Study plan

Name of study plan: 07 40 45 50 BSTR IAT 2012 K základ

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Welcome page
Type of study: unknown combined
Required credits: 263
Elective courses credits: -26
Sum of credits in the plan: 237
Note on the plan: první pokus

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 216
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** *Milan Hofreiter, Růžena Petrová, Tomáš Vyhlídal, Jaromír Fišer* ***Tomáš Vyhlídal*** *Tomáš Vyhlídal (Gar.)*	Z,ZK	5	3P+1S+0C+0L	*	P
2182019	**Chemistry** *Radek Šulc, Martin Dostál, Vojtěch Bělohlav, Stanislav Solnař, Jan Skočilas* ***Radek Šulc*** *Radek Šulc (Gar.)*	KZ	3	2P+1C	1	P
2131512	**Machine Elements and Mechanisms I.** ***František Lopot***	Z,ZK	6	3P+2C	*	P
2131026	**Machine Elements and Mechanisms II** *Eliška Cézová, Zdeněk Češpíro, Martin Dub, Jan Flek, Jiří Houkal, Jan Kanaval, František Lopot, Karel Petr* ***František Lopot*** *František Lopot (Gar.)*	ZK	3	3P+0C	*	P
2141504	**Electric Circuits and Electronics** *Stanislava Papežová, Jan Chyský, Jaroslav Novák, Lukáš Novák* ***Zuzana Sedlecká*** *Jan Chyský (Gar.)*	Z,ZK	4	2P+0S+0C+1L	*	P
2141505	**Electrical machines and drives** *Jan Chyský, Jaroslav Novák, Lukáš Novák* ***Jaroslav Novák*** *Jaroslav Novák (Gar.)*	Z,ZK	4	2P+0S+0C+1L	*	P
2021041	**Physics I.**	Z,ZK	7	4P+1L	*	P
2021025	**Physics II.**	Z,ZK	4	1P+2L	3	P
2133025	**Design** *František Lopot* ***František Lopot*** *František Lopot (Gar.)*	Z	4	0P+4C	*	P
2011021	**Constructive Geometry** ***Ivana Linkeová***	Z,ZK	6	3P+2C	*	P
2381054	**Management and Economics of the Enterprise** *Theodor Beran, Štěpánka Uličná, Vladimír Brdek, Ladislav Vaniš, Petr Žemlička* ***Theodor Beran*** *Theodor Beran (Gar.)*	Z,ZK	4	2P+2C	*	P
2011056	**Mathematics I** *Radka Keslerová, Marta Hlavová, Jiří Holman, Gejza Dohnal, Marta Čertíková, Vladimír Hric, Nikola Pajerová, Petr Louda, Lukáš Hájek, ...* ***Radka Keslerová*** *Gejza Dohnal (Gar.)*	Z,ZK	8	4P+4C	*	P
2011062	**Matematika II.** ***Radka Keslerová***	Z,ZK	8	4P+4C	*	P
2011009	**Mathematics III** *Radka Keslerová, Jiří Holman, Gejza Dohnal, Marta Čertíková, Vladimír Hric, Jan Valášek, Luděk Beneš, Tomáš Bodnár, Tomáš Neustupa, ...* ***Stanislav Kračmar*** *Stanislav Kračmar (Gar.)*	Z,ZK	5	2P+2C	*	P

