)	Z,ZK	2	0P+2C	*	PV
2041062	German - Bachelor Exam / FME Eliška Vítková, Jaroslava Kommová, Petr Laurich Jaroslava Kommová	Z,ZK	2	0P+2C	*	PV
2041065	Russian - Bachelor Exam / FME Eliška Vítková, Dušana Jirovská Eliška Vítková	Z,ZK	2	0P+2C	*	PV
2041064	Spanish - Bachelor Exam / FME Eliška Vítková, Jaime Andrés Villagómez Jaime Andrés Villagómez	Z,ZK	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12B4Q-BZJ S+T Name=08 2012 bakalá ské zkoušky z jazyk pro STR a TZIS**

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.		
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: 12BS*6Q-OP

Name of the group: 10 2012 BSTR 6. sem oborové projekty

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: Student si vybere předmět příslušný oboru, který studuje

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
2372091	Project	KZ	2	0P+2C	*	PV
2362091	Project Jan Hošek	KZ	2	0P+2C	*	PV
2212091	Branch Project Rastislav Toman, Gabriela Achtenová, Jan Ban ek, Ond ej Bolehovský, Ivan Bortel, Ivaylo Brankov, Pavel Brynych, Libor ervenka, Marcel Diviš, Petr Hatschbach Petr Hatschbach (Gar.)	KZ	2	0P+2C	*	PV
2152091	Departmental Project	KZ	2	0P+2C	*	PV
2182091	Project Tomáš Jirout	KZ	2	0P+2C	*	PV
2162091	Project	KZ	2	0P+2C	*	PV
2132503	Project Ji í Houkal	KZ	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*6Q-OP Name=10 2012 BSTR 6. sem oborové projekty

2372091	Project	KZ	2	An individual project from the branch of specialisation, which student will study on his/her magister level		
2362091	Project	KZ	2			
2212091	Branch Project	KZ	2	Basic practical skills of work with advanced CAD/CAE/CAM systems. Project training in solution of design task based on industry requirements.		
2152091	Departmental Project	KZ	2			
2182091	Project	KZ	2	Absolvent se seznámí se základy oboru Procesní technika.		
2162091	Project	KZ	2	Student will be informed about basics of environmental engineering and creation of thermal comfort.		

2132503	Project	KZ	2
Elaboration of semester global project of mechanical drive of conveyor composed of electric motor, elastic shaft coupling (respectively V-belt drive), gearbox provided with two pairs of mating gears and compensating double-row toothed shaft coupling (respectively roller chain drive). Second, alternative arrangement of projected mechanical drive is provided instead of previous gearbox and additional mechanical drives by means of only one single-stage worm gearbox.. Elaboration of 4 additional reports analysing production and economic problems of assigned machine element (gearbox shaft or gear). Besides project of mechanical drive must be elaborated design project of crank mechanism and its flywheel for assigned single-cylinder piston engine.			

Code of the group: 12BS*6Q-PP

Name of the group: 11 2012 BSTR 6. sem prezentace projekt

Requirement credits in the group: In this group you have to gain 4 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 4

Note on the group: 2363091 nese psán Student si vybere předmět příslušný oboru, který studuje

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
2133091	Presentation of Project <i>Roman Uhlí</i>	Z	4	4B	*	PV
2153091	Presentation of Project <i>Václav Dostál</i>	Z	4	4B	*	PV
2363091	Project Presentation <i>Jan Hošek</i>	Z	4	4B		PV
2183091	Project Presentation <i>Tomáš Jirout</i>	Z	4	0P+4C	*	PV
2373091	Project presentation	Z	4	4B	*	PV
2163091	Project Presentation	Z	4	4B	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*6Q-PP Name=11 2012 BSTR 6. sem prezentace projekt

2133091	Presentation of Project	Z	4
2153091	Presentation of Project	Z	4
2363091	Project Presentation	Z	4
2183091	Project Presentation Preparation and presentation of a given project theme.	Z	4
2373091	Project presentation Diploma thesis or bachelor work presentation. Student should study the presentation software possibilities and proposition of the department. Student should prepare the presentation of actual version of his diploma or bachelor work and present it in the face of the other student. The presentation will continue with discussion. Consequently, the work should be presented as a pdf file on a temporal web page.	Z	4
2163091	Project Presentation Processing and presentation of engaged theme	Z	4

Code of the group: 12BS*7Q-EPT-P1

Name of the group: 13 2012 BSTR 7.sem 1povvol EPT-P1

Requirement credits in the group: In this group you have to gain 5 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 5

Note on the group: Kód předmětu Projekt I. se zapisuje podle ústavu: 2153707 Ústav energetiky a 2183707 Ústav procesní a zpracovatelské techniky

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
2183707	Project I. <i>Tomáš Jirout Tomáš Jirout Tomáš Jirout (Gar.)</i>	Z	5	0P+7C	*	PV
2153707	Project I. <i>Václav Dostál, Ondřej Bartoš, Tomáš Dlouhý, Michal Kolovratník, Pavel Novák, Jan Havlík, Pavel Skopec, Jan Melíchar, František Hrdlička, Tomáš Dlouhý (Gar.)</i>	Z	5	0P+7C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*7Q-EPT-P1 Name=13 2012 BSTR 7.sem 1povvol EPT-P1

2183707	Project I. Project, dimensioning and designing solution of basic elements for process technology.	Z	5
2153707	Project I.	Z	5

Code of the group: 12BS*7Q-EPT-ZAM

Name of the group: 14 2012 BSTR 7.sem 1povvol EPT-zam

Requirement credits in the group: In this group you have to gain 5 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 5

