

# Study plan

## Name of study plan: 14 80 85 00 BVES MAT 2012 P 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 full-time

Required credits: 183

Elective courses credits: -1

Sum of credits in the plan: 182

Note on the plan: první pokus

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Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 172

The role of the block: P

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Code of the group: 12B\*P\*P-TV

Name of the group: 07 2012 bakalářský cvičení

Requirement credits in the group: In this group you have to gain 3 credits

Requirement courses in the group: In this group you have to complete 3 courses

Credits in the group: 3

Note on the group: Letní výcvikový kurz je předmět povinný. Student jej může vykonat kdykoliv v průběhu studia, avšak v souladu s příslušnými ustanoveními Ústavu tělesné výchovy a sportu ČVUT

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Code of the group: 12B\*P\*P-ZT21

Name of the group: 04 2012 prezenční ZT v pořadí 21

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
2333038	Fundamentals of Technology I.	Z	3	1P+1C	*	P

### Characteristics of the courses of this group of Study Plan: Code=12B\*P\*P-ZT21 Name=04 2012 prezenční ZT v pořadí 21

2333038	Fundamentals of Technology I.	Z	3
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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.

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Code of the group: 12B-KMEN\* VES

Name of the group: 01 2012 souhrn 12B\*\*1P-KMEN a 12B\*\*2P-KMEN

Requirement credits in the group: In this group you have to gain 50 credits

Requirement courses in the group: In this group you have to complete 11 courses

Credits in the group: 50

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
2182019	<b>Chemistry</b> Radek Šulc, Martin Dostál, Vojtěch B. Iohlav, Stanislav Solna, Jan Skořilas Radek Šulc Radek Šulc (Gar.)	KZ	3	2P+1C	1	P
2021041	<b>Physics I.</b>	Z,ZK	7	4P+1L	*	P
2011021	<b>Constructive Geometry</b> Ivana Linkeová	Z,ZK	6	3P+2C	*	P
2011056	<b>Mathematics I</b> Radka Keslerová, Marta Hlavová, Jiří Holman, Gejza Dohnal, Marta Čertíková, Vladimír Hříč, Nikola Pajerová, Petr Louda, Lukáš Hájek, ..... Radka Keslerová Gejza Dohnal (Gar.)	Z,ZK	8	4P+4C	*	P
2011062	<b>Matematika II.</b> Radka Keslerová	Z,ZK	8	4P+4C	*	P
2322029	<b>Materials Science I.</b> Jana Sobotová, Eliška Galíková, Jiří Čejp, Pavlína Hájková, Jan Král, Vladimír Mára, Lucie Pilslová, Tereza Vacková Jana Sobotová Jana Sobotová (Gar.)	KZ	3	2P+1L	2	P
2012037	<b>Computer Graphics</b> 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	<b>Computer Support for Study</b>	KZ	3	1P+1C	*	P
2131002	<b>Engineering Design II</b> Eliška Cézová, Jan Flek, Jan Kanaval, Karel Petr, Martin Dub, Martin Havlíček, Jan Hoidekr Karel Petr Karel Petr (Gar.)	Z,ZK	4	2P+3C	2	P

**Characteristics of the courses of this group of Study Plan: Code=12B-KMEN\*VES Name=01 2012 souhrn 12B\*\*1P-KMEN a 12B\*\*2P-KMEN**

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.		
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.		
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.		
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: eigenvalues 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.		
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.		
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.		
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.		

Code of the group: 12BVP3P

Name of the group: 08 2012 BVES 3.sem prezen ní povinné

Requirement credits in the group: In this group you have to gain 31 credits

Requirement courses in the group: In this group you have to complete 7 courses

Credits in the group: 31

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
2021025	<b>Physics II.</b>	Z,ZK	4	1P+2L	3	P

