Study plan

Name of study plan: Jaderná chemie

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Nuclear Chemistry
Type of study: Bachelor full-time
Required credits: 0
Elective courses credits: 180
Sum of credits in the plan: 180
Note on the plan:

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 0
The role of the block: P

Code of the group: BSPJCH1
Name of the group: BS P_JCHB 1st year
Requirement credits in the group:
Requirement courses in the group: In this group you have to complete at least 15 courses
Credits in the group: 0
Note on the group: Vykonání zkoušky 15ANCH1 je podmíněno úspěšným absolvováním předmětů 15LABT.Vykonání zkoušky 15ANCH2 je podmíněno úspěšným absolvováním předmětů 15ANCH1 a 15ANP.Vstup do praktika je podmíněn úspěšným absolvováním předmětu 15LABT.

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
15ANCH1	*Michaela Fridrichová, Václav Tyrpekl, Jan Kotek* ***Václav Tyrpekl*** *Jan Kotek (Gar.)*	Z,ZK	5	3+2	Z	P
15ANCH2	**Inorganic Chemistry 2** *Michaela Fridrichová, Václav Tyrpekl, Jan Kotek, Petr Štěpnička* ***Václav Tyrpekl*** *Jan Kotek (Gar.)*	Z,ZK	5	3+2	L	P
15ANP	**Practical Training in Inorganic Chemistry** *Václav Tyrpekl, Vojtěch Kubíček* ***Václav Tyrpekl*** *Václav Tyrpekl (Gar.)*	Z	4	9 dní	L	P
02ELMA	**Electricity and Magnetism** *Iskender Yalcinkaya, Josef Schmidt, Jiří Hrivnák, Goce Chadzitaskos, Jan Vysoký* ***Jan Vysoký*** *Josef Schmidt (Gar.)*	Z,ZK	6	4+2	L	P
15LABT	**Practical Training in Laboratory Technique** *Michaela Fridrichová, Michaela Fridrichová* ***Michaela Fridrichová*** *Michaela Fridrichová (Gar.)*	Z	3	0+4	Z	P
01MATZ1	**Mathematics, Examination 1** *Radek Fučík* ***Radek Fučík*** *Radek Fučík (Gar.)*	ZK	2	-	Z	P
01MATZ2	**Mathematics, Examination 2** *Radek Fučík, Matěj Tušek* ***Matěj Tušek*** *Radek Fučík (Gar.)*	ZK	2	-	L	P
01MAT1	**Mathematics 1** *Radek Fučík* ***Radek Fučík*** *Radek Fučík (Gar.)*	Z	4	3P+3C	Z	P
01MAT2	**Mathematics 2** *Radek Fučík* ***Radek Fučík*** *Radek Fučík (Gar.)*	Z	4	3P+3C	L	P
02MECH	**Mechanics** *David Břeň* ***Antonín Hoskovec*** *David Břeň (Gar.)*	Z	4	4+2	Z	P
02MECHZ	**Mechanics - Examination** *Iskender Yalcinkaya, Goce Chadzitaskos, Stanislav Skoupý, Petr Novotný, David Břeň, Filip Petrásek, Antonín Hoskovec* ***Antonín Hoskovec*** *David Břeň (Gar.)*	ZK	2	-	Z	P
15OCH	**General Chemistry** *Petr Distler, Ondřej Holas* ***Petr Distler*** *Petr Distler (Gar.)*	Z,ZK	6	5+2	Z	P
15ORCA1	**Organic chemistry 1** *Michal Sakmár, Ján Kozempel, Stanislav Smrček, Martin Vlk* ***Stanislav Smrček*** *Ján Kozempel (Gar.)*	Z	2	2P+2C	L	P
00PT	**Preparatory Week** *Petr Ambrož, Milan Krbálek* ***Petr Ambrož*** *Petr Ambrož (Gar.)*	Z	2	týden	Z	P

15TOXA	**Toxicology** *Ján Kozempel, Martin Vlk* ***Martin Vlk*** *Ján Kozempel (Gar.)*	ZK	2	2P	L	P

Characteristics of the courses of this group of Study Plan: Code=BSPJCH1 Name=BS P_JCHB 1st year