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
2181502	Hydromechanical Equipment Tomáš Jirout Tomáš Jirout Tomáš Jirout (Gar.)	Z,ZK	5	2P+2C	*	PV
2151002	Nuclear Power Principles Pavel Zácha, Václav Dostál, Václav Železný Václav Dostál Václav Dostál (Gar.)	Z,ZK	5	2P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*7Q-EPT-ZAM Name=14 2012 BSTR 7.sem 1povvol EPT-zam

2181502	Hydromechanical Equipment	Z,ZK	5	Design, principles and basic calculations of following equipment: pipes and pipe networks, packed and bubble columns, filters, settlers, centrifuges and cyclones, fluidized beds, mixing equipment, silos and conveyors, crushers and mills, granulators, extruders, injection and blow moulding machines, rolls and calenders.		
2151002	Nuclear Power Principles	Z,ZK	5	Physical fundamentals of nuclear energy. Development and heat removal from core. Basic materials for nuclear reactors. Basic types of nuclear reactors. Review of advanced types of nuclear reactors. Fuel cycle. Reactor radiation, detection and quantification, determination of radiation doses. Problems of nuclear safety and technical provisions.		

Code of the group: 12BS*8Q-EPT-BP

Name of the group: 16 2012 BSTR 8.sem 1povvol EPT-BP

Requirement credits in the group: In this group you have to gain 5 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 5

Note on the group: Kód předmětu Bakalářská práce se zapisuje podle ústavu: 2153985 Ústav energetiky
2183985 Ústav procesní a zpracovatelské techniky

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
2183985	Bachelor Thesis Tomáš Jirout	Z	5	0P+6C	*	PV
2153985	Bachelor Thesis Pavel Skopec	Z	5	0P+6C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*8Q-EPT-BP Name=16 2012 BSTR 8.sem 1povvol EPT-BP

2183985	Bachelor Thesis	Z	5	Bachelor thesis is final individual work. This work checks ability of logical independent technical thinking and treatment with technical materials. There is applied acquired knowledge from previous study periods.		
2153985	Bachelor Thesis	Z	5			

Code of the group: 12BS*8R-EPT-ZAM

Name of the group: 17 2012 BSTR 8.sem 2povvol EPT-zam

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 2 courses

Credits in the group: 20

Note on the group: Ze skupiny PV předmětů nutno d v a volit

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
2181507	Diffusion separation equipment Radek Šulc	Z,ZK	5	2P+2C	*	PV
2152028	Energy Audit and Legislation Monika Vitvarová	KZ	5	2P+2C	*	PV
2151702	Renewable Energy Sources Jan Havlík	Z,ZK	5	2P+2C	*	PV
2181508	Heat transfer equipments Martin Dostál	Z,ZK	5	2P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*8R-EPT-ZAM Name=17 2012 BSTR 8.sem 2povvol EPT-zam

2181507	Diffusion separation equipment	Z,ZK	5	Classis from Equipment for diffusion separation processes are giving a basic knowledge of processes and equipments where gas or liquid mixture is been separated due to principals of physical-chemical equilibriums or on the basis of mass transfer mechanisms. They are used for concentrating of products from dilute solutions or in turn for purification of diluted gasses or liquid solutions.		
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2152028	Energy Audit and Legislation	KZ	5
2151702	Renewable Energy Sources	Z,ZK	5
2181508	Heat transfer equipments	Z,ZK	5
Fundamentals of thermodynamics and conductive and convective heat transfer. Enthalpy balancing. Technical thermodynamics and basic thermodynamic cycles. Functional description, mechanical design, thermal and hydraulic design of a heat exchangers, evaporators and dryers.			

Name of the block: Elective courses

Minimal number of credits of the block: 32

The role of the block: V

Code of the group: 12BS**V-ALFA

Name of the group: 02 2012 ALFA volitelné pro STR

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: Předměty typu Alfa (A) nejsou u studijního programu B2341 Strojírenství povinné, avšak jsou povinné u studijního programu B2342 Teoretický základ strojírenství.

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
202A041	Physics I.	ZK	3	0P+0L	*	v
202A025	Physics II.A	ZK	2	0P+0C	*	v
201A021	Constructive Geometry A	ZK	3	0P+0C	*	v
201A056	Mathematics I.A Radka Keslerová	ZK	4	0P+0C	*	v
201A062	Mathematics II.A Radka Keslerová	ZK	4	0P+0C	*	v
201A009	Mathematics III.A Marta Čertíková, Jan Valášek, Hynek Čezníček, Luděk Beneš, Tomáš Bodnár, Jiří Fürst, Jan Halama, Radka Keslerová, Stanislav Kraus, Radka Keslerová Leopold Herrmann (Gar.)	ZK	2	0P+0C	*	v
231A101	Mechanics I.A Pavel Bastl, Michael Valášek, Tomáš Vampola, Zbyněk Šíka, Václav Bauma, Ivo Bukovský, Pavel Steinbauer, Jan Zavel, Martin Nečas, Michael Valášek Michael Valášek (Gar.)	ZK	2	0P+0C	*	v
231A102	Mechanics II.A Michael Valášek	ZK	2	0P+0C	*	v
212A500	Fluid Dynamics A	ZK	3	0P+0C	*	v
201A049	Numerical Mathematics A Radka Keslerová	ZK	2	0P+0C	*	v
212A023	Thermodynamics A	ZK	2	0P+0C	*	v