2011009	<b>Mathematics III</b> Radka Keslerová, Jiří Holman, Gejza Dohnal, Marta ertíková, Vladimír Hric, Jan Valášek, Luděk Beneš, Tomáš Bodnár, Tomáš Neustupa, ..... <b>Stanislav Kra mar</b> Stanislav Kra mar (Gar.)	Z,ZK	5	2P+2C	*	P
2321039	<b>Materials Science II.</b> Jana Sobotová, Eliška Galíková, Jiří Cejp, Pavlína Hájková, Jan Král, Vladimír Mára, Lucie Pilslová, Taana Vacková, Jan Walter, ..... <b>Jana Sobotová</b> Jana Sobotová (Gar.)	Z,ZK	4	2P+2L	*	P
2331068	<b>Technology I.</b>	Z,ZK	5	2P+2C	*	P

**Characteristics of the courses of this group of Study Plan: Code=12BVP3P Name=08 2012 BVES 3.sem prezen ní povinné**

2021025	Physics II. Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction of radiation with matter. Photoelectric effect. Wave-particle nature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.	Z,ZK	4			
2011009	Mathematics III An introductory course in ordinary differential equation and infinite series.	Z,ZK	5			
2321039	Materials Science II. Fundamentals of metallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and thermo-mechanical processing, technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.	Z,ZK	4			
2331068	Technology I. Foundry properties of metals. Treatment. Pouring. Casting solidification. Moulding and core making. Thermal treatment. Plastic deformation. Division of forming processes. Semi-products, heating-up. Cutting. Cold and hot forming. Welds. Weldability. Weldment testing. Thermal cutting. Brazing. Surface treatments.	Z,ZK	5			

Code of the group: 12BVP4P

Name of the group: 09 2012 BVES 4.sem prezen ní povinné

Requirement credits in the group: In this group you have to gain 22 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 22

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
2342005	Quality Control	KZ	2	1P+1C+1L	*	P
2341014	Technology II.	Z,ZK	5	2P+0C+2L	*	P

**Characteristics of the courses of this group of Study Plan: Code=12BVP4P Name=09 2012 BVES 4.sem prezen ní povinné**

2342005	Quality Control Basic quality control terms, where is quality created, who is responsible for a quality. Basic statistical terms and distributions. Statistical methods: statistical process control, statistical sampling. Tools and methods for a quality assurance during product lifetime cycle. Standards 9 000 and 14 000, certification of quality control systems.	KZ	2			
2341014	Technology II. mechanics of chip formation, cutting processes, finishing operations, non-traditional machining processes. Production rates calculation, machining economics. Automation of processes, programming of manufacture. Engineering metrology. Assembly techniques. Introduction to process planning.	Z,ZK	5			

Code of the group: 12BV\*5P

Name of the group: 12 2012 BVES 5.sem povinné

Requirement credits in the group: In this group you have to gain 11 credits

Requirement courses in the group: In this group you have to complete 3 courses

Credits in the group: 11

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
2141204	Introduction to Electrical Engineering for Technology Jan Chyský, Lubomír Musálek, Martin Novák <b>Lubomír Musálek</b> Jan Chyský (Gar.)	Z,ZK	4	2P+0C+2L	*	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=12BV\*5P Name=12 2012 BVES 5.sem povinné**

2141204	Introduction to Electrical Engineering for Technology Elements of electrical circuits, analysis of electrical circuits as DC and AC. El. Power and Energy. Principle and typical parameters diodes, transistors, operation amplifiers. Analogue and digital circuits. AC el. circuits. Electrical power and energy. Calculation, measurement, power factor. Transformer. Induction machines. Synchronous machines. DC-machines	Z,ZK	4			
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2383001	Fundamentals of Law	Z	2
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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: 12BV\*5P-MAT

Name of the group: 14 2012 BVES 5.sem zam MAT povinné

Requirement credits in the group: In this group you have to gain 18 credits

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

Credits in the group: 18

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2341001	<b>Metrology</b>	Z,ZK	5	2P+0C+2L	*	P
2331505	<b>Welding Technology</b>	Z,ZK	4	2P+1C	*	P
2322041	<b>Heat treatment</b> <i>Jana Sobotová, Martin Kuřík Jana Sobotová Jana Sobotová (Gar.)</i>	KZ	4	2P+1C	*	P

Characteristics of the courses of this group of Study Plan: Code=12BV\*5P-MAT Name=14 2012 BVES 5.sem zam MAT povinné

2341001	Metrology	Z,ZK	5
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Metrology, intergration into quality control, legal metrology, metrology system. Geometrical quantities metrology. Measurement uncertainty. Primary and secondary standarts. Measurement in 1, 2, end 3 coordinates. Laserinterferometres and their applications. Geometrical surface properties. Form - and position deviations. Surface structure - roughness, waviness. Measurement automatization.