2311101	**Mechanics I.** *Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Nečas, Zdeněk Neusser, Jan Pelikán, Pavel Steinbauer, Zbyněk Šika, ... **Zbyněk Šika** Zbyněk Šika (Gar.)*	Z,ZK	4	2P+2C	*	P
2311102	**Mechanics II.** *Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Nečas, Zdeněk Neusser, Jan Pelikán, Pavel Steinbauer, Zbyněk Šika, ... **Václav Bauma** Václav Bauma (Gar.)*	Z,ZK	4	2P+2C	*	P
2322029	**Materials Science I.** *Jana Sobotová, Eliška Galčíková, Jiří Cejp, Pavlína Hájková, Jan Krčil, Vladimír Mára, Lucie Pilsová, Taťana Vacková **Jana Sobotová** Jana Sobotová (Gar.)*	KZ	3	2P+1L	2	P
2321039	**Materials Science II.** *Jana Sobotová, Eliška Galčíková, Jiří Cejp, Pavlína Hájková, Jan Krčil, Vladimír Mára, Lucie Pilsová, Taťana Vacková, Jan Walter, ... **Jana Sobotová** Jana Sobotová (Gar.)*	Z,ZK	4	2P+2L	*	P
2011049	**Numerical Mathematics** *Radka Keslerová, Jiří Holman, Marta Čertíková, Vladimír Hric, Petr Louda, Lukáš Hájek, Jan Valášek, Luděk Beneš, Tomáš Bodnár, ... **Petr Sváček** Petr Sváček (Gar.)*	Z,ZK	4	2P+2C	4	P
2012037	**Computer Graphics** *Marta Hlavová, Jiří Holman, Nikola Pajerová, Martin Hanek, Jan Karel, Ivana Linkeová, Jaroslav Cibulka **Ivana Linkeová** Ivana Linkeová (Gar.)*	KZ	3	1P+1C	*	P
2372041	**Computer Support for Study** ***Vladimír Hlaváč***	KZ	3	1P+1C	*	P
2181026	**Momentum, Mass and Heat Transfer** *Martin Dostál, Vojtěch Bělohlav, Stanislav Solnař, Jan Skočilas, Tomáš Jirout, Adam Krupica, Jiří Moravec **Tomáš Jirout** Tomáš Jirout (Gar.)*	Z,ZK	5	3P+1C	*	P
2131002	**Engineering Design II** *Eliška Cézová, Martin Dub, Jan Flek, Jan Kanaval, František Lopot, Karel Petr, Martin Havlíček, Jan Hoidekr, Roman Uhlíř **Karel Petr** Karel Petr (Gar.)*	Z,ZK	4	2P+3C	2	P
2133013	**Engineering Design III.** *Jan Kanaval, František Lopot, Jan Hoidekr, David Skalický, Roman Uhlíř **Jan Kanaval** Jan Kanaval (Gar.)*	Z	2	0P+2C	Z	P
2133014	**Engineering Design IV.** *František Lopot **František Lopot** František Lopot (Gar.)*	Z	2	0P+2C	L	P
2372083	**Measurement in Engineering** *Martin Novák, Vladimír Hlaváč **Martin Novák** Martin Novák (Gar.)*	KZ	3	1P+0C+2L	*	P
K331068	**Technology I**	Z,ZK	5	16B	*	P
K341014	**Technology II.**	Z,ZK	5	8KP+8KC	*	P
2012035	**Algorithmization and Programming Fundamentals** *Jiří Holman, Marta Čertíková, Vladimír Hric, Lukáš Hájek, Jan Halama, Vladimír Prokop, Martin Hanek, Jan Karel, Josef Musil, ... **Petr Sváček** Petr Sváček (Gar.)*	KZ	4	1P+2C	*	P
2153005	**Fundamentals of Energy Conversions**	Z	1	1P+1C	*	P
2383001	**Fundamentals of Law** *Václav Pilík Václav Pilík (Gar.)*	Z	2	1P+1C	*	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 seminaries are arranged in laboratories where practical skills and control engineering methods are trained. Students begin to work with MATLAB software as a common platform of control engineers.

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.

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 aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.

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

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 mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.			
2133025	Design	Z	4
Design, design calculations and their aplications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and clutches.			
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.			
2381054	Management and Economics of the Enterprise	Z,ZK	4
The subject is intended to teach the students of the Faculty of Mechanical Engineering the basic economic starting points necessary for technical reasoning and to help them understand the basic relationships between economic quantities costs - revenues, expenses - incomes and other basic economic terms. The goal is for the audience to be able to communicate with economists in organizations. every product or service is valued at a selling price and therefore it is necessary to understand the simple costing of products and services. Every technician will encounter reports and should understand the basic structure of financial statements. As a future manager, he will compile and approve the operating budget. In the field of management, they will learn basic managerial functions and their content. Furthermore, they will learn how to use network analysis in project management. For decision-making purposes, they will learn the applications of multi-criteria decision-making. The basics of marketing and strategic management will be introduced.			
2011056	Mathematics I	Z,ZK	8
In the course, greater emphasis is placed on the theoretical basis of the concepts discussed and on the derivation of basic relationships and connections between concepts. Students will also get to know the procedures for solving problems with parametric input. In addition, students will gain extended knowledge in some thematic areas: eigennumbers and eigenvectors of a matrix, Taylor polynomial, integral as a limit function, integration of some special functions.			
2011062	Matematika II.	Z,ZK	8
Open and closed set, boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.			
2011009	Mathematics III	Z,ZK	5
An introductory course in ordinary differential equation and infinite series.			
2311101	Mechanics I.	Z,ZK	4
Mechanics I deals with the basic concepts of statics. There are described the methods of solution of equilibrium of particles and rigid bodies and their systems with and without friction. There are introduced the methods of description of position and motion of particles and rigid bodies.			
2311102	Mechanics II.	Z,ZK	4
Kinematics of point and of rigid bodies. Transformation matrix. Kinematics of concurrent movements. Motion: translation, rotation, general planar motion, spherical motion, screw motion, general spatial motion. Composition of mechanisms. Basic planar mechanisms. Analytical methods in kinematics of mechanisms - Trigonometric and vector method. Graphical methods in kinematics. Basic theory of gearing. Transmition mechanisms with geers. Strutting and seezing in mechanisms. Cable mechanisms.			
2322029	Materials Science I.	KZ	3
History and present state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deformation, recrystallization and fracture of materials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, iron-carbon phase diagram.			
2321039	Materials Science II.	Z,ZK	4
Fundamentals of metallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and thermo-mechanical processing, technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.			
2011049	Numerical Mathematics	Z,ZK	4
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.			
2012037	Computer Graphics	KZ	3
2372041	Computer Support for Study	KZ	3
The course introduces students into creating technical and professional documents on computers or Web and into realizing technical computations with the use of computers. Students gain practical skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating technical-based WWW page.			
2181026	Momentum, Mass and Heat Transfer	Z,ZK	5
Fundamentals of transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanical energy equation. Residence time distributions in continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and thermal radiation. Multicomponent systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.			
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.			
2133013	Engineering Design III.	Z	2
Design of assembly unit (draft drawing, detail drawing, assembly drawing, technical report)			
2133014	Engineering Design IV.	Z	2
2372083	Measurement in Engineering	KZ	3
Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments.			
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.			
K341014	Technology II.	Z,ZK	5