Characteristics of the courses of this group of Study Plan: Code=12BS**V-ALFA Name=02 2012 ALFA volitelné pro STR

202A041	Physics I. 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. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.	ZK	3
202A025	Physics II.A 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 duality 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.	ZK	2
201A021	Constructive Geometry A The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	ZK	3
201A056	Mathematics I.A Introduction to linear algebra, analytic geometry of straight lines and planes in E ³ , calculus of functions of one variable	ZK	4
201A062	Mathematics II.A Open and closed set, boundary in E ⁿ . 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.	ZK	4
201A009	Mathematics III.A	ZK	2
231A101	Mechanics I.A	ZK	2
231A102	Mechanics II.A	ZK	2

212A500	Fluid Dynamics A	ZK	3
The basic course in fluid dynamics deals with fundamental laws of hydrostatics and hydrodynamics and their application on the basic problems, as 1D flow in ducts, estimation of pressure losses, simplified solution of unsteady flow. Basic information on more complicated problems (laminar and turbulent flow, boundary layer theory, flow separation) are introduced as well.			
201A049	Numerical Mathematics A	ZK	2
212A023	Thermodynamics A	ZK	2
The course deal with a basic engineering approach to classical thermodynamics, heat transfer and compressible flow through nozzles and diffusers. Basic concepts and principles are introduced, and they are applied mostly to systems behaving as ideal gases or typical vapours. Basic notions associated with ideal mixtures are studied with an emphasis on psychometrics. Heat transfer covers fundamentals of conduction, convection and radiation. Heat exchangers are treated as an engineering application. Exercises and labs are devoted to practical problems and experimental technique			

Code of the group: 12B**1V-DOP SEMI

Name of the group: 05 2012 doporučené semináře

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group: Pokud si chce student své dosud získané znalosti (například z matematiky, fyziky, cizích jazyků atd.) doplnit, může si zapsat některý z volitelných předmětů, které příslušné ústavy pro 1. semestr (zimní) vypisují. Doporučujeme zejména předměty uvedené v této skupině

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
2026016	Physics - Seminar	Z	2	0P+2C	1	v
2016007	Mathematics I. - Seminar Lud k Beneš, Tomáš Bodnár, Radka Keslerová, Olga Majlingová Radka Keslerová	Z	2	0P+2C	1	v

Characteristics of the courses of this group of Study Plan: Code=12B**1V-DOP SEMI Name=05 2012 doporučené semináře

2026016	Physics - Seminar	Z	2
The subject is mainly meant for high-school students for repetition of high-school physics.			
2016007	Mathematics I. - Seminar	Z	2

Code of the group: 12B**1V-DOP ZJK

Name of the group: 06 2012 doporučené základní jazykové kurzy a prezentace

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
2046155	English Conversation Eliška Vítková, Ilona Šimice, Nina Procházková Ayyub Nina Procházková Ayyub Nina Procházková Ayyub (Gar.)	Z	2	0P+2C	*	v
2046156	English Conversation Eliška Vítková, Ilona Šimice Nina Procházková Ayyub	Z	2	0P+2C	L	v
2046070	English - Lower Intermediate Eliška Vítková, Zuzana Kalinová, Michaela Schusová, Ilona Šimice, Nina Procházková Ayyub, Hana Volejníková, Veronika Kratochvílová Michaela Schusová Zuzana Kalinová (Gar.)	Z	2	0P+2C	Z	v
2046071	English - Lower Intermediate Michaela Schusová	Z	2	0P+2C	L	v
2046075	English - Advanced Michaela Schusová	Z	2	0P+2C	L	v
2046074	English - Advanced Eliška Vítková, Zuzana Kalinová, Michaela Schusová, Ilona Šimice, Nina Procházková Ayyub, Hana Volejníková, Veronika Kratochvílová Michaela Schusová Zuzana Kalinová (Gar.)	Z	2	0P+2C	Z	v
2046072	English - Upper Intermediate Eliška Vítková, Zuzana Kalinová, Michaela Schusová, Ilona Šimice, Nina Procházková Ayyub, Hana Volejníková, Veronika Kratochvílová Michaela Schusová Zuzana Kalinová (Gar.)	Z	2	0P+2C	Z	v
2046073	English - Upper Intermediate Michaela Schusová	Z	2	0P+2C	L	v
2046069	English - Beginners Michaela Schusová	Z	2	0P+2C	L	v