2331505	Welding Technology	Z,ZK	4
2322041	Heat treatment	KZ	4

Theoretical fundamentals of heat treatment, basic processes of heat and chemical-heat treatment of ferrous and non-ferrous metals, excursion focused on the given topic

Code of the group: 12BV\*6P

Name of the group: 15 2012 BVES 6.sem povinné

Requirement credits in the group: In this group you have to gain 9 credits

Requirement courses in the group: In this group you have to complete 2 courses

Credits in the group: 9

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2331071	<b>Automation of Production Processes</b>	Z,ZK	5	3P+2C	*	P

Characteristics of the courses of this group of Study Plan: Code=12BV\*6P Name=15 2012 BVES 6.sem povinné

2331071	Automation of Production Processes	Z,ZK	5
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Automation of basic technological processes - casting, welding, forming and finishing. Facilities and equipment required to automate offices. Mechanization and automation in iron and steel foundries. Automation and robotics of die casting process, including other peripherals. Designing and programming of robotic welding centers. Designing and programming of robotic workstations for sheet metal forming. Design of automated forging cells. Design of automated finishing lines.

Code of the group: 12BV\*6P-MAT

Name of the group: 16 2012 BVES 6.sem zam MAT povinné

Requirement credits in the group: In this group you have to gain 22 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 22

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
2323993	<b>Bachelor Thesis</b> <i>Jana Sobotová</i>	Z	5	0P+6C	*	P
2321501	<i>Jana Sobotová</i>	Z,ZK	4	3P+1C	*	P

2321503	<b>Technical testing of materials</b> <i>Elena ižárová</i>	Z,ZK	5	2P+2C+0L	*	P
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**Characteristics of the courses of this group of Study Plan: Code=12BV\*6P-MAT Name=16 2012 BVES 6.sem zam MAT povinné**

2323993	Bachelor Thesis	Z	5			
2321501		Z,ZK	4			
The course characterizes individual groups of new construction materials. In addition to the development and physical nature of these materials, the most commonly used types of recently developed materials, their basic characteristics and mechanical properties are listed. Their technological possibilities, design applicability and methods of their designations are also presented.						
2321503	Technical testing of materials	Z,ZK	5			
Term and definition of properties. Verification of properties in a certified quality management system. Accredited test laboratory and test systems, test standard. Basic mechanical properties and testing the characteristics of metals, polymers, composites and ceramics. Testing of material for the limited state is the basic methods in accordance with the relevant standards. Test of resistance to brittle fracture, fatigue, creep. Evaluation of technological properties. Defectoscopic method for detecting defects in the material.						

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 11

The role of the block: PV

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

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

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

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

Credits in the group: 2

Note on the group: Ze skupiny humanitních předmětů nutno je d e n absolvovat

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

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

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: 12BV\*4Q-BZJ VES

Name of the group: 11 2012 bakalá ské zkoušky z jazyk pro VES

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:

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

**Characteristics of the courses of this group of Study Plan: Code=12BV\*4Q-BZJ VES Name=11 2012 bakalá ské zkoušky z jazyk pro VES**

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: 12BV\*4Q-ZAM

Name of the group: 10 2012 BVES 4.sem zam 1povvol

Requirement credits in the group: In this group you have to gain at least 5 credits (at most 10)

Requirement courses in the group: In this group you have to complete at least 1 course ( at most 2)

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
2321067	Technical Application of Materials Stanislav Krum	Z,ZK	5	3P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BV\*4Q-ZAM Name=10 2012 BVES 4.sem zam 1povvol

2321067	Technical Application of Materials	Z,ZK	5
P edm t popisuje aplikovatelnost jednotlivých skupin inženýrských materiál ů a jejich odpovídající vlastnosti. Rovn ě se v ů nuje aktuálním vývojovým trend m t chto skupin. The subject describes applicability of specific engineering material types and their characteristics. It deals with the current development trends in these materials as well.			