15ANCH1		Z,ZK	5
15ANCH2	Inorganic Chemistry 2	Z,ZK	5
The first part of course is devoted to systematical chemistry of elements. The properties of representative elements, transition elements and chemistry of coordination compounds are characterised. Selected chapters in the second part of course deal with catalysis, organometallic compounds and chemistry of solid state. The role of metal ions in biological environment is discussed at the end of course.			
15ANP	Practical Training in Inorganic Chemistry	Z	4
Basic practical course dealing with synthesis and characterization of inorganic compounds. Students get practical training in syntheses of inorganic compounds by acid- base and oxidation-reduction reactions, complex formation reactions and reactions in melt.			
02ELMA	Electricity and Magnetism	Z,ZK	6
Electric charge, Coulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits, conductivity. Basics of the relativity theory. Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Electromagnetic waves, Maxwell equations.			
15LABT	Practical Training in Laboratory Technique	Z	3
This course covers basic laboratory training and is designed for students of "Chemistry in Science", "Teaching of Chemistry", and "Biology". The course puts the laboratory experience of the students gained at secondary school to an equal level and gets them ready for all following laboratory trainings. After absolving of the course, the students have the basic skills including handling the most frequently used laboratory equipments (pH-meter, UV-Vis spectrophotometer, vacuum rotary evaporator) and have the necessary information about safety rules as well as about writing laboratory diaries. The training is organized in blocks of four hours a week. The students work in groups of two according to a firm schedule so that each group absolve the complete set of (all) 10 exercises during semester. In the exercises, measurements of properties of unknown samples, basic synthetic and purification operations and basic methods of analyses are involved.			
01MATZ1	Mathematics, Examination 1	ZK	2
01MATZ2	Mathematics, Examination 2	ZK	2
01MAT1	Mathematics 1	Z	4
The course is devoted to the study of the basics of calculus of one variable. It includes an introduction to differential and integral calculus, with particular emphasis on applications in practical problems.			
01MAT2	Mathematics 2	Z	4
The course, which is the continuation of Mathematics 1, is devoted to the integration techniques, improper Riemann integral, introduction to parametric curves (especially in polar coordinates), the basics of sequences and infinite series, and finally to the Taylor and power series and their applications.			
02MECH	Mechanics	Z	4
Introduction to physics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle, solving equations of motion for one-dimensional motion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles, two-body problems, particle collisions. Mechanics of a rigid body, rotation.			
02MECHZ	Mechanics - Examination	ZK	2
The content of the subject is the examination according to the plan of studies.			
15OCH	General Chemistry	Z,ZK	6
General chemistry, classification of substances, concentrations, chemical reactions and equations, stoichiometric calculations, atoms and molecules, chemical bond, the states of matter, chemical thermodynamics, first law of thermodynamics, thermochemistry, second law of thermodynamics, entropy, Gibbs energy, phase and chemical equilibria, electrochemistry, pH, reaction kinetics, kinetic equation, Arrhenius' equation.			
15ORCA1	Organic chemistry 1	Z	2
Structure of organic compounds, properties of covalent bond, reactions on covalent bonds. Nomenclature of organic compounds (main chain, group, locants, prefixes and suffixes) . Spatial structures of organic compounds, double bond isomers, chirality, enantiomers and diastereomeric compounds. Configuration and conformation, relationships. Lewis structures, formal charges, acidity, hard and soft acids and bases. Resonance, aromaticity, classification of substituents, reactivity of polycyclic arenes. Intermediates: carbocations, carbanions, carbenes, radicals - electronic structure. Basic overview on alkanes and cycloalkanes, alkenes, arenes, halogenderivatives, organometallic compounds, alcohols and ethers, organic compounds of sulfur, nitrogen, phosphorus, silicon, other elements and carbonyl compounds chemistry.			
00PT	Preparatory Week	Z	2
15TOXA	Toxicology	ZK	2
Overview of basic toxicology, containing general and special toxicology, toxicological data, legislation and basic aspects of chemical compounds handling. In general toxicology aspects of toxicity, metabolism, biodistribution and elimination has been described, as well as toxicological effects, evaluation of toxicity, indexes, and biological tests. In special toxicology part selected group of organic compounds, inorganic compounds, natural compounds and warfare were described from toxicity behaviour. In legislation part REACH, international and national regulation is described.			

Code of the group: BSPJCH2
Name of the group: BS P_JCHB 2nd year
Requirement credits in the group:
Requirement courses in the group: In this group you have to complete at least 13 courses
Credits in the group: 0
Note on the group: Vykonání zkoušky 15ORCA2 je podmíněno splněním povinností z předmětu 15ORCA1.Vykonání zkoušky15ANALY2 je podmíněno splněním povinností z předmětů 15ANAL1, 15APLA.Zápis předmětu 15POCHA je podmíněn absolvováním předmětu 15ORCA2.

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**
15ANAL1	**Analytical Chemistry 1** *Vlastimil Vyskočil, Anna Kubíčková* ***Vlastimil Vyskočil*** *Vlastimil Vyskočil (Gar.)*	Z	5	3+2	L	P
15ANALY2	**Analytical Chemistry 2** *Vlastimil Vyskočil* ***Vlastimil Vyskočil*** *Vlastimil Vyskočil (Gar.)*	Z,ZK	5	3P+2C	L	P

15FCHN1	**Physical Chemistry 1** *Viliam Múčka, Jan Bárta* ***Jan Bárta*** *Viliam Múčka (Gar.)*	Z,ZK	5	3+2	Z	P
15FCHN2	**Physical Chemistry 2** *Barbora Drtinová* ***Barbora Drtinová*** *Václav Čuba (Gar.)*	Z,ZK	5	3+2	Z	P
15JACH1	**Nuclear Chemistry 1** *Václav Čuba, Merja Johanna Herzig, Xenie Lytvynenko, Jan John* ***Václav Čuba*** *Jan John (Gar.)*	Z,ZK	3	2+1	L	P
17JARE	**Nuclear Reactors** *Tomáš Bílý* ***Tomáš Bílý*** *Tomáš Bílý (Gar.)*	ZK	2	2	L	P
01MAT3	**Mathematics 3** *Miroslav Kolář, David Krejčiřík, Severin Pošta* ***David Krejčiřík*** *David Krejčiřík (Gar.)*	Z,ZK	4	2+2	Z	P
01MAT4	**Mathematics 4** *Matěj Tušek* ***Matěj Tušek*** *Matěj Tušek (Gar.)*	Z,ZK	4	2+2	L	P
15ORCA2	**Organic chemistry 2** *Michal Sakmár, Ján Kozempel, Stanislav Smrček, Martin Vlk* ***Stanislav Smrček*** *Ján Kozempel (Gar.)*	Z,ZK	6	2P+2C	Z	P
15APLA	**Laboratory Training in Analytical Chemistry** *Jakub Hraníček* ***Jakub Hraníček*** *Jakub Hraníček (Gar.)*	Z	4	4L	L	P
15POCHA	**Organic Chemistry Practical** *Miroslav Lorenc* ***Miroslav Lorenc*** *Miroslav Lorenc (Gar.)*	Z	4	4L	L	P
15POLE	**Theory of Electromagnetic Field and Waves** *Aleš Vetešník* ***Aleš Vetešník*** *Aleš Vetešník (Gar.)*	Z,ZK	4	4+1	L	P
15ZBCHA	**Fundamentals of Biochemistry** *Tomáš Ječmen, Radek Indra* ***Radek Indra*** *Tomáš Ječmen (Gar.)*	ZK	2	2P+0C	Z	P

Characteristics of the courses of this group of Study Plan: Code=BSPJCH2 Name=BS P_JCHB 2nd year

15ANAL1	Analytical Chemistry 1	Z	5

Introduction, methods of analytical chemistry, scheme of analytical procedures. Sampling and preparation of Hample. Precipitation reactions, solubility product, factores influencing solubility. Gravimetry. Statistical evaluation of results. Precipitation titrations, titration curve, endpoint indication. Complex-formation reactions, stability constant, factors influencing stability of complexes. Chelatometric titrations, titration curve, endpoint indication. Qualitative analysis of cations and anions, application of precipitation and complex-formation reactions for separation and identification of ions. Acid-base reactions, acids, basis, acidity function, salts, hydrolysis of salts, buffers, acid-base indicators. Acid-base titrations, titration curves, detrmination of strong and weak acids, bases and salts. Acid-base reactions in nonaqueous solvents.