2046068	English - Beginners <i>Eliška Vítková, Zuzana Kalinová, Michaela Schusová, Ilona Šimice, Hana Volejníková, Veronika Kratochvílová</i> Michaela Schusová Zuzana Kalinová (Gar.)	Z	2	0P+2C	Z	v
2046087	French - Lower Intermediate Course <i>Eliška Vítková</i>	Z	2	0P+2C	L	v
2046086	French - Lower Intermediate Course <i>Eliška Vítková, Dušana Jirovská</i> Eliška Vítková Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046091	French - Advanced <i>Eliška Vítková</i>	Z	2	0P+2C	L	v
2046090	French - Advanced <i>Eliška Vítková, Dušana Jirovská</i> Eliška Vítková Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046089	French - Upper Intermediate <i>Eliška Vítková</i>	Z	2	0P+2C	L	v
2046088	French - Upper Intermediate <i>Eliška Vítková, Dušana Jirovská</i> Eliška Vítková Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046084	French - Beginners <i>Eliška Vítková, Dušana Jirovská</i> Eliška Vítková Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046085	French - Beginners' Course <i>Eliška Vítková</i>	Z	2	0P+2C	L	v
2146060	Indonesian Language Course for Exchange	Z	2	0P+2C	*	v
2146061	Technical Indonesian - Course I.	Z	2	0P+2C	Z	v
2144062	Technical Indonesian - Course II.	Z,ZK	3	1P+2C	L	v
2046079	German - Lower Intermediate Course <i>Jaroslava Kommová</i>	Z	2	0P+2C	L	v
2046078	German - Lower Intermediate Course <i>Eliška Vítková, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046083	German - Advanced Course	Z	2	0P+2C	L	v
2046082	German - Advanced Course <i>Eliška Vítková, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046080	German - Upper Intermediate Course <i>Eliška Vítková, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046081	German - Upper Intermediate Course <i>Jaroslava Kommová</i>	Z	2	0P+2C	L	v
2046076	German - Beginners <i>Eliška Vítková, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Petr Laurich (Gar.)	Z	2	0P+2C	Z	v
2046077	German - Beginners <i>Jaroslava Kommová</i>	Z	2	0P+2C	L	v
2046161	Presentations in English <i>Eliška Vítková, Zuzana Kalinová, Michaela Schusová, Ilona Šimice, Nina Procházková Ayyub</i> Michaela Schusová Michaela Schusová (Gar.)	Z	2	0P+2C	*	v
2046162	Presentations in German <i>Eliška Vítková, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Eliška Vítková (Gar.)	Z	2	0P+2C	*	v
2046164	Presentations in Russian <i>Eliška Vítková, Dušana Jirovská</i> Eliška Vítková Dušana Jirovská (Gar.)	Z	2	0P+2C	*	v
2046166	Presentations in Czech <i>Eliška Vítková, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Petr Laurich (Gar.)	Z	2	0P+2C	*	v
2046163	Presentations in French language <i>Eliška Vítková, Dušana Jirovská</i> Eliška Vítková Dušana Jirovská (Gar.)	Z	2	0P+2C	*	v
2046165	Presentations in Spanish <i>Eliška Vítková</i> Eliška Vítková	Z	2	0P+2C	*	v
2046138	Russian - Lower Intermediate Course	Z	2	0P+2C	L	v
2046137	Russian - Lower Intermediate Course <i>Eliška Vítková, Hana Volejníková, Dušana Jirovská</i> Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046142	Russian - Advanced	Z	2	0P+2C	L	v
2046141	Russian - Advanced <i>Eliška Vítková, Hana Volejníková, Dušana Jirovská</i> Dušana Jirovská (Gar.)	Z	2	0P+2C	Z	v
2046139	Russian - Upper Intermediate <i>Eliška Vítková, Hana Volejníková, Dušana Jirovská</i> Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046140	Russian - Upper Intermediate	Z	2	0P+2C	L	v
2046135	Russian - Beginners <i>Eliška Vítková, Hana Volejníková, Dušana Jirovská</i> Eliška Vítková (Gar.)	Z	2	0P+2C	Z	v
2046136	Russian - Beginners	Z	2	0P+2C	L	v
2046125	Czech Lower Intermediate <i>Ilona Šimice, Jaroslava Kommová, Petr Laurich</i> Jaroslava Kommová Petr Laurich (Gar.)	Z	2	0P+2C	Z	v
2046126	Czech Lower Intermediate <i>Jaroslava Kommová</i>	Z	2	0P+2C	L	v

2046118	Czech -Advanced <i>Jaroslava Kormmová</i>	Z	2	0P+2C	L	v
2046117	Czech -Advanced <i>Ilona Šimice, Jaroslava Kormmová, Petr Laurich Jaroslava Kormmová</i> <i>Jaroslava Kormmová (Gar.)</i>	Z	2	0P+2C	Z	v
2046128	Czech - Upper Intermediate <i>Jaroslava Kormmová</i>	Z	2	0P+2C	L	v
2046127	Czech - Upper Intermediate <i>Ilona Šimice, Jaroslava Kormmová, Petr Laurich Jaroslava Kormmová</i> <i>Jaroslava Kormmová (Gar.)</i>	Z	2	0P+2C	Z	v
2046119	Czech Language for Beginners I. <i>Ilona Šimice, Jaroslava Kormmová, Petr Laurich Jaroslava Kormmová</i> <i>Jaroslava Kormmová (Gar.)</i>	Z	2	0P+2C	Z	v
2046120	Czech Language for Beginners II. <i>Jaroslava Kormmová</i>	Z	2	0P+2C	L	v
2046098	Spanish - Lower Intermediate <i>Eliška Vítková, Jaime Andrés Villagómez Eliška Vítková (Gar.)</i>	Z	2	0P+2C	Z	v
2046099	Spanish - Lower Intermediate	Z	2	0P+2C	L	v
2046096	Spanish - Beginners <i>Eliška Vítková, Jaime Andrés Villagómez Eliška Vítková (Gar.)</i>	Z	2	0P+2C	Z	v
2046097	Spanish - Beginners	Z	2	0P+2C	L	v

Characteristics of the courses of this group of Study Plan: Code=12B1V-DOP ZJK Name=06 2012 doporu ené základní jazykové kurzy a prezentace**