Code of the group: 12BV\*5Q-OP

Name of the group: 13 2012 BVES 5.sem 1povvol oborové projekty

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 8)

Requirement courses in the group: In this group you have to complete at least 1 course ( at most 4)

Credits in the group: 2

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
2322091	Project Jana Sobotová, Ji í Cejp, Pavlína Hájková, Jan Kr il, Vladimír Mára, Ta ana Vacková, Jakub Horník, Ladislav Cvr ek, Elena ůžmárová, ..... Jana Sobotová Jana Sobotová (Gar.)	KZ	2	0P+2C	*	PV
2332091	Project	KZ	2	0P+2C	*	PV
2342091	Project	KZ	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BV\*5Q-OP Name=13 2012 BVES 5.sem 1povvol oborové projekty

2322091	Project	KZ	2
On the basis of the preliminary submission of a bachelor thesis the students, under supervision of their supervisors, prepare a review summarizing and evaluating the studied literature with particular emphasis on experimental technologies which can be applied in their bachelor theses. They can also mention a planned experiment or evaluate hitherto obtained knowledge or results.			
2332091	Project	KZ	2
2342091	Project	KZ	2
Work on specialized tasks.			

Name of the block: Elective courses

Minimal number of credits of the block: 0

The role of the block: V

Code of the group: 12BV\*\*V-ALFA

Name of the group: 02 2012 ALFA volitelné pro VES

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
202A041	Physics I.	ZK	3	0P+0L	*	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

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

202A041	Physics I. Kinematics and dynamics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic properties of bodies. Oscillations, waves. Fluid mechanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Conductors, semiconductors, insulators. Magnetic field. Magnetic materials. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.	ZK	3
201A021	Constructive Geometry A The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	ZK	3
201A056	Mathematics I.A Introduction to linear algebra, analytic geometry of straight lines and planes in E <sup>3</sup> , calculus of functions of one variable	ZK	4
201A062	Mathematics II.A Open and closed set, boundary in E <sup>n</sup> . Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.	ZK	4