2012035	Algorithmization and Programming Fundamentals	KZ	4
Programming in MATLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrices, vectors and operations. Writting M-script. Input and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systems of linear equations. Scripts and functions. Structure of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Structures. Algorithmization of simple programs: minimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of systems of linear equations.			
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			

Code of the group: 12B*K*P-ZT12
Name of the group: 04 2012 kombinované ZT v pořadí 12
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 6
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
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 pořadí 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-IAT
Name of the group: 12 2012 BSTR 7.sem povinné IAT
Requirement credits in the group: In this group you have to gain 29 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 29
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
2361097	**Design of Instruments**	Z,ZK	5	3P+1C	*	P
2371710	**Computer Simulation Models**	Z,ZK	4	2P+2C	*	P
2373712	**Project** ***Vladimír Hlaváč***	Z	3	0P+2C	*	P
2371524	**Means of Automatic Control**	Z,ZK	5	3P+0C+2L	*	P
2371126	**Programmable Controller Applications** *Pavel Trnka, Oto Vrána, Jakub Jura* ***Jakub Jura*** *Jakub Jura (Gar.)*	Z,ZK	4	2P+0C+2L	*	P
2362502	**Technical optics**	KZ	3	2P+1C+0L	*	P

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

2361097	Design of Instruments	Z,ZK	5
Basics of instruments design.			
2371710	Computer Simulation Models	Z,ZK	4
The course provides a basic knowledge on formulation and computer implementation of dynamical system models. It starts from theoretical issues of Laplace and Z transform in their application to describing the continuous and discrete linear systems respectively. A particular emphasis is given on the skills in describing the dynamic processes in the state space approach in both linear and non-linear systems.			
2373712	Project	Z	3
Breaf introduction to the SmartPlant projection software. The project from the informatics in the second half of this subject.			
2371524	Means of Automatic Control	Z,ZK	5
Various categories of means for automatic control according to the different criterions. Main features in each category.Air and hydraulic fluid as a medium for information transfer. Symbols and descriptions in pneumatic and hydraulic diagrams. Pneumatic control systems design. Pneumatic actuators, valves, special pneumatic, electropneumatic devices. Control valves, categories, dimensioning, design, applications. Inteligent pneumatics as an integration of pneumatic, electronic and control components and systems. Valve islands and terminals, standard, with industrial buses communication, programmable. Pneumatic positioning systems.			

2371126	Programmable Controller Applications	Z,ZK	4

Logic control, Theory of finite automaton - introduction, Petri nets -application for industrial processes control. Programmable Logic Controller (PLC), PLCs in distributed control systems, type sof PLC and application areas. Function principles of PLC, configuration, HW structure of PLC, PLC software. Standard IEC 1131-3: software, program mand communication model, common elements of programming languages, standard and derived functions and function blocks, structuring resource - sequential function diagram (SFC), programming languages LD, IL, ST and FBD. Control applications design -methodology. Software tools for PLC programming. Industrial processes visualization. Systems of PLCs, networking of PLCs, communication possibilities of PLCs. Industrial communication standards (Profibus, ASi). Laboratory exercises on technological models via PLCs:Teco, Festo, Schneider Electric, Siemens.

2362502	Technical optics	KZ	3

The course gives a thorough interpretation of the principle of image forming by planar and spherical surfaces under the laws of geometric optics. It also deals with monochromatic and colour aberrations and basic visual instruments.

Code of the group: 12BS*8P-IAT
Name of the group: 13 2012 BSTR 8.sem povinné IAT
Requirement credits in the group: In this group you have to gain 25 credits
Requirement courses in the group: In this group you have to complete 6 courses
Credits in the group: 25
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
2362503	**Applied Optics**	KZ	4	2P+1S+0L	*	P
2141519	**Electrical Measurement and Diagnostics**	Z,ZK	4	2P+0C+1L	*	P
2372507	**Informatic systems**	KZ	4	2P+2C	*	P
2141006	**Embedded systems** *Jan Chyský*	Z,ZK	4	2P+0C+2L	*	P
2361005	**Instrumental Technology**	Z,ZK	4	2P+0C+2L	*	P

Characteristics of the courses of this group of Study Plan: Code=12BS*8P-IAT Name=13 2012 BSTR 8.sem povinné IAT

2362503	Applied Optics	KZ	4

The course introduces students to the functions of basic optical instruments and shows their applications.