2046155	English Conversation Improving communicative skills in speaking on general topics and general technical topics.	Z	2			
2046156	English Conversation Improving communicative skills in speaking on general topics and general technical topics.	Z	2			
2046070	English - Lower Intermediate 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. A1 - A2.	Z	2			
2046071	English - Lower Intermediate Mapped to the Common European Framework of Reference Level A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or at 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.	Z	2			
2046075	English - Advanced Mapped to the Common European Framework of Reference Level B1 - B2. The aim: comprehension of spoken English as well as lectures given in English 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.	Z	2			
2046074	English - Advanced The aim: comprehension of spoken English as well as lectures given in English 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. B1 - B2.	Z	2			
2046072	English - Upper Intermediate The aim is to extend language skills taking into consideration professional English and common professional terminology. Comprehension of standard English speech and conversation about topics of everyday life - at school, at work, during free time, on intermediate level. Broadening grammar knowledge. A2 - B1.	Z	2			
2046073	English - Upper Intermediate Mapped to the Common European Framework of Reference Level B1. The aim is to extend language skills taking into consideration professional English and common professional terminology. Comprehension of standard English speech and conversation about topics of everyday life - at school, at work, during free time, on intermediate level. Broadening grammar knowledge.	Z	2			
2046069	English - Beginners 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).	Z	2			
2046068	English - Beginners Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language). A1	Z	2			
2046087	French - Lower Intermediate Course 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.	Z	2			
2046086	French - Lower Intermediate Course 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.	Z	2			
2046091	French - Advanced Mapped to the level of Common European Framework of reference: B1 - B2 Comprehension of spoken language as well as lectures in French 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 current issues and popular scientific and technical articles.	Z	2			
2046090	French - Advanced Comprehension of spoken language as well as lectures in French 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 current issues and popular scientific and technical articles.	Z	2			
2046089	French - Upper Intermediate 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.	Z	2			
2046088	French - Upper Intermediate 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.	Z	2			

2046084	French - Beginners	Z	2
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.			
2046085	French - Beginners' Course	Z	2
Mapped to the level of Common European Framework of Reference: A1 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.			
2146060	Indonesian Language Course for Exchange	Z	2
Basic of Indonesian Language for Student Exchange Program to Indonesia			
2146061	Technical Indonesian - Course I.	Z	2
Second part of Indonesian Language for Student Exchange Program to Indonesia			
2144062	Technical Indonesian - Course II.	Z,ZK	3
Basic of Indonesian Language for Student Exchange Program to Indonesia			
2046079	German - Lower Intermediate Course	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 comprehension of simple texts. Improvement of professional language.			
2046078	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.			
2046083	German - Advanced Course	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.			
2046082	German - Advanced Course	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 current issues and popular scientific and technical articles.			
2046080	German - Upper Intermediate Course	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.			
2046081	German - Upper Intermediate Course	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.			
2046076	German - Beginners	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)			
2046077	German - Beginners	Z	2
Mapped to the level Common European Framework of Reference A1 Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language).			
2046161	Presentations in English	Z	2
Preparing students to present in English on technical topics, with a possible co-operation with specialized departments.			
2046162	Presentations in German	Z	2
Preparation for presenting technical topics in German, possibly in cooperation with specialized departments.			
2046164	Presentations in Russian	Z	2
Preparation for presenting technical topics in Russian, possibly in cooperation with specialized departments.			
2046166	Presentations in Czech	Z	2
Preparing students to give presentations in English on technical topics, with a possible co-operation with specialized departments.			
2046163	Presentations in French language	Z	2
Preparation for presenting technical topics in French, possibly in cooperation with specialized departments.			
2046165	Presentations in Spanish	Z	2
Preparation for presenting technical topics in Spanish, possibly in cooperation with specialized departments.			
2046138	Russian - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference: A2 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.			
2046137	Russian - Lower Intermediate Course	Z	2
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.			
2046142	Russian - Advanced	Z	2
Mapped to the level of Common European Framework of reference: B1 - B2 Comprehension of spoken language as well as lectures in Russian 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 current issues and popular scientific and technical articles.			
2046141	Russian - Advanced	Z	2
Comprehension of spoken language as well as lectures in Russian 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 current issues and popular scientific and technical articles.			
2046139	Russian - 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.			
2046140	Russian - Upper Intermediate	Z	2
Mapped to the level of Common European Framework of Reference: A2 - B1 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.			
2046135	Russian - Beginners	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)			

2046136	Russian - Beginners	Z	2
Mapped to the level of Common European Framework of Reference: A1 Basic vocabulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (professional language)			
2046125	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.			
2046126	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.			
2046118	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.			
2046117	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 current issues and popular scientific and technical articles.			
2046128	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.			
2046127	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.			
2046119	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)			
2046120	Czech Language 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).			
2046098	Spanish - Lower Intermediate	Z	2
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.			
2046099	Spanish - Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 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.			
2046096	Spanish - Beginners	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.			
2046097	Spanish - Beginners	Z	2
Mapped to the Common European Framework of Reference Level A1. 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.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
2011009	Mathematics III An introductory course in ordinary differential equation and infinite series.	Z,ZK	5
2011021	Constructive Geometry The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	Z,ZK	6
2011049	Numerical Mathematics Numerical solution of systems of linear equations, iterative methods. Numerical solution of nonlinear algebraic equations. Least squares method. Numerical solution of ordinary differential equations, initial and boundary value problems. Numerical solution of basic linear partial differential equations by finite difference method.	Z,ZK	4
2011056	Mathematics I Introduction to linear algebra, analytic geometry of straight lines and planes in E3, calculus of functions of one variable	Z,ZK	8
2011062	Matematika II. 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.	Z,ZK	8
2012035	Algorithmization and Programming Fundamentals Programming in MATLAB and C programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrices, vectors and operations. Writing 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. C programming language. 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.	KZ	4
2012037	Computer Graphics	KZ	3