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

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

2026016	Physics - Seminar The subject is mainly meant for high-school students for repetition of high-school physics.	Z	2
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	<b>English Conversation</b> <i>Ilona Šimice, Michele Le Blanc</i>	Z	2	0P+2C	L	v
2046071	<b>English - Lower Intermediate</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová</i>	Z	2	0P+2C	L	v
2046070	<b>English - Lower Intermediate</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová</i> <b>Michaela Schusová</b> <i>Ilona Šimice (Gar.)</i>	Z	2	0P+2C	Z	v
2046074	<b>English - Advanced</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová, Michele Le Blanc</i> <b>Michaela Schusová</b> <i>Ilona Šimice (Gar.)</i>	Z	2	0P+2C	Z	v
2046075	<b>English - Advanced</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová, Michele Le Blanc</i> <b>Ilona Šimice</b> <i>Ilona Šimice (Gar.)</i>	Z	2	0P+2C	L	v
2046072	<b>English - Upper Intermediate</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová</i> <b>Michaela Schusová</b> <i>Ilona Šimice (Gar.)</i>	Z	2	0P+2C	Z	v
2046073	<b>English - Upper Intermediate</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová</i> <b>Ilona Šimice</b> <i>Ilona Šimice (Gar.)</i>	Z	2	0P+2C	L	v
2046068	<b>English - Beginners</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová</i> <b>Michaela Schusová</b> <i>Ilona Šimice (Gar.)</i>	Z	2	0P+2C	Z	v
2046069	<b>English - Beginners</b> <i>Ilona Šimice, Michaela Schusová, Hana Volejníková, Veronika Kratochvílová</i> <b>Ilona Šimice</b>	Z	2	0P+2C	L	v
2046126	<b>Czech Lower Intermediate</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	L	v
2046125	<b>Czech Lower Intermediate</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	Z	v
2046118	<b>Czech -Advanced</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	L	v
2046117	<b>Czech -Advanced</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	Z	v
2046127	<b>Czech - Upper Intermediate</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	Z	v
2046128	<b>Czech - Upper Intermediate</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	L	v
2046119	<b>Czech Language for Beginners I.</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	Z	v
2046120	<b>Czech Language for Beginners II.</b> <b>Jaroslava Kommová</b>	Z	2	0P+2C	L	v
2046086	<b>French - Lower Intermediate Course</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Michaela Schusová</b> <i>Michaela Schusová (Gar.)</i>	Z	2	0P+2C	Z	v
2046087	<b>French - Lower Intermediate Course</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Dušana Jirovská</b> <i>Dušana Jirovská (Gar.)</i>	Z	2	0P+2C	L	v
2046091	<b>French - Advanced</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Dušana Jirovská</b> <i>Dušana Jirovská (Gar.)</i>	Z	2	0P+2C	L	v
2046090	<b>French - Advanced</b> <i>Michaela Schusová, Dušana Jirovská, Eliška Vítková</i> <b>Eliška Vítková</b> <i>Eliška Vítková (Gar.)</i>	Z	2	0P+2C	Z	v
2046089	<b>French - Upper Intermediate</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Dušana Jirovská</b> <i>Dušana Jirovská (Gar.)</i>	Z	2	0P+2C	L	v
2046088	<b>French - Upper Intermediate</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Michaela Schusová</b> <i>Michaela Schusová (Gar.)</i>	Z	2	0P+2C	Z	v
2046084	<b>French - Beginners</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Michaela Schusová</b> <i>Michaela Schusová (Gar.)</i>	Z	2	0P+2C	Z	v
2046085	<b>French - Beginners' Course</b> <i>Michaela Schusová, Dušana Jirovská</i> <b>Michaela Schusová</b> <i>Dušana Jirovská (Gar.)</i>	Z	2	0P+2C	L	v
2146060	<b>Indonesian Language Course for Exchange</b>	Z	2	0P+2C	*	v
2146061	<b>Technical Indonesian - Course I.</b>	Z	2	0P+2C	Z	v
2144062	<b>Technical Indonesian - Course II.</b>	Z,ZK	3	1P+2C	L	v
2046078	<b>German - Lower Intermediate Course</b> <i>Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich</i> <b>Michaela Schusová</b> <i>Michaela Schusová (Gar.)</i>	Z	2	0P+2C	Z	v
2046079	<b>German - Lower Intermediate Course</b> <i>Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich</i> <b>Eliška Vítková</b> <i>Jaroslava Kommová (Gar.)</i>	Z	2	0P+2C	L	v
2046083	<b>German - Advanced Course</b> <i>Michaela Schusová, Jaroslava Kommová, Eliška Vítková, Petr Laurich</i> <b>Jaroslava Kommová</b> <i>Jaroslava Kommová (Gar.)</i>	Z	2	0P+2C	L	v



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

**Characteristics of the courses of this group of Study Plan: Code=12B\*\*1V-DOP ZJK Name=06 2012 doporu ené základní jazykové kurzy a prezentace**

2046155	English Conversation Improving communicative skills in speaking on general topics and general technical topics.	Z	2
2046156	English Conversation Improving communicative skills in speaking on general topics and general technical topics.	Z	2
2046071	English - Lower Intermediate Mapped to the Common European Framework of Reference Level A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or at his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehension of simple texts. Improvement of professional language.	Z	2
2046070	English - Lower Intermediate Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language. A1 - A2.	Z	2
2046074	English - Advanced The aim: comprehension of spoken English as well as lectures given in English without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. reading and comprehension of popular-scientific and scientific articles or texts from student's field of studies without difficulties. Grammar structures on advanced level. B1 - B2.	Z	2