15ANALY2	Analytical Chemistry 2	Z,ZK	5

Analytická chemie 2 navazuje na předmět Analytická chemie 1. Kurz je zaměřen na instrumentální metody analytické chemie a zpracování výsledků analýzy.

15FCHN1	Physical Chemistry 1	Z,ZK	5

The introductive part is devoted to the recapitulation of the thermodynamic systems and thermodynamic properties of ideal and real gases. Next chapters are devoted to the first, second and third law of thermodynamics and their applications. Last but not least, attention is devoted also to the thermodynamic, phase and chemical equilibriums as well as to the elementals of nonequilibrium thermodynamics.

15FCHN2	Physical Chemistry 2	Z,ZK	5

Lecture of Physical Chemistry 2 focuses on thermodynamics of solutions, particularly on electolytes. Basics of colloidal chemistry extend the theory of solvents in the end of the lecture.

15JACH1	Nuclear Chemistry 1	Z,ZK	3

Concept and history of nuclear chemistry and radiochemistry, nuclear entities, nuclear reactions, natural and artificial radioactivity. Kinetics of nuclear reactions, laws of radioactive decay. Energetics of nuclear reactions, mass and energy balance of nuclei and energy of alpha, beta decay, gamma deexcitation in nuclear reactions.

17JARE	Nuclear Reactors	ZK	2

Introduction. World power issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety systems, containment. Classification of reactors into IV generations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. Pressurized water reactors (PWR). Western-type PWR (Westinghouse, KWU, Framatom). VVER-type reactors , Temelín nuclear power plant. Boiling water reactors. Heavy water reactors, fast breeder reactors, high-temperature gas cooled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF and INPRO initiatives. Evaluation and selection of proposed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role of nuclear power in long-term outlook

01MAT3	Mathematics 3	Z,ZK	4

The subject summarises the most important notions and theorems related to the study of finite-dimensional vector spaces.

01MAT4	Mathematics 4	Z,ZK	4

Linear and non-linear differential equations of the first order. Linear differential equations of higher order with constant coefficients. Multivariable calculus and its applications.

15ORCA2	Organic chemistry 2	Z,ZK	6

Introduction to the second group of organic compounds, carboxylic acids and their derivatives, heterocyclic compounds, important natural compounds, industrial organic compounds and pharmaceuticals - industrial and natural. Introduction to the metods of structural analysis.

15APLA	Laboratory Training in Analytical Chemistry	Z	4

First part of laboratory exercises is oriented to qualitative analysis of cations and anions using wet chemistry procedures. Quantitative determination of analyte based upon various titration procedures follows. In the last part of exercises students become acquainted with basic instrumental methods of chemical analysis.

15POCHA	Organic Chemistry Practical	Z	4

The basic practices of organic chemistry have the task to teach students the basics of laboratory techniques and methodology of work in the organic laboratory. Synthetic tasks are chosen so that the students are acquainted with basic chemical operations, and to obtain information on the preparation and properties of organic compounds. Students thus have to supplement the theoretical knowledge from the lectures of organic chemistry.

15POLE	Theory of Electromagnetic Field and Waves	Z,ZK	4

The course comprises of three parts: the first part contains selected passages of the theory of the electromagnetic field, the second part is dedicated to the wave motion and the optics, and the third part is the introduction to the atomic physics.

15ZBCHA	Fundamentals of Biochemistry	ZK	2

The course covers the whole field of a general biochemistry as well as basic biochemical pathways. The special attention is paid to make students understand interconnection of cell processes essential for the life.

Code of the group: BSPJCH3
Name of the group: BS P_JCHB 3rd year

Requirement credits in the group:
Requirement courses in the group: In this group you have to complete at least 15 courses
Credits in the group: 0
Note on the group: Zápis předmětu 15JACH2 je podmíněn absolvováním předmětu 15JACH1.Zápis předmětu 15RATEC je podmíněn absolvováním předmětu 15JACH1.Zápis předmětu 15PINS je podmíněn současným zápisem nebo absolvováním předmětu 15INSN1.Zápis předmětu 15DEIZ je podmíněn současným zápisem nebo absolvování předmětu 15DIZ.