2141519	Electrical Measurement and Diagnostics	Z,ZK	4

The transmission of signals in measure systems. Electromagnetic compatibility. Electronics measurements circuits and a conversion of signal for the transmission.

2372507	Informatic systems	KZ	4

Meanings of Information. Information theory. Channel capacity. Coding theory. Data coding, markup languages, XML. Cryptography. OSI Reference Model. Transmission media (metallic, optical, wireless). Data link layer. Network layer, communication protocols, TCP/IP suite. Digitization of analog signals. Quantum information. Genetic information.

2141006	Embedded systems	Z,ZK	4

Computers and microcomputers history. Block diagram of computer. Busses, processors, memories, input and output circuits. Single chip microcomputers, microcontrollers. Instruction set, machine code, assembler, ANSY-C language. Software and hardware tools for application developing. Simulator, emulator, logical analyzer. Computer interfaces. Converters, digital input and output. Analogous signal discretization, methods and errors of D/A and A/D conversion. Standard analogous signal. Interrupt system. Practical labs are focused on 8051/52 microcomputer family.

2361005	Instrumental Technology	Z,ZK	4

This subject gives students a detail review of technology used for instrumentation production.

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 15
The role of the block: PV

Code of the group: 12B**1Q-HUM
Name of the group: 03 2012 bakalářské povinně 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 j e 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)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
2383009	**Communication and Dealing with People** *Vladimír Brdek, Jan Horejc **Jan Horejc** Jan Horejc (Gar.)*	Z	2	1P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12B1Q-HUM Name=03 2012 bakalářské povinně volitelné humanitární**

2383009	Communication and Dealing with People	Z	2

Human communication represents an irreplaceable phenomenon in human activity, as it is present in practically all of his activities. The same applies (with specific modifications) to the activities of managers. So you can't not communicate - you can only communicate badly, well and excellently.

Code of the group: 12B**4Q-BZJ S+T
Name of the group: 08 2012 bakalářské zkoušky z jazyků 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** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová, Michele Le Blanc Ilona Šimice (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041063	**French - Bachelor Exam /FME** *Michaela Schusová, Dušana Jirovská **Eliška Vítková** Dušana Jirovská (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041062	**German - Bachelor Exam / FME** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich **Jaroslava Kommová** Jaroslava Kommová (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041065	**Russian - Bachelor Exam / FME** *Michaela Schusová, Hana Volejníková, Dušana Jirovská **Eliška Vítková** Dušana Jirovská (Gar.)*	Z,ZK	2	0P+2C	*	PV
2041064	**Spanish - Bachelor Exam / FME** *Michaela Schusová, Jaime Andrés Villagómez **Eliška Vítková** Jaime Andrés Villagómez (Gar.)*	Z,ZK	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12B4Q-BZJ S+T Name=08 2012 bakalářské zkoušky z jazyků 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**	KZ	2	0P+2C	*	PV
2152091	**Deparmental Project**	KZ	2	0P+2C	*	PV
2182091	**Project** ***Tomáš Jirout***	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

2152091	Deparmental Project	KZ	2
2182091	Project	KZ	2
Absolvent se seznámí se základy oboru Procesní technika.			

Code of the group: 12BS*6Q-PP
Name of the group: 11 2012 BSTR 6. sem prezentace projektů
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 nesepsán 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
2153091	**Presentation of Project**	Z	4	4B	*	PV
2363091	**Project Presentation**	Z	4	4B		PV
2373091	**Project presentation**	Z	4	4B	*	PV
2183091	**Project Presentation** ***Tomáš Jirout***	Z	4	0P+4C	*	PV

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

2153091	Presentation of Project	Z	4
2363091	Project Presentation	Z	4
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.			
2183091	Project Presentation	Z	4
Preparation and presentation of a given project theme.			

Code of the group: 12BS*8Q-IAT-BP
Name of the group: 14 2012 BSTR 8.sem 1povvol IAT-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:

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
2363985	**Bachelor Thesis**	Z	5	0P+6C		PV
2373985	**Bachelor Thesis**	Z	5	0P+6C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BS*8Q-IAT-BP Name=14 2012 BSTR 8.sem 1povvol IAT-BP

2363985	Bachelor Thesis	Z	5
2373985	Bachelor Thesis	Z	5
Each student will solve his individual theme under guiding of his individual supervising department specialist. Result is his/her bachelor thesis.			

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 strojního inženýrství.