2046075	English - Advanced	Z	2
Mapped to the Common European Framework of Reference Level B1 - B2. The aim: comprehension of spoken English as well as lectures given in English without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. reading and comprehension of popular-scientific and scientific articles or texts from student's field of studies without difficulties. Grammar structures on advanced level.			
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 current 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 current 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 current 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 at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046079	German - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehension of simple texts. Improvement of professional language.			
2046083	German - Advanced Course	Z	2
Mapped to the level of Common European Framework of Reference: B1 - B2 The aim: comprehension of spoken German as well as lectures given in German without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehension of popular-scientific and scientific articles or texts from student's field of studies without difficulties. Grammar structures on advanced level.			
2046082	German - Advanced Course	Z	2
Comprehension of spoken language as well as lectures in German on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning current issues and popular scientific and technical articles.			
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 student 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)			
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 current 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 current 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	<b>Mathematics III</b> An introductory course in ordinary differential equation and infinite series.	Z,ZK	5
2011021	<b>Constructive Geometry</b> The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	Z,ZK	6
2011056	<b>Mathematics I</b> 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.	Z,ZK	8
2011062	<b>Matematika II.</b> Open and closed set, boundary in $E^k$ . Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.	Z,ZK	8
2012037	<b>Computer Graphics</b>	KZ	3
2016007	<b>Mathematics I. - Seminar</b>	Z	2
201A021	<b>Constructive Geometry A</b> The subject is focused on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	ZK	3
201A056	<b>Mathematics I.A</b> Introduction to linear algebra, analytic geometry of straight lines and planes in $E^3$ , calculus of functions of one variable	ZK	4
201A062	<b>Mathematics II.A</b> Open and closed set, boundary in $E^k$ . Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskij theorem.	ZK	4
2021025	<b>Physics II.</b> Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction of radiation with matter. Photoelectric effect. Wave-particle nature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.	Z,ZK	4
2021041	<b>Physics I.</b> Kinematics and dynamics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic properties of bodies. Oscillations, waves. Fluid mechanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Conductors, semiconductors, insulators. Magnetic field. Magnetic materials. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.	Z,ZK	7
2026016	<b>Physics - Seminar</b> The subject is mainly meant for high-school students for repetition of high-school physics.	Z	2
202A041	<b>Physics I.</b> Kinematics and dynamics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic properties of bodies. Oscillations, waves. Fluid mechanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Conductors, semiconductors, insulators. Magnetic field. Magnetic materials. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.	ZK	3
2041061	<b>English-Bachelor Exam</b> Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.	Z,ZK	2
2041062	<b>German - Bachelor Exam / FME</b> Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.	Z,ZK	2
2041063	<b>French - Bachelor Exam /FME</b> Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.	Z,ZK	2
2041064	<b>Spanish - Bachelor Exam / FME</b> Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.	Z,ZK	2
2041065	<b>Russian - Bachelor Exam / FME</b> Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.	Z,ZK	2
2046068	<b>English - Beginners</b> Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language). A1	Z	2
2046069	<b>English - Beginners</b> Mapped to the Common European Framework of Reference Level A1 Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language).	Z	2

2046070	English - Lower Intermediate	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)			
2046077	German - Beginners	Z	2
Mapped to the level Common European Framework of Reference A1 Basic vocabulary of everyday life in a written and spoken form. Understanding and use of basic expressions of general scientific terminology (professional language).			
2046078	German - Lower Intermediate Course	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046079	German - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a student meets either at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. reading and comprehension of simple texts. Improvement of professional language.			
2046080	German - Upper Intermediate Course	Z	2
Understanding standard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, briefly explain one's opinions and plans. Reading and understanding general and technical texts.			
2046081	German - Upper Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference: A2 - B1 Understanding standard speech about familiar topics, that a students comes across at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, explain one's opinions and plans. Reading and understanding general and technical texts.			
2046082	German - Advanced Course	Z	2
Comprehension of spoken language as well as lectures in German on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			
2046083	German - Advanced Course	Z	2
Mapped to the level of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken German as well as lectures given in German without great difficulties and active participation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehension of popular-scientific and scientific articles or texts from student's field of studies without difficulties. Grammar structures on advanced level.			
2046084	French - Beginners	Z	2
Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046085	French - Beginners' Course	Z	2
Mapped to the level of Common European Framework of Reference: A1 Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046086	French - Lower Intermediate Course	Z	2
Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046087	French - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference: A2 Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046088	French - Upper Intermediate	Z	2
Understanding standard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, briefly explain one's opinions and plans. Reading and understanding general and technical texts.			
2046089	French - Upper Intermediate	Z	2
Mapped to the level of Common European Framework of Reference: A2 - B1 Understanding standard speech about familiar topics, that a students comes across at work, at school, during free time, and talking about these topics. Ability to describe experiences and events, explain one's opinions and plans. Reading and understanding general and technical texts.			
2046090	French - Advanced	Z	2
Comprehension of spoken language as well as lectures in French on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			
2046091	French - Advanced	Z	2
Mapped to the level of Common European Framework of reference: B1 - B2 Comprehension of spoken language as well as lectures in French on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			