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
15BPCH1	**Bachelor Thesis 1** *Petr Distler, Martin Vlk, Jan Bárta, Barbora Drtinová, Václav Čuba, Josef Filgas, Dušan Vopálka, Jan Král, Tereza Janská, ... **Václav Čuba** Václav Čuba (Gar.)*	Z	5	0+5	Z	P
15BPCH2	**Bachelor Thesis 2** *Petr Distler, Martin Vlk, Jan Bárta, Barbora Drtinová, Václav Čuba, Josef Filgas, Dušan Vopálka, Jan Král, Tereza Janská, ... **Lenka Prouzová Procházková** Václav Čuba (Gar.)*	Z	10	0+10	L	P
17BPROV	**Safe operation of nuclear facilities** *Lenka Frýbortová, Ľubomír Sklenka Lenka Frýbortová (Gar.)*	KZ	2	2P		P
15DIZ	**Detection of Ionizing Radiation** *Jan John, Martin Daňo **Jan John** Jan John (Gar.)*	ZK	2	2+0	L	P
15EXK1	**Excursion 1** *Barbora Drtinová, Alena Zavadilová **Alena Zavadilová** Barbora Drtinová (Gar.)*	Z	1	5 dnů	L	P
15INSN1	**Instrumental Methods 1** *Martin Vlk, Alena Zavadilová **Martin Vlk***	ZK	3	3+0	L	P
15JACH2	**Nuclear Chemistry 2** *Václav Čuba, Merja Johanna Herzig, Xenie Lytvynenko, Jan John **Václav Čuba** Václav Čuba (Gar.)*	Z,ZK	4	2+2	Z	P
15MZD	**Measurement and Data Handling** *Aleš Vetešník, Dušan Vopálka, Lucie Baborová **Aleš Vetešník** Aleš Vetešník (Gar.)*	Z,ZK	3	2+1	Z	P
12NMEA	**Numerical Methods for Scientists and Engineers** *Alena Zavadilová, Pavel Váchal **Pavel Váchal** Pavel Váchal (Gar.)*	KZ	3	2+2	L	P
15DEIZ	**Practical Exercises in Detection of Ionizing Radiation** *Pavel Bartl, Mojmír Němec, Miroslava Semelová **Miroslava Semelová** Mojmír Němec (Gar.)*	KZ	3	0+3	L	P
15PRFCH	**Practical Exercises in Physical Chemistry** *Kateřina Ušelová **Kateřina Ušelová***	Z	5	0P+4C	Z	P
15PINS	**Laboratory Practice in Instrumental Methods** *Martin Vlk, Alena Zavadilová **Martin Vlk** Alena Zavadilová (Gar.)*	KZ	2	0+3	L	P
15RATEC	**Practical Exercises in Radiochemical Techniques** *Kateřina Čubová, Pavel Bartl, Mojmír Němec, Miroslava Semelová **Miroslava Semelová** Mojmír Němec (Gar.)*	KZ	2	0+2	Z	P
15SBP	**Bachelor Thesis Seminar** *Barbora Drtinová, Alena Zavadilová **Alena Zavadilová** Alena Zavadilová (Gar.)*	Z	1	0+1	Z	P
16ZDOZ1	**Fundamentals of Radiation Dosimetry 1** *Tomáš Trojek **Tomáš Trojek** Tomáš Trojek (Gar.)*	Z,ZK	4	2+2		P

Characteristics of the courses of this group of Study Plan: Code=BSPJCH3 Name=BS P_JCHB 3rd year

15BPCH1	Bachelor Thesis 1	Z	5
Background research and results of research			
15BPCH2	Bachelor Thesis 2	Z	10
Background research and results of research			
17BPROV	Safe operation of nuclear facilities	KZ	2
The aim of the subject is to familiarize students with basic principles of nuclear safety.			
15DIZ	Detection of Ionizing Radiation	ZK	2
The first part of the course deals with the definitions, properties, and application of the detectors of ionising radiation (IR). In the second part, a detailed overview of the gas detectors, scintillation detectors, detectors for high energy IR, semiconductor detectors, and integrating solid state detectors is given. The last part of the course reviews the principles of the statistical treatment of data, and limits of detection.			
15EXK1	Excursion 1	Z	1
The excursion aims at mediating the students the acquaintance with various radiochemical and radiation methods used in practice.			
15INSN1	Instrumental Methods 1	ZK	3
Overview of selected modern instrumental methods of research and analysis, theoretical fundamentals, instrumental technique, utilization and application.			
15JACH2	Nuclear Chemistry 2	Z,ZK	4
The following topics are discussed in detail in the course: Nuclear reactions yield, reaction cross section, excitation function. Fission reaction, spontaneous fission. Chemistry of atoms formed in a nuclear reaction, local temperature, atomic recoil and recoil energy, recoil of atom bound in a molecule, hot atom chemistry, retention, Szilard Chalmers reaction.			
15MZD	Measurement and Data Handling	Z,ZK	3
Characteristics of statistical distribution functions (one-dimensional data), hypotesis testing, analysis of variance (ANOVA), correlation analysis, regression, statistical analysis of multidimensional data; chemometrics; testing of analytical methods; numerical methods and computers in data processing			

12NMEA	Numerical Methods for Scientists and Engineers	KZ	3
There are explained the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Methods for solution of tasks very important for physicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computational environment MATLAB is used as a demonstration tool. The seminars are held in computer laboratory and PASCAL is used as a principle programming language and MATLAB is also used.			
15DEIZ	Practical Exercises in Detection of Ionizing Radiation	KZ	3
This laboratory exercise is a practical introduction to fundamental principles of detection of ionizing radiation (IR), interaction of IR with matter, and functionality and settings of particular types of detectors and detection systems.			
15PRFCH	Practical Exercises in Physical Chemistry	Z	5
Principles of fundamental physico-chemical phenomena are demonstrated in ten exercises. Basic thermodynamic, kinetic and electrochemical characteristics, as equilibrium constants, rate constant, buffer capacity etc., are determinated. Required data are obtained by means of chemical analysis (e.g. titration, extraction) and by common instrumental methods (UV-VIS spectrophotometry, polarography, potentiometry, conductometry, electrolysis, viscosimetry). Emphasis is given on appropriate interpretation of measured data and their mathematical and statistical evaluation.			
15PINS	Laboratory Practice in Instrumental Methods	KZ	2
Practical training of students in the use of selected modern instrumental methods and techniques for determination of required parameters			
15RATEC	Practical Exercises in Radiochemical Techniques	KZ	2
The exercise is oriented on the training of students in laboratory praxis and work with open radioactive sources through basic lab operations such as pipetting, extraction and chromatography techniques. Training is also focused on decontamination of surfaces and clean-up of the accident, work behind shielding and in a glove box.			
15SBP	Bachelor Thesis Seminar	Z	1
The aim is to prepare students to write and defend bachelor thesis, including work with information sources and to acquire basic presentation skills.			
16ZDOZ1	Fundamentals of Radiation Dosimetry 1	Z,ZK	4
History, development, and objectives of dosimetry. Quantities and units used for description of sources, fields, interactions of ionizing radiation, ionizations, energy transfer and absorption. Fundamentals of the effects of ionizing radiation.			

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 0
The role of the block: PV

Code of the group: BSSPOLVEDY
Name of the group: BS - Social Sciences
Requirement credits in the group:
Requirement courses in the group: In this group you have to complete at least 1 course
Credits in the group: 0
Note on the group: Only one of these courses is obligatory.