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** ***Ivana Linkeová***	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** ***Stanislav Kračmar***	ZK	2	0P+0C	*	v
201A049	**Numerical Mathematics A** ***Luděk Beneš***	ZK	2	0P+0C	*	v

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

202A041	Physics I.	ZK	3
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.			
202A025	Physics II.A	ZK	2
Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction of radiation with matter. Photoelectric effect. Wave-particle mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.			
201A021	Constructive Geometry A	ZK	3
The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.			
201A056	Mathematics I.A	ZK	4
Introduction to linear algebra, analytic geometry of straight lines and planes in E3, calculus of functions of one variable			
201A062	Mathematics II.A	ZK	4
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.			
201A009	Mathematics III.A	ZK	2
201A049	Numerical Mathematics A	ZK	2

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** *Radka Keslerová, Hynek Řezníček, Olga Majlingová* ***Radka Keslerová*** *Gejza Dohnal (Gar.)*	Z	2	0P+2C	1	v

Characteristics of the courses of this group of Study Plan: Code=12B1V-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** *Ilona Šimice, Michele Le Blanc* ***Ilona Šimice*** *Michele Le Blanc (Gar.)*	Z	2	0P+2C	*	v
2046156	**English Conversation** *Ilona Šimice, Michele Le Blanc*	Z	2	0P+2C	L	v
2046071	**English - Lower Intermediate** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová*	Z	2	0P+2C	L	v
2046070	**English - Lower Intermediate** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová* ***Michaela Schusová*** *Ilona Šimice (Gar.)*	Z	2	0P+2C	Z	v
2046074	**English - Advanced** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová, Michele Le Blanc* ***Michaela Schusová*** *Ilona Šimice (Gar.)*	Z	2	0P+2C	Z	v
2046075	**English - Advanced** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová, Michele Le Blanc* ***Ilona Šimice*** *Ilona Šimice (Gar.)*	Z	2	0P+2C	L	v
2046072	**English - Upper Intermediate** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová* ***Michaela Schusová*** *Ilona Šimice (Gar.)*	Z	2	0P+2C	Z	v
2046073	**English - Upper Intermediate** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová* ***Ilona Šimice*** *Ilona Šimice (Gar.)*	Z	2	0P+2C	L	v
2046068	**English - Beginners** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová* ***Michaela Schusová*** *Ilona Šimice (Gar.)*	Z	2	0P+2C	Z	v
2046069	**English - Beginners** *Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová* ***Ilona Šimice***	Z	2	0P+2C	L	v
2046126	**Czech Lower Intermediate** ***Jaroslava Kommová***	Z	2	0P+2C	L	v
2046125	**Czech Lower Intermediate** ***Jaroslava Kommová***	Z	2	0P+2C	Z	v
2046118	**Czech -Advanced** ***Jaroslava Kommová***	Z	2	0P+2C	L	v
2046117	**Czech -Advanced** ***Jaroslava Kommová***	Z	2	0P+2C	Z	v
2046127	**Czech - Upper Intermediate** ***Jaroslava Kommová***	Z	2	0P+2C	Z	v
2046128	**Czech - Upper Intermediate** ***Jaroslava Kommová***	Z	2	0P+2C	L	v
2046119	**Czech Language for Beginners I.** ***Jaroslava Kommová***	Z	2	0P+2C	Z	v
2046120	**Czech Language for Beginners II.** ***Jaroslava Kommová***	Z	2	0P+2C	L	v
2046086	**French - Lower Intermediate Course** *Michaela Schusová, Dušana Jirovská* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046087	**French - Lower Intermediate Course** *Michaela Schusová, Dušana Jirovská* ***Dušana Jirovská*** *Dušana Jirovská (Gar.)*	Z	2	0P+2C	L	v
2046091	**French - Advanced** *Michaela Schusová, Dušana Jirovská* ***Dušana Jirovská*** *Dušana Jirovská (Gar.)*	Z	2	0P+2C	L	v
2046090	**French - Advanced** *Michaela Schusová, Dušana Jirovská, Eliška Vítková* ***Eliška Vítková*** *Eliška Vítková (Gar.)*	Z	2	0P+2C	Z	v
2046089	**French - Upper Intermediate** *Michaela Schusová, Dušana Jirovská* ***Dušana Jirovská*** *Dušana Jirovská (Gar.)*	Z	2	0P+2C	L	v
2046088	**French - Upper Intermediate** *Michaela Schusová, Dušana Jirovská* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046084	**French - Beginners** *Michaela Schusová, Dušana Jirovská* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046085	**French - Beginners´ Course** *Michaela Schusová, Dušana Jirovská* ***Michaela Schusová*** *Dušana Jirovská (Gar.)*	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