2016007	Mathematics I. - Seminar	Z	2
201A009	Mathematics III.A	ZK	2
201A021	Constructive Geometry A The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	ZK	3
201A049	Numerical Mathematics A	ZK	2
201A056	Mathematics I.A Introduction to linear algebra, analytic geometry of straight lines and planes in E3, calculus of functions of one variable	ZK	4
201A062	Mathematics II.A 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.	ZK	4
2021025	Physics II. 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 nature 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.	Z,ZK	4
2021041	Physics I. 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. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.	Z,ZK	7
2026016	Physics - Seminar The subject is mainly meant for high-school students for repetition of high-school physics.	Z	2
202A025	Physics II.A 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 nature 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.	ZK	2
202A041	Physics I. 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. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.	ZK	3
2041061	English-Bachelor Exam 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.	Z,ZK	2
2041062	German - Bachelor Exam / FME 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.	Z,ZK	2
2041063	French - Bachelor Exam /FME 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.	Z,ZK	2
2041064	Spanish - Bachelor Exam / FME 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.	Z,ZK	2
2041065	Russian - Bachelor Exam / FME 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.	Z,ZK	2
2046068	English - Beginners Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language). A1	Z	2
2046069	English - Beginners 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).	Z	2
2046070	English - Lower Intermediate 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. A1 - A2.	Z	2
2046071	English - Lower Intermediate Mapped to the Common European Framework of Reference Level A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or at 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.	Z	2
2046072	English - Upper Intermediate The aim is to extend language skills taking into consideration professional English and common professional terminology. Comprehension of standard English speech and conversation about topics of everyday life - at school, at work, during free time, on intermediate level. Broadening grammar knowledge. A2 - B1.	Z	2
2046073	English - Upper Intermediate Mapped to the Common European Framework of Reference Level B1. The aim is to extend language skills taking into consideration professional English and common professional terminology. Comprehension of standard English speech and conversation about topics of everyday life - at school, at work, during free time, on intermediate level. Broadening grammar knowledge.	Z	2
2046074	English - Advanced The aim: comprehension of spoken English as well as lectures given in English 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. B1 - B2.	Z	2

2046075	English - Advanced	Z	2
Mapped to the Common European Framework of Reference Level B1 - B2. The aim: comprehension of spoken English as well as lectures given in English 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.			
2046076	German - Beginners	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)			
2046077	German - Beginners	Z	2
Mapped to the level Common European Framework of Reference A1 Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language).			
2046078	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.			
2046079	German - Lower Intermediate Course	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 comprehension of simple texts. Improvement of professional language.			
2046080	German - Upper Intermediate Course	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.			
2046081	German - Upper Intermediate Course	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.			
2046082	German - Advanced Course	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.			
2046083	German - Advanced Course	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.			
2046084	French - Beginners	Z	2
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.			
2046085	French - Beginners' Course	Z	2
Mapped to the level of Common European Framework of Reference: A1 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.			
2046086	French - Lower Intermediate Course	Z	2
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.			
2046087	French - Lower Intermediate Course	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.			
2046088	French - 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.			
2046089	French - 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.			
2046090	French - Advanced	Z	2
Comprehension of spoken language as well as lectures in French 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.			
2046091	French - Advanced	Z	2
Mapped to the level of Common European Framework of reference: B1 - B2 Comprehension of spoken language as well as lectures in French 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.			
2046096	Spanish - Beginners	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.			
2046097	Spanish - Beginners	Z	2
Mapped to the Common European Framework of Reference Level A1. 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.			
2046098	Spanish - Lower Intermediate	Z	2
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.			
2046099	Spanish - Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 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.			
2046117	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.			

2046118	Czech -Advanced 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.	Z	2
2046119	Czech Language for Beginners I. Basic vocabulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (professional language)	Z	2
2046120	Czech Language for Beginners II. 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).	Z	2
2046125	Czech Lower Intermediate 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.	Z	2
2046126	Czech Lower Intermediate 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.	Z	2
2046127	Czech - Upper Intermediate 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.	Z	2
2046128	Czech - Upper Intermediate 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.	Z	2
2046135	Russian - Beginners Basic vocabulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (professional language)	Z	2
2046136	Russian - Beginners Mapped to the level of Common European Framework of Reference: A1 Basic vocabulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (professional language)	Z	2
2046137	Russian - Lower Intermediate Course 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.	Z	2
2046138	Russian - Lower Intermediate Course Mapped to the level of Common European Framework of Reference: A2 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.	Z	2
2046139	Russian - Upper Intermediate 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.	Z	2
2046140	Russian - Upper Intermediate Mapped to the level of Common European Framework of Reference: A2 - B1 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.	Z	2
2046141	Russian - Advanced Comprehension of spoken language as well as lectures in Russian 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 current issues and popular scientific and technical articles.	Z	2
2046142	Russian - Advanced Mapped to the level of Common European Framework of reference: B1 - B2 Comprehension of spoken language as well as lectures in Russian 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 current issues and popular scientific and technical articles.	Z	2
2046155	English Conversation Improving communicative skills in speaking on general topics and general technical topics.	Z	2
2046156	English Conversation Improving communicative skills in speaking on general topics and general technical topics.	Z	2
2046161	Presentations in English Preparing students to present in English on technical topics, with a possible co-operation with specialized departments.	Z	2
2046162	Presentations in German Preparation for presenting technical topics in German, possibly in cooperation with specialized departments.	Z	2
2046163	Presentations in French language Preparation for presenting technical topics in French, possibly in cooperation with specialized departments.	Z	2
2046164	Presentations in Russian Preparation for presenting technical topics in Russian, possibly in cooperation with specialized departments.	Z	2
2046165	Presentations in Spanish Preparation for presenting technical topics in Spanish, possibly in cooperation with specialized departments.	Z	2
2046166	Presentations in Czech Preparing students to give presentations in English on technical topics, with a possible co-operation with specialized departments.	Z	2
2121023	Thermodynamics The course deal with a basic engineering approach to classical thermodynamics, heat transfer and compressible flow through nozzles and diffusers. Basic concepts and principles are introduced, and they are applied mostly to systems behaving as ideal gases or typical vapours. Basic notions associated with ideal mixtures are studied with an emphasis on psychometrics. Heat transfer covers fundamentals of conduction, convection and radiation. Heat exchangers are treated as an engineering application. Exercises and labs are devoted to practical problems and experimental technique.	Z,ZK	5