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
00EKOT	**Economy in Technology** ***Jana Kovářová***	Z	1	2+0		PV
00ETV	**Ethics of Science and Technology** *Jakub Hajíček* ***Jana Kovářová***	Z	1	0+2	L	PV
00RET	**Rhetoric** *Jana Kovářová* ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	1	0+2		PV
00UPRA	**Introduction to Law** *Martin Čech* ***Jana Kovářová***	Z	1	0+2		PV
00UPSY	**Introduction to Psychology** *Jakub Hajíček* ***Jana Kovářová***	Z	1	0+2		PV

Characteristics of the courses of this group of Study Plan: Code=BSSPOLVEDY Name=BS - Social Sciences

00EKOT	Economy in Technology	Z	1
The course introduces the basics of micro- and macroeconomics.			
00ETV	Ethics of Science and Technology	Z	1
00RET	Rhetoric	Z	1
The course is focused on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the composition of public speech as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of the course.			
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	Z	1

Code of the group: BSPJAZYKYZK
Name of the group: BS P languages
Requirement credits in the group:
Requirement courses in the group: In this group you have to complete at least 2 courses
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
04XAMZK	**English for Intermediate Students Examination** *Jana Kovářová, Slavěna Brownová* ***Jana Kovářová***	ZK	4		Z	PV
04XAPZK	**English for Advanced Students Examination** *Slavěna Brownová, Darren Copeland* ***Jana Kovářová***	ZK	4		Z	PV
04XCESZZK	**Czech for Foreigners Beginners - Examination** *Slavěna Brownová* ***Jana Kovářová*** *Jana Kovářová (Gar.)*	ZK	4		Z	PV
04XCESMZK	**Czech for Intermediate Students Examination** *Jana Kovářová* ***Jana Kovářová*** *Jana Kovářová (Gar.)*	ZK	4		Z	PV
04XCESPZK	**Czech for Foreign Students - Advanced Examination** *Jana Kovářová* ***Jana Kovářová*** *Jana Kovářová (Gar.)*	ZK	4		Z	PV
04XFMZK	**French for Intermediate Students Examination** *Věra Šlechtová* ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	ZK	4		Z	PV
04XFPZK	**French for Advanced Students Examination** *Věra Šlechtová* ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	ZK	4		Z	PV
04XFZZK	**French for Beginners Examination** *Věra Šlechtová* ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	ZK	3		L	PV
04XNMZK	**German for Intermediate Students Examination** *Miloslava Čechová* ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	ZK	4		Z	PV
04XNPZK	**German for Advanced Students Examination** *Miloslava Čechová* ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	ZK	4		Z	PV
04XRMZK	**Russian for Intermediate Students Examination** *Zhanna Isaeva* ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	ZK	4		Z	PV
04XRPZK	**Russian for Advanced Students Examination** *Zhanna Isaeva* ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	ZK	4		Z	PV
04XRZZK	**Russian for Beginners Examination** *Zhanna Isaeva* ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	ZK	3		L	PV
04XSMZK	**Spanish for Intermediate Students Examination** *Beatriz Vadillo Gonzalo* ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	ZK	4		Z	PV
04XSPZK	**Spanish for Advanced Students Examination** *Beatriz Vadillo Gonzalo* ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	ZK	4		Z	PV
04XSZZK	**Spanish for Beginners Examination** *Beatriz Vadillo Gonzalo* ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	ZK	3		L	PV

Characteristics of the courses of this group of Study Plan: Code=BSPJAZYKYZK Name=BS P languages

04XAMZK	English for Intermediate Students Examination	ZK	4

The course content is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts - written (100 min) and oral (20-30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English courses.

04XAPZK	English for Advanced Students Examination	ZK	4

The course content is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to apply their knowledge obtained in the three AP courses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from the student´s field of study.

04XCESZZK	Czech for Foreigners Beginners - Examination	ZK	4

The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04XCESZ1,2,3 courses and can only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.

04XCESMZK	Czech for Intermediate Students Examination	ZK	4

The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESM1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.

04XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4

The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.

04XFMZK	French for Intermediate Students Examination	ZK	4

The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination consists of a written and oral part and is organized according to Examination Instructions, a document available on the web.

04XFPZK	French for Advanced Students Examination	ZK	4

The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized according to Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading.

04XFZZK	French for Beginners Examination	ZK	3

The content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is ruled by the document Instruction for examination. Its content covers the levels FZ1 - FZ5.

04XNMZK	German for Intermediate Students Examination	ZK	4

The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. More detailed information is to be obtained from the teacher.

04XNPZK	German for Advanced Students Examination	ZK	4

The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed information is to be obtained from the teacher.

04XRMZK	Russian for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RM1 - RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher.			
04XRPZK	Russian for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RP1 - RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions by the teacher.			
04XRZZK	Russian for Beginners Examination	ZK	3
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RZ1 - RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions by the teacher.			
04XSMZK	Spanish for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course SM3.Oral examination follows the written part.			
04XSPZK	Spanish for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is having passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student.			
04XSZZK	Spanish for Beginners Examination	ZK	3
The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination only if he/she has passed the written examination test.			