2046078	**German - Lower Intermediate Course** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046079	**German - Lower Intermediate Course** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Eliška Vítková*** *Jaroslava Kommová (Gar.)*	Z	2	0P+2C	L	v
2046083	**German - Advanced Course** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	Z	2	0P+2C	L	v
2046082	**German - Advanced Course** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046081	**German - Upper Intermediate Course** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Eliška Vítková*** *Jaroslava Kommová (Gar.)*	Z	2	0P+2C	L	v
2046080	**German - Upper Intermediate Course** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046076	**German - Beginners** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Michaela Schusová*** *Petr Laurich (Gar.)*	Z	2	0P+2C	Z	v
2046077	**German - Beginners** *Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Eliška Vítková*** *Jaroslava Kommová (Gar.)*	Z	2	0P+2C	L	v
2046161	**Presentations in English** ***Michaela Schusová***	Z	2	0P+2C	*	v
2046166	**Presentations in Czech** ***Jaroslava Kommová***	Z	2	0P+2C	*	v
2046162	**Presentations in German** *Jaroslava Kommová, Eliška Vítková, Petr Laurich* ***Jaroslava Kommová*** *Jaroslava Kommová (Gar.)*	Z	2	0P+2C	*	v
2046164	**Presentations in Russian** ***Dušana Jirovská***	Z	2	0P+2C	*	v
2046163	**Presentations in French language** *Dušana Jirovská* ***Dušana Jirovská***	Z	2	0P+2C	*	v
2046165	**Presentations in Spanish** ***Eliška Vítková***	Z	2	0P+2C	*	v
2046137	**Russian - Lower Intermediate Course** *Michaela Schusová, Hana Volejníková, Dušana Jirovská, Eliška Vítková* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046138	**Russian - Lower Intermediate Course** *Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Dušana Jirovská***	Z	2	0P+2C	L	v
2046141	**Russian - Advanced** *Michaela Schusová, Hana Volejníková, Dušana Jirovská, Eliška Vítková* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046142	**Russian - Advanced** *Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Dušana Jirovská***	Z	2	0P+2C	L	v
2046140	**Russian - Upper Intermediate** *Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Dušana Jirovská***	Z	2	0P+2C	L	v
2046139	**Russian - Upper Intermediate** *Michaela Schusová, Hana Volejníková, Dušana Jirovská, Eliška Vítková* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046136	**Russian - Beginners** *Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Dušana Jirovská***	Z	2	0P+2C	L	v
2046135	**Russian - Beginners** *Michaela Schusová, Hana Volejníková, Dušana Jirovská, Eliška Vítková* ***Michaela Schusová*** *Michaela Schusová (Gar.)*	Z	2	0P+2C	Z	v
2046099	**Spanish - Lower Intermediate** *Michaela Schusová, Jaime Andrés Villagómez* ***Eliška Vítková*** *Jaime Andrés Villagómez (Gar.)*	Z	2	0P+2C	L	v
2046098	**Spanish - Lower Intermediate** *Michaela Schusová, Eliška Vítková, Jaime Andrés Villagómez* ***Eliška Vítková*** *Eliška Vítková (Gar.)*	Z	2	0P+2C	Z	v
2046096	**Spanish - Beginners** *Michaela Schusová, Eliška Vítková, Jaime Andrés Villagómez* ***Eliška Vítková*** *Eliška Vítková (Gar.)*	Z	2	0P+2C	Z	v
2046097	**Spanish - Beginners** *Michaela Schusová, Jaime Andrés Villagómez* ***Jaime Andrés Villagómez*** *Jaime Andrés Villagómez (Gar.)*	Z	2	0P+2C	L	v

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

2046155	English Conversation	Z	2
Improving communicative skills in speaking on general topics and general technical topics.			
2046156	English Conversation	Z	2
Improving communicative skills in speaking on general topics and general technical topics.			
2046071	English - Lower Intermediate	Z	2
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.			

2046070	English - 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. A1 - A2.			
2046074	English - Advanced	Z	2
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.			
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.			
2046072	English - Upper Intermediate	Z	2
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.			
2046073	English - Upper Intermediate	Z	2
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.			
2046068	English - Beginners	Z	2
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			
2046069	English - Beginners	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).			
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.			
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.			
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 currant issues and popular scientific and technical articles.			
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.			
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.			
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).			
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.			
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.			
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.			
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.			
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.			
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			
2046078	German - Lower Intermediate Course	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets in the company 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 comprehesion 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 currant issues and popular scientific and technical articles.			
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.			
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.			
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) It corresponds to the Common European Framework of Reference for Languages A1.			
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.			
2046166	Presentations in Czech	Z	2
Preparing students to give presentations 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.			
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.			
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.			
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.			
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 currant issues and popular scientific and technical articles.			
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 currant issues and popular scientific and technical articles.			
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.			
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.			
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)			
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)			