2046096	Spanish - Beginners	Z	2
Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046097	Spanish - Beginners	Z	2
Mapped to the Common European Framework of Reference Level A1. Aim: Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046098	Spanish - Lower Intermediate	Z	2
Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046099	Spanish - Lower Intermediate	Z	2
Mapped to the level of Common European Framework of Reference A2 Understanding clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement of professional language.			
2046117	Czech -Advanced	Z	2
Comprehension of spoken language as well as lectures in Czech on topics familiar to the student. Communication with native speakers, participation in discussions. Expressing opinions. Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical articles.			
2046118	Czech -Advanced	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	<b>Presentations in French language</b> Preparation for presenting technical topics in French, possibly in cooperation with specialized departments.	Z	2
2046164	<b>Presentations in Russian</b> Preparation for presenting technical topics in Russian, possibly in cooperation with specialized departments.	Z	2
2046165	<b>Presentations in Spanish</b> Preparation for presenting technical topics in Spanish, possibly in cooperation with specialized departments.	Z	2
2046166	<b>Presentations in Czech</b> Preparing students to give presentations in English on technical topics, with a possible co-operation with specialized departments.	Z	2
2131002	<b>Engineering Design II</b> Principles of ISO GPS (Geometrical Products Specification). Students will get critical knowledge about ISO system of limits and fits, tolerancing, surface texture, geometrical tolerance, dimensional loops, tolerancing of angles and cones, tolerancing of threads. Integral part of course is a project where students apply and practice their knowledge from lectures.	Z,ZK	4
2141204	<b>Introduction to Electrical Engineering for Technology</b> Elements of electrical circuits, analysis of electrical circuits as DC and AC. El. Power and Energy. Principle and typical parameters diodes, transistors, thyristors, operation amplifiers. Analogue and digital circuits. AC el. circuits. Electrical power and energy. Calculation, measurement, power factor. Transformer. Induction machines. Synchronous machines. DC-machines	Z,ZK	4
2144062	<b>Technical Indonesian - Course II.</b> Basic of Indonesian Language for Student Exchange Program to Indonesia	Z,ZK	3
2146060	<b>Indonesian Language Course for Exchange</b> Basic of Indonesian Language for Student Exchange Program to Indonesia	Z	2
2146061	<b>Technical Indonesian - Course I.</b> Second part of Indonesian Language for Student Exchange Program to Indonesia	Z	2
2182019	<b>Chemistry</b> General chemistry from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties of matter, thermodynamics, phase equilibrium, chemical reactions, reaction engineering), the remaining 1/3 is devoted to organic chemistry (hydrocarbons, polymers) and biochemistry. Laboratory practice is oriented upon the material properties measurement.	KZ	3
2321039	<b>Materials Science II.</b> Fundamentals of metallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and thermo-mechanical processing, technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.	Z,ZK	4
2321067	<b>Technical Application of Materials</b> P ed m t popisuje aplikovatelnost jednotlivých skupin inženýrských materiálů a jejich odpovídající vlastnosti. Rovněž se v ní uvádí aktuální vývojové trendy těchto skupin. The subject describes applicability of specific engineering material types and their characteristics. It deals with the current development trends in these materials as well.	Z,ZK	5
2321501	<b>Technical testing of materials</b> The course characterizes individual groups of new construction materials. In addition to the development and physical nature of these materials, the most commonly used types of recently developed materials, their basic characteristics and mechanical properties are listed. Their technological possibilities, design applicability and methods of their designations are also presented.	Z,ZK	4