2121500	Fluid Dynamics	Z,ZK	5
The basic course in fluid dynamics deals with fundamental laws of hydrostatics and hydrodynamics and their application on the basic problems, as 1D flow in ducts, estimation of pressure losses, simplified solution of unsteady flow. Basic information on more complicated problems (laminar and turbulent flow, boundary layer theory, flow separation) are introduced as well.			
212A023	Thermodynamics A	ZK	2
The course deal with a basic engineering approach to classical thermodynamics, heat transfer and compressible flow through nozzles and diffusers. Basic concepts and principles are introduced, and they are applied mostly to systems behaving as ideal gases or typical vapours. Basic notions associated with ideal mixtures are studied with an emphasis on psychometrics. Heat transfer covers fundamentals of conduction, convection and radiation. Heat exchangers are treated as an engineering application. Exercises and labs are devoted to practical problems and experimental technique			
212A500	Fluid Dynamics A	ZK	3
The basic course in fluid dynamics deals with fundamental laws of hydrostatics and hydrodynamics and their application on the basic problems, as 1D flow in ducts, estimation of pressure losses, simplified solution of unsteady flow. Basic information on more complicated problems (laminar and turbulent flow, boundary layer theory, flow separation) are introduced as well.			
2131002	Engineering Design II	Z,ZK	4
Principles of ISO GPS (Geometrical Products 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.			
2131005	History of Technology	ZK	3
Development of human knowledge in the domain of science and technology in the retrospective of the development of our civilization. Emphasis is given upon new branches of technology with special attention to the contribution of mining, iron metallurgy, power engineering, transportation and of the machine industry in the narrower sense of the word.			
2131026	Machine Elements and Mechanisms II	ZK	3
Preliminary design, design calculations and application of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.			
2131512	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.			
2132001	Engineering Design I. Basic of technical representation, dimensioning and tolerancing	KZ	2
2132503	Project	KZ	2
Elaboration of semester global project of mechanical drive of conveyor composed of electric motor, elastic shaft coupling (respectively V-belt drive), gearbox provided with two pairs of mating gears and compensating double-row toothed shaft coupling (respectively roller chain drive). Second, alternative arrangement of projected mechanical drive is provided instead of previous gearbox and additional mechanical drives by means of only one single-stage worm gearbox.. Elaboration of 4 additional reports analysing production and economic problems of assigned machine element (gearbox shaft or gear). Besides project of mechanical drive must be elaborated design project of crank mechanism and its flywheel for assigned single-cylinder piston engine.			
2133013	Engineering Design III. Design of assembly unit (draft drawing, detail drawing, assembly drawing, technical report)	Z	2
2133014	Engineering Design IV.	Z	2
2133025	Design Design, design calculations and their applications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and clutches.	Z	4
2133091	Presentation of Project	Z	4
2141504	Electric 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. 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.			
2141505	Electrical machines and drives	Z,ZK	4
AC el. circuits. 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.			
2144062	Technical Indonesian - Course II. Basic of Indonesian Language for Student Exchange Program to Indonesia	Z,ZK	3
2146060	Indonesian Language Course for Exchange Basic of Indonesian Language for Student Exchange Program to Indonesia	Z	2
2146061	Technical Indonesian - Course I. Second part of Indonesian Language for Student Exchange Program to Indonesia	Z	2
2151002	Nuclear Power Principles	Z,ZK	5
Physical fundamentals of nuclear energy. Development and heat removal from core. Basic materials for nuclear reactors. Basic types of nuclear reactors. Review of advanced types of nuclear reactors. Fuel cycle. Reactor radiation, detection and quantification, determination of radiation doses. Problems of nuclear safety and technical provisions.			
2151090	Industry power and heating plant	Z,ZK	5
2151117	Design of Power Facilities	Z,ZK	5
2151118	Distributed Energy	Z,ZK	5
2151158	Principles of Refrigerating Technology and Heat Pumps	Z,ZK	5
2151165	Hydraulic and Pneumatic Machines	Z,ZK	5
Classification and principles of operation of hydraulic machines. Criteria of hydrodynamical similarity. Hydraulic systems. Different types of pumps, construction, capacity control and operation in various conditions. Theory of compression processes. Constructions, calculation, capacity control of compressors, operation with various gases. Refrigerating compressors. Accessories of a compressor stations and plants. Economical and ecological problems of a compressed air production and distribution.			
2151554	Thermal Turbines	Z,ZK	5
2151559	Heat Exchangers and Boilers	Z,ZK	5
2151702	Renewable Energy Sources	Z,ZK	5