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.			
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.			
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	Z,ZK	5
An introductory course in ordinary differential equation and infinite series.			
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.			
2011049	Numerical Mathematics	Z,ZK	4
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.			
2011056	Mathematics I	Z,ZK	8
In the course, greater emphasis is placed on the theoretical basis of the concepts discussed and on the derivation of basic relationships and connections between concepts. Students will also get to know the procedures for solving problems with parametric input. In addition, students will gain extended knowledge in some thematic areas: eigennumbers and eigenvectors of a matrix, Taylor polynomial, integral as a limit function, integration of some special functions.			
2011062	Matematika II.	Z,ZK	8
Open and closed set, boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.			
2012035	Algorithmization and Programming Fundamentals	KZ	4
Programming in MATLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrices, vectors and operations. Writting M-script. Input and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systems of linear equations. Scripts and functions. Structure of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Structures. Algorithmization of simple programs: minimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of systems of linear equations.			
2012037	Computer Graphics	KZ	3
2016007	Mathematics I. - Seminar	Z	2
201A009	Mathematics III.A	ZK	2
201A021	Constructive Geometry A	ZK	3
The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.			
201A049	Numerical Mathematics A	ZK	2
201A056	Mathematics I.A	ZK	4
Introduction to linear algebra, analytic geometry of straight lines and planes in E3, calculus of functions of one variable			
201A062	Mathematics II.A	ZK	4
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.			
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 mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.			
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.			
2026016	Physics - Seminar	Z	2
The subject is mainly meant for high-school students for repetition of high-school physics.			

202A025	Physics II.A	ZK	2
Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction of radiation with matter. Photoelectric effect. Wave-particle mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.			
202A041	Physics I.	ZK	3
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.			
2041061	English-Bachelor Exam	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041062	German - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041063	French - Bachelor Exam /FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041064	Spanish - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2041065	Russian - Bachelor Exam / FME	Z,ZK	2
Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.			
2046068	English - Beginners	Z	2
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			
2046069	English - Beginners	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).			
2046070	English - 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. A1 - A2.			
2046071	English - Lower Intermediate	Z	2
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.			
2046072	English - Upper Intermediate	Z	2
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.			
2046073	English - Upper Intermediate	Z	2
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.			
2046074	English - Advanced	Z	2
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.			
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) It corresponds to the Common European Framework of Reference for Languages A1.			
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 in the company 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 comprehesion 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	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.			
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).			
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.			
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.			
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.			
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)			

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.			
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.			
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.			
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 currant issues and popular scientific and technical articles.			
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 currant issues and popular scientific and technical articles.			
2046155	English Conversation	Z	2
Improving communicative skills in speaking on general topics and general technical topics.			
2046156	English Conversation	Z	2
Improving communicative skills in speaking on general topics and general technical topics.			
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.			
2046163	Presentations in French language	Z	2
Preparation for presenting technical topics in French, 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.			
2046165	Presentations in Spanish	Z	2
Preparation for presenting technical topics in Spanish, 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.			
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.			
2131026	Machine Elements and Mechanisms II	ZK	3
Preliminary design, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.			
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.			
2133013	Engineering Design III.	Z	2
Design of assembly unit (draft drawing, detail drawing, assembly drawing, technical report)			
2133014	Engineering Design IV.	Z	2
2133025	Design	Z	4
Design, design calculations and their aplications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and clutches.			
2141006	Embedded systems	Z,ZK	4
Computers and microcomputers history. Block diagram of computer. Busses, processors, memories, input and output circuits. Single chip microcomputers, microcontrollers. Instruction set, machine code, assembler, ANSY-C language. Software and hardware tools for application developing. Simulator, emulator, logical analyzer. Computer interfaces. Converters, digital input and output. Analogous signal discretization, methods and errors of D/A and A/D conversion. Standard analogous signal. Interrupt system. Practical labs are focused on 8051/52 microcomputer family.			
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. curcuits. Electrical power and energy. Calculation, measurement, power factor. Magnetic circuit, materials, hysteresis loop. Electromagnet. Transformer, principle, construction, 3-phase transformer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed-torque characteristic, speed control. Synchronous machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characteristic. Low-voltage instruments. Low-voltage distribution system.			
2141519	Electrical Measurement and Diagnostics	Z,ZK	4
The transmission of signals in measure systems. Electromagnetic compatibility. Electronics measurements circuits and a conversion of signal for the transmission.			
2144062	Technical Indonesian - Course II.	Z,ZK	3
Basic of Indonesian Language for Student Exchange Program to Indonesia			