Name of the block: Elective courses
Minimal number of credits of the block: 0
The role of the block: V

Code of the group: BSPJCHV
Name of the group: BS P_JCHB Optional courses
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
15CHEM	**Analytical Calculations and Chemometry Principals** *Jiří Zima* ***Jiří Zima*** *Jiří Zima (Gar.)*	ZK	2	2+0	Z	v
02DEF1	**History of Physics 1** *Igor Jex Igor Jex (Gar.)*	Z	2	2+0	Z	v
02DEF2	**History of Physics 2** *Igor Jex Igor Jex (Gar.)*	Z	2	2+0	L	v
16EPAM	**Exact Methods in Research of Historic Monuments** *Ladislav Musílek* ***Ladislav Musílek*** *Ladislav Musílek (Gar.)*	ZK	2	2+0	Z	v
02PRAK	**Experimental Laboratory** *Libor Škoda Libor Škoda (Gar.)*	KZ	4	0+4	L	v
04AKS	**English Conversation** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	1	0+2	L	v
02KF	**Quantum Physics** *Filip Petrásek* ***Petr Jizba*** *Petr Jizba (Gar.)*	Z,ZK	3	2P+1C	Z	v
00MAM1	**Essentials of High School Course 1** *David Břeň*	Z	1	0+1		v
00MAM2	**Essentials of High School Math Course 2** *Lukáš Heriban* ***Severin Pošta*** *Lukáš Heriban (Gar.)*	Z	1	0+1		v
01PRSTB	**Probability and Statistics B** *Tomáš Hobza* ***Tomáš Hobza*** *Tomáš Hobza (Gar.)*	KZ	4	3+1	Z	v
TV-1	**Physical Education**	Z	1		Z	v
TV-2	**Physical Education**	Z	1		L	v
TV-3	**Physical education**	Z	1	0+2	Z	v
TV-4	**Physical education**	Z	1	0+2	L	v
14TED	**Creating Electronic Documents** *Aleš Materna, Jiří Martinčík* ***Aleš Materna*** *Aleš Materna (Gar.)*	Z	2	26C		v
02UFEC	**Introduction to Elementary Particle Physics** *Marek Matas, Jaroslav Bielčík* ***Jaroslav Bielčík*** *Jaroslav Bielčík (Gar.)*	Z	2	2+0	Z	v
18ZALG	**Basics of Algorithmization** *Jan Tomsa, Petr Pauš, Vladimír Jarý, František Voldřich, Miroslav Virius, František Gašpar, Zuzana Petříčková* ***Vladimír Jarý*** *Miroslav Virius (Gar.)*	Z,ZK	4	2+2	L	v
16ZBAF1	**Fundamentals of Human Biology, Anatomy and Physiology 1** *Alena Doubková, Šimon Vaculín, Zdeňka Polívková, Josef Stingl* ***Alena Doubková*** *Alena Doubková (Gar.)*	Z,ZK	4	2+2	Z	v

16ZBAF2	**Fundamentals of Human Biology, Anatomy and Physiology 2** *Alena Doubková, Šimon Vaculín, Josef Stingl* ***Alena Doubková*** *Alena Doubková (Gar.)*	Z,ZK	4	2+2	L	v
02ZJFY	**Fundamentals of Nuclear Physics** *Vladimír Wagner Vladimír Wagner (Gar.)*	Z,ZK	5	3P+2C	Z	v
18ZPRO	**Basics of Programming** *Jan Tomsa, Petr Pauš, Vladimír Jarý, František Voldřich, Miroslav Virius, Zuzana Petříčková, Nichita Vatamaniuc, Jan Vondruška, Maksym Dreval, ...* ***Miroslav Virius*** *Miroslav Virius (Gar.)*	Z	4	4C	Z	v

Characteristics of the courses of this group of Study Plan: Code=BSPJCHV Name=BS P_JCHB Optional courses

15CHEM	Analytical Calculations and Chemometry Principals	ZK	2
Lecture deals with basic principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, basic data distributions, one- and two-tailed significance testing, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, seminar part consists of equation solving, titration stoichiometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. pH calculations, calculations in potentiometry, coulometry, spectrophotometry and separation methods, solving of complex forming equilibria.			
02DEF1	History of Physics 1	Z	2
Physics and its place in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philosophers, Aristotle. Physics in Helenistic period, Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, Huygens. The birth of physics as experimental science. Newton and his work.			
02DEF2	History of Physics 2	Z	2
Development of classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. Electricity and magnetism - electrostatics, galvanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann. The birth of modern quantum and relativistic physics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear energy, Elementary particles, standard model. The concept of Nature and Universe of today.			
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2
Aims and methods of historic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further radiation methods, dendrochronology, archaeomagnetism), analytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence analysis and other methods), photogrammetry.			
02PRAK	Experimental Laboratory	KZ	4
Lecture is intended primarily for students who study branch Nuclear Chemistry engineering, or practically oriented bachelor's specializations of branch Nuclear engineering. But it can be also visited by students interested in the other specializations. During Experimental laboratory, students learn how to prepare for experiments (including work with the literature), the implementation of the measurement (acquire of different experimental procedures and routines), will teach writing the records of measurement, processing and evaluation of results. At the same time practically extend the knowledge gained in lectures on physics.			
04AKS	English Conversation	Z	1
The course will develop the student´s communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication. The student will develop their vocabulary for various communication situations and will master their communication strategy. They will also practise their listening skills in order to better follow and participate in discussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more confident speaker.			
02KF	Quantum Physics	Z,ZK	3
State description, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heisenberg uncertainty principle, quantization of angular momentum, solution of simple systems, hydrogen atom.			
00MAM1	Essentials of High School Course 1	Z	1
Students are introduced to mathematical concepts and methods used in the introductory physics course.			
00MAM2	Essentials of High School Math Course 2	Z	1
Review of basics of high school mathematics.			
01PRSTB	Probability and Statistics B	KZ	4
It is a basic course of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and continuing till the Kolmogorov definition. The notions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit theorems are stated and proved. On the basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explained.			
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1
TV-3	Physical education	Z	1
TV-4	Physical education	Z	1
14TED	Creating Electronic Documents	Z	2
Basic skills for creating and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentations and entire documents in an office suite.			
02UFEC	Introduction to Elementary Particle Physics	Z	2
The course provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject are presented.			
18ZALG	Basics of Algorithmization	Z,ZK	4
This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the algorithm complexity.			
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1	Z,ZK	4
Organization of living systems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecular genetics. Cell cycle, mitosis, their regulation. General human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system and its physiology. Respiratory system and physiology of respiration. Excretory and genital tract.			
16ZBAF2	Fundamentals of Human Biology, Anatomy and Physiology 2	Z,ZK	4
Heart and physiology of cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, blood clotting. Overview of nerves. CNS. Visual system and physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, endocrine glands.			
02ZJFY	Fundamentals of Nuclear Physics	Z,ZK	5
This scientific field presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic domain, where much of our classical intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.			