2321503	<b>Technical testing of materials</b> Term and definition of properties. Verification of properties in a certified quality management system. Accredited test laboratory and test systems, test standard. Basic mechanical properties and testing the characteristics of metals, polymers, composites and ceramics. Testing of material for the limited state is the basic methods in accordance with the relevant standards. Test of resistance to brittle fracture, fatigue, creep. Evaluation of technological properties. Defectoscopic method for detecting defects in the material.	Z,ZK	5
2322029	<b>Materials Science I.</b> History and present state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deformation, recrystallization and fracture of materials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, iron-carbon phase diagram.	KZ	3
2322041	<b>Heat treatment</b> Theoretical fundamentals of heat treatment, basic processes of heat and chemical-heat treatment of ferrous and non-ferrous metals, excursion focused on the given topic	KZ	4
2322091	<b>Project</b> On the basis of the preliminary submission of a bachelor thesis the students, under supervision of their supervisors, prepare a review summarizing and evaluating the studied literature with particular emphasis on experimental technologies which can be applied in their bachelor theses. They can also mention a planned experiment or evaluate hitherto obtained knowledge or results.	KZ	2
2323993	<b>Bachelor Thesis</b>	Z	5
2331068	<b>Technology I.</b> Foundry properties of metals. Treatment. Pouring. Casting solidification. Moulding and core making. Thermal treatment. Plastic deformation. Division of forming processes. Semi-products, heating-up. Cutting. Cold and hot forming. Welds. Weldability. Weldment testing. Thermal cutting. Brazing. Surface treatments.	Z,ZK	5
2331071	<b>Automation of Production Processes</b> Automation of basic technological processes - casting, welding, forming and finishing. Facilities and equipment required to automate offices. Mechanization and automation in iron and steel foundries. Automation and robotics of die casting process, including other peripherals. Designing and programming of robotic welding centers. Designing and programming of robotic workstations for sheet metal forming. Design of automated forging cells. Design of automated finishing lines.	Z,ZK	5
2331505	<b>Welding Technology</b>	Z,ZK	4
2332091	<b>Project</b>	KZ	2
2333038	<b>Fundamentals of Technology I.</b> 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.	Z	3
2341001	<b>Metrology</b> Metrology, intergration into quality control, legal metrology, metrology system. Geometrical quantities metrology. Measurement uncertainty. Primary and secondary standarts. Measurement in 1, 2, end 3 coordinates. Laserinterferometres and their applications. Geometrical surface properties. Form - and position deviations. Surface structure - roughness, waviness. Measurement automatisaton.	Z,ZK	5
2341014	<b>Technology II.</b> mechanics of chip formation, cutting processes, finishing operations, non-traditional machining processes. Production rates calculation, machining economics. Automation of processes, programming of manufacture. Engineering metrology. Assembly techniques. Introduction to process planing.	Z,ZK	5

2342005	<b>Quality Control</b> Basic quality control terms, where is quality created, who is responsible for a quality. Basic statistical terms and distributions. Statistical methods: statistical process control, statistical sampling. Tools and methods for a quality assurance during product lifetime cycle. Standards 9 000 and 14 000, certification of quality control systems.	KZ	2
2342091	<b>Project</b> Work on specialized tasks.	KZ	2
2372041	<b>Computer Support for Study</b> The course introduces students into creating technical and professional documents on computers or Web and into realizing technical computations with the use of computers. Students gain practical skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating technical-based WWW page.	KZ	3
2383001	<b>Fundamentals of Law</b> 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	Z	2
2383009	<b>Communication and Dealing with People</b> 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.	Z	2

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

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