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		
2152091	Deparmental Project	KZ	2
2153005	Fundamentals of Energy Conversions	Z	1
2153091	Presentation of Project	Z	4
2181026	Momentum, Mass and Heat Transfer	Z,ZK	5
	Fundamentals of transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanical energy equation. Residence time distributions in continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and thermal radiation. Multicomponent systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.		
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.		
2182091	Project	KZ	2
	Absolvent se seznámí se základy oboru Procesní technika.		
2183091	Project Presentation	Z	4
	Preparation and presentation of a given project theme.		
2311101	Mechanics I.	Z,ZK	4
	Mechanics I deals with the basic concepts of statics. There are described the methods of solution of equilibrium of particles and rigid bodies and their systems with and without friction. There are introduced the methods of description of position and motion of particles and rigid bodies.		
2311102	Mechanics II.	Z,ZK	4
	Kinematics of point and of rigid bodies. Transformation matrix. Kinematics of concurrent movements. Motion: translation, rotation, general planar motion, spherical motion, screw motion, general spatial motion. Composition of mechanisms. Basic planar mechanisms. Analytical methods in kinematics of mechanisms - Trigonometric and vector method. Graphical methods in kinematics. Basic theory of gearing. Transmition mechanisms with geers. Strutting and seezing in mechanisms. Cable mechanisms.		
2321039	Materials Science II.	Z,ZK	4
	Fundamentals of metallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and thermo-mechanical processing, technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.		
2322029	Materials Science I.	KZ	3
	History and present state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deformation, recrystallization and fracture of materials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, iron-carbon phase diagram.		
2361005	Instrumental Technology	Z,ZK	4
	This subject gives students a detail review of technology used for instrumentation production.		
2361097	Design of Instruments	Z,ZK	5
	Basics of instruments design.		
2362091	Project	KZ	2
2362502	Technical optics	KZ	3
	The course gives a thorough interpretation of the principle of image forming by planar and spherical surfaces under the laws of geometric optics. It also deals with monochromatic and colour aberrations and basic visual instruments.		
2362503	Applied Optics	KZ	4
	The course introduces students to the functions of basic optical instruments and shows their applications.		
2363091	Project Presentation	Z	4
2363985	Bachelor Thesis	Z	5
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 seminaries are arranged in laboratories where practical skills and control engineering methods are trained. Students begin to work with MATLAB software as a common platform of control engineers.		
2371126	Programmable Controller Applications	Z,ZK	4
	Logic control, Theory of finite automaton - introduction, Petri nets -application for industrial processes control. Programmable Logic Controller (PLC), PLCs in distributed control systems, type sof PLC and application areas. Function principles of PLC, configuration, HW structure of PLC, PLC software. Standard IEC 1131-3: software, program mand communication model, common elements of programming languages, standard and derived functions and function blocks, structuring resource - sequential function diagram (SFC), programming languages LD, IL, ST and FBD. Control applications design -methodology. Software tools for PLC programming. Industrial processes visualization. Systems of PLCs, networking of PLCs, communication possibilities of PLCs. Industrial communication standards (Profibus, ASi). Laboratory exercises on technological models via PLCs:Teco, Festo, Schneider Electric, Siemens.		
2371524	Means of Automatic Control	Z,ZK	5
	Various categories of means for automatic control according to the different criterions. Main features in each category.Air and hydraulic fluid as a medium for information transfer. Symbols and descriptions in pneumatic and hydraulic diagrams. Pneumatic control systems design. Pneumatic actuators, valves, special pneumatic, electropneumatic devices. Control valves, categories, dimensioning, design, applications. Inteligent pneumatics as an integration of pneumatic, electronic and control components and systems. Valve islands and terminals, standard, with industrial buses communication, programmable. Pneumatic positioning systems.		
2371710	Computer Simulation Models	Z,ZK	4
	The course provides a basic knowledge on formulation and computer implementation of dynamical system models. It starts from theoretical issues of Laplace and Z transform in their application to describing the continuous and discrete linear systems respectively. A particular emphasis is given on the skills in describing the dynamic processes in the state space approach in both linear and non-linear systems.		
2372041	Computer Support for Study	KZ	3
	The course introduces students into creating technical and professional documents on computers or Web and into realizing technical computations with the use of computers. Students gain practical skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating technical-based WWW page.		

2372083	Measurement in Engineering	KZ	3
Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments.			
2372091	Project	KZ	2
An individual project from the branch of specialisation, which student will study on his/her magister level			
2372507	Informatic systems	KZ	4
Meanings of Information. Information theory. Channel capacity. Coding theory. Data coding, markup languages, XML. Cryptography. OSI Reference Model. Transmission media (metallic, optical, wireless). Data link layer. Network layer, communication protocols, TCP/IP suite. Digitization of analog signals. Quantum information. Genetic information.			
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.			
2373712	Project	Z	3
Breaf introduction to the SmartPlant projection software. The project from the informatics in the second half of this subject.			
2373985	Bachelor Thesis	Z	5
Each student will solve his individual theme under guiding of his individual supervising department specialist. Result is his/her bachelor thesis.			
2381054	Management and Economics of the Enterprise	Z,ZK	4
The subject is intended to teach the students of the Faculty of Mechanical Engineering the basic economic starting points necessary for technical reasoning and to help them understand the basic relationships between economic quantities costs - revenues, expenses - incomes and other basic economic terms. The goal is for the audience to be able to communicate with economists in organizations. every product or service is valued at a selling price and therefore it is necessary to understand the simple costing of products and services. Every technician will encounter reports and should understand the basic structure of financial statements. As a future manager, he will compile and approve the operating budget. In the field of management, they will learn basic managerial functions and their content. Furthermore, they will learn how to use network analysis in project management. For decision-making purposes, they will learn the applications of multi-criteria decision-making. The basics of marketing and strategic management will be introduced.			
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			
2383009	Communication and Dealing with People	Z	2
Human communication represents an irreplaceable phenomenon in human activity, as it is present in practically all of his activities. The same applies (with specific modifications) to the activities of managers. So you can't not communicate - you can only communicate badly, well and excellently.			
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

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