18ZPRO	Basics of Programming	Z	4

This course is intended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in programming and with the Python programming language.

Code of the group: BSPJAZYKYZAP
Name of the group: BS P jazyky zap
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
04XAM1	**English for Intermediate Students M1** ***Jana Kovářová***	Z	2	0+2	Z	v
04XAM2	**English for Intermediate Students M2** ***Jana Kovářová***	Z	2	0+2	L	v
04XAM3	**English for Intermediate Students M3** ***Jana Kovářová***	Z	2	0+2	Z	v
04XAP1	**English for Advanced Students P1** ***Jana Kovářová***	Z	2	0+2	Z	v
04XAP2	**English for Advanced Students P2** ***Jana Kovářová***	Z	2	0+2	L	v
04XAP3	**English for Advanced Students P3** ***Jana Kovářová***	Z	2	0+2	Z	v
04XCESZ1	**Czech for Foreigners - Beginners 1** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	Z	v
04XCESZ2	**Czech for Foreigners - Beginners 2** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	L	v
04XCESZ3	**Czech for Foreigners - Beginners 3** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	2S	Z	v
04XCESM1	**Czech for Foreigners - Intermediate 1** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	Z	v
04XCESM2	**Czech for Foreigners - Intermediate 2** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	L	v
04XCESM3	**Czech for Foreigners - Intermediate 3** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	Z	v
04XCESP1	**Czech for Foreign Students - Advanced 1** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	Z	v
04XCESP2	**Czech for Foreigners - Advanced 2** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	L	v
04XCESP3	**Czech for Foreigners - Advanced 3** ***Jana Kovářová*** *Jana Kovářová (Gar.)*	Z	2	0+2	Z	v
04XFM1	**French for Intermediate Students M1** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+2	Z	v
04XFM2	**French for Intermediate Students M2** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+2	L	v
04XFM3	**French for Intermediate Students M3** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+2	Z	v
04XFP1	**French for Advanced Students P1** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+2	Z	v
04XFP2	**French for Advanced Students P2** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+2	L	v
04XFP3	**French for Advanded Students P3** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+2	Z	v
04XFZ1	**French for Beginners Z1** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+4	L	v
04XFZ2	**French for Beginners Z2** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+4	Z	v
04XFZ3	**French for Beginners Z3** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+4	L	v
04XFZ4	**French for Beginners Z4** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+4	Z	v
04XFZ5	**French for Beginners Z5** ***Věra Šlechtová*** *Věra Šlechtová (Gar.)*	Z	2	0+4	L	v
04XNM2	**German for Intermediate Students M2** ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	Z	2	0+2	L	v
04XNM1	**German for Intermediate Students M1** ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	Z	2	0+2	Z	v
04XNM3	**German for Intermediate Students M3** ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	Z	2	0+2	Z	v

04XNP1	**German for Advanced Students P1** ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	Z	2	0+2	Z	v
04XNP2	**German for Advanced Students P2** ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	Z	2	0+2	L	v
04XNP3	**German for Advanced Students P3** ***Miloslava Čechová*** *Miloslava Čechová (Gar.)*	Z	2	0+2	Z	v
04XRM1	**Russian for Intermediate Students M1** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+2	Z	v
04XRM2	**Russian for Intermediate Students M2** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+2	L	v
04XRM3	**Russian for Intermediate Students M3** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+2	Z	v
04XRP1	**Russian for Advanced Students P1** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+2	Z	v
04XRP2	**Russian for Advanced Students P2** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+2	L	v
04XRP3	**Russian for Advanced Students P3** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+2	Z	v
04XRZ1	**Russian for Beginners Z1** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+4	L	v
04XRZ2	**Russian for Beginners Z2** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+4	Z	v
04XRZ3	**Russian for Beginners Z3** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+4	L	v
04XRZ4	**Russian for Beginners Z4** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+4	Z	v
04XRZ5	**Russian for Beginners Z5** ***Zhanna Isaeva*** *Zhanna Isaeva (Gar.)*	Z	2	0+4	L	v
04XSM1	**Spanish for Intermediate Students M1** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+2	Z	v
04XSM2	**Spanish for Intermediate Students M3** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+2	L	v
04XSM3	**Spanish for Intermediate Students M3** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+2	Z	v
04XSP1	**Spanish for Advanced Students P1** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+2	Z	v
04XSP2	**Spanish for Advanced Students P2** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+2	L	v
04XSP3	**Spanish for Advanced Students P3** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+2	Z	v
04XSZ1	**Spanish for Beginners Z1** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+4	L	v
04XSZ2	**Spanish for Beginners Students Z2** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+4	Z	v
04XSZ3	**Spanish for Beginners Z3** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+4	L	v
04XSZ4	**Spanish for Beginners Z4** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+4	Z	v
04XSZ5	**Spanish for Beginners Z5** ***Beatriz Vadillo Gonzalo*** *Beatriz Vadillo Gonzalo (Gar.)*	Z	2	0+4	L	v

Characteristics of the courses of this group of Study Plan: Code=BSPJAZYKYZAP Name=BS P jazyky zap

04XAM1	English for Intermediate Students M1	Z	2

The course is designed for students who have successfully completed the full secondary school English language course at least at the A2 level of the Common European Framework of Reference for Languages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of professional oral and written communication situations. Thus it covers topics related to the student´s life and needs as well as topics of subtechnical interest. Attention is also paid to extending the knowledge of grammar issues used in EAP.

04XAM2	English for Intermediate Students M2	Z	2

The AM2 course expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more on specific grammar, functions, and lexical items typical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided writing. If necessary, grammar revision is included.

04XAM3	English for Intermediate Students M3	Z	2

The course develops the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnical vocabulary and independent understanding of professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication and their appropriate Czech equivalents. The course also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation on a chosen topic related to the student´s field.