2152028	Energy Audit and Legislation	KZ	5
2152091	Departmental Project	KZ	2
2153005	Fundamentals of Energy Conversions	Z	1
2153006	Technology of Air Protection in Power Engineering	Z	2
2153091	Presentation of Project	Z	4
2153707	Project I.	Z	5
2153985	Bachelor Thesis	Z	5
2162091	Project Student will be informed about basics of environmental engineering and creation of thermal comfort.	KZ	2
2163091	Project Presentation Processing and presentation of engaged theme	Z	4
2181026	Momentum, Mass and Heat Transfer 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.	Z,ZK	5
2181502	Hydromechanical Equipment Design, principles and basic calculations of following equipment: pipes and pipe networks, packed and bubble columns, filters, settlers, centrifuges and cyclones, fluidized beds, mixing equipment, silos and conveyors, crushers and mills, granulators, extruders, injection and blow moulding machines, rolls and calendars.	Z,ZK	5
2181507	Diffusion separation equipment Classes from Equipment for diffusion separation processes are giving a basic knowledge of processes and equipments where gas or liquid mixture is been separated due to principals of physical-chemical equilibriums or on the basis of mass transfer mechanisms. They are used for concentrating of products from dilute solutions or in turn for purification of diluted gasses or liquid solutions.	Z,ZK	5
2181508	Heat transfer equipments Fundamentals of thermodynamics and conductive and convective heat transfer. Enthalpy balancing. Technical thermodynamics and basic thermodynamic cycles. Functional description, mechanical design, thermal and hydraulic design of a heat exchangers, evaporators and dryers.	Z,ZK	5
2182019	Chemistry 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.	KZ	3
2182091	Project Absolvent se seznámí se základy oboru Procesní technika.	KZ	2
2183091	Project Presentation Preparation and presentation of a given project theme.	Z	4
2183707	Project I. Project, dimensioning and designing solution of basic elements for process technology.	Z	5
2183985	Bachelor Thesis Bachelor thesis is final individual work. This work checks ability of logical independent technical thinking and treatment with technical materials. There is applied acquired knowledge from previous study periods.	Z	5
2212091	Branch Project Basic practical skills of work with advanced CAD/CAE/CAM systems. Project training in solution of design task based on industry requirements.	KZ	2
2311101	Mechanics I.	Z,ZK	4
2311102	Mechanics II. 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. Transmission mechanisms with gears. Strutting and seeing in mechanisms. Cable mechanisms.	Z,ZK	4
231A101	Mechanics I.A	ZK	2
231A102	Mechanics II.A	ZK	2
2321039	Materials Science II. 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.	Z,ZK	4
2322029	Materials Science I. 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.	KZ	3
2362091	Project	KZ	2
2363091	Project Presentation	Z	4
2371047	Automatic Control 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 seminars 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.	Z,ZK	5
2372041	Computer Support for Study 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 technical-based WWW page.	KZ	3
2372083	Measurement in Engineering Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments.	KZ	3
2372091	Project An individual project from the branch of specialisation, which student will study on his/her magister level	KZ	2

2373091	Project presentation	Z	4
Diploma thesis or bachelor work presentation. Student should study the presentation software possibilities and proposition of the department. Student should prepare the presentation of actual version of his diploma or bachelor work and present it in the face of the other student. The presentation will continue with discussion. Consequently, the work should be presented as a pdf file on a temporal web page.			
2381054	Enterprise Management and Economics	Z,ZK	4
The course is designed to give students the understanding of economic principles. The economical part of the course is consisted from: explanation of relationship between costs and revenues, expenses and income, concept of investment and calculations per product, presentation how to assemble a basic operating budget and explanation of the basic structure of the financial statements. The management introduces the basic managerial functions and their contents, the uses of network analysis in project management, with the application of multi-criteria decision, the basics of marketing and strategic management.			
2383001	Fundamentals of Law	Z	2
Basic orientation in legal system is a necessary part of professional equipment of each expert with university degree. The aim of this course is to provide a view into the Czech Legal Order, particular sources of law and system of law (branch of law), using tutorials, lectures, specialised literature and significant legal regulations. It is necessary for students to know our legal institutions, that will be regularly in touch with, especially during their professional career and to learn how to work with the collection of laws. At the same time the course leads students to know some practical habits and processes while putting the law on, especially in domain of contracts and other important legal relationships and to make them ready to prepare professional presentations and to understand basic structures between law and engineering			
2383008	Managerial Psychology	Z	2
2383009	Communication and Dealing with People	Z	2
Goal of the course is to explain to the students, that communication became a part of qualification of every modern employee and manager as well. The base of interpersonal communication is rhetoric, which develops itself from classical school in ancient Greece to modern school in Europe and in the world. Course concerns mainly in the analysis of monologue (presentation) and dialogue (how to deal in trade). Course explains nonverbal communication and methods of self improving of own rhetorical art.			
2383019	Philosophical Issues Of Individual and Science	Z	2
K331068	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. Brasing. Surface treatment.			
K333038	Fundamentals of Technology I.	Z	3
Production processes in engineering production. Technology of engineering production. Materials in engineering. Concepts of steel and cast iron, technical metals. Production of pig iron and steel. Casting: modeling devices, molding materials, molding and castings. Foundry alloys. Overview of basic casting technology. Forming technology. Hot and cold forging. Free and drop forging. Rolling. Production of pipes. Bulk and sheet metal forming. Welding technology. The characteristics of the various types of welding. Fusion welding: Flame welding and arc welding with coated electrodes. Thermal cutting.			
K341014	Technology II.	Z,ZK	5

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