04XAP1	English for Advanced Students P1	Z	2

The course is designed for students who have successfully completed the full secondary school English language course (at least the B1 level of the Common European Framework of Reference for Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamentals of vocabulary, functions, grammar, and style typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, graph descriptions, etc). It also covers professional oral and written communication on topics related to the undergraduate´s life and needs. It develops skills for free professional writing (writing a CV, letter of application, polite request). If necessary, revision of selected grammar topics is included.

04XAP2	English for Advanced Students P2	Z	2
The AP2 course is based on AP1, thus extending the student´s skills for working with subtechnical texts, and even with professional texts of chosen branches of science. According to the students´ needs it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorical functions (e.g., various types of descriptions, and, if possible, a case study). Increasing emphasis is placed on the undergraduate´s independent work with and reading of linguistically more demanding materials. The course extends the student´s subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writing including the sentence and paragraph structure, linking, cohesion and coherence in texts.			
04XAP3	English for Advanced Students P3	Z	2
The AP3 course is based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It includes training oral and written communication skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing an abstract) and, if possible, also preparing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal language both in oral and written communication.			
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
The course is designed for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and grammar features) and they will acquire basic language and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication in the most common everyday situations. The course covers roughly lessons 1-3 of Čeština Express (Czech Express) by L. Holá and P. Bořilová.			
04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and conjugation system and practise basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bořilová.			
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on building up basic vocabulary, fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce simple texts and they practise frequent types of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons 5-7 in Čeština expres 1.			
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2
The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the student´s vocabulary for various social situations.			
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and reading skills and trains the student in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.			
04XCESM3	Czech for Foreigners - Intermediate 3	Z	2
The last course revises morphological topics covered earlier and extends the student´s knowledge of more difficult language phenomena. It is especially focused on stylistics and lexicology and on developing the student´s writing skills.			
04XCESP1	Czech for Foreign Students - Advanced 1	Z	2
The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common European Framework of Reference. It is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of science. Students are taught the basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies and Student Life. Written practice includes communication with teachers and faculty administrators.			
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extends the student´s knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and specialist texts placing greater emphasis on individual work.			
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
The course develops the student´s knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, and, finally, presentation of the student´s project. Writing skills necessary for professional communication are trained.			
04XFM1	French for Intermediate Students M1	Z	2
French - intermediate FM The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to transmit general and technical information and to solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, systemizes and expands language skills gained in previous study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work based on these texts.			
04XFM2	French for Intermediate Students M2	Z	2
Course FM2 builds on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science texts, features typical for technical and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science and technology, French scientists, artists and architects. Description of an object, device, shapes, dimensions, material.			
04XFM3	French for Intermediate Students M3	Z	2
The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and infinitive clauses, participle structures, compound tenses). Text summary. -Students prepare a written paper which will be delivered in form of an oral presentation in-class. The paper is linked to the field of students´ future specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work compiled from French articles and one´s own knowledge/experience. -Longer monologues on topics /situations set for the examination are prepared. Text structure, cohesion and coherence.			
04XFP1	French for Advanced Students P1	Z	2
FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general and technical information and to solve problems. FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repeated and expanded: subjonctif, passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics of specialization: mathematics, internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.			
04XFP2	French for Advanced Students P2	Z	2
With the link to P1 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on given topics. Features typical of technical and scientific communication are stressed (passive voice, nominalization, word formation).			
04XFP3	French for Advanded Students P3	Z	2
The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering environment. Special skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covers a technical /applied science topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.			

04XFZ1	French for Beginners Z1	Z	2
French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life , in socializing and in professional life. The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at elementary level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners (Francouzština pro začátečky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4 : introductions, personal information, asking and giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grammar.			
04XFZ2	French for Beginners Z2	Z	2
The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook: Pravda - Pravdová : French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagreement, apology, thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Specific topics covered: How does the machine work? A few expressions concerning the study. Name of University and Faculty.			
04XFZ3	French for Beginners Z3	Z	2
The course builts upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravdová: French for Beginners. Topics, functions and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for information and loud as part of pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.			
04XFZ4	French for Beginners Z4	Z	2
The course builds up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The contents is roughly covered with lessons 19 - 23 of the textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lecture notes French for Engineering Students of FJFI. The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopping, weather, university in our country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.			
04XFZ5	French for Beginners Z5	Z	2
All four skills acquired in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They present it orally in the class. The general contents is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. Topics: on physics from lecture notes, success of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate clauses, typical conjunctions, subjunctive clauses, gerund, passive.			
04XNM2	German for Intermediate Students M2	Z	2
The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses).			
04XNM1	German for Intermediate Students M1	Z	2
The objective of the course is to level off the students´ skills in the German language. The course focuses on revision of more difficult phenomena and structures (e.g. the passive) and word formation processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Republic and Germany, current environmental issues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists, and the fundamentals of IT terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.			
04XNM3	German for Intermediate Students M3	Z	2
The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses).			
04XNP1	German for Advanced Students P1	Z	2
This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the beginning of the course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It revises and develops more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical everyday communication, i.e., telephoning.			
04XNP2	German for Advanced Students P2	Z	2
The course develops the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending their general and subtechnical vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and practising formal communication, both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).			
04XNP3	German for Advanced Students P3	Z	2
The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variety of less common situations (traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocabulary range in fields such as nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By means of a presentation, students are trained to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The course also includes translation practice to and from German.			
04XRM1	Russian for Intermediate Students M1	Z	2
The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (both printed and handwritten), basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking the way and giving directions), they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement level of the RZ2 course. The contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.			
04XRM2	Russian for Intermediate Students M2	Z	2
The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.			
04XRM3	Russian for Intermediate Students M3	Z	2
The course develops the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, however, for half of the time allotted in the timetable.			
04XRP1	Russian for Advanced Students P1	Z	2
The entrance requirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, practicing more difficult grammar structures, understanding the fundamentals of technical language and training writing skills.			
04XRP2	Russian for Advanced Students P2	Z	2
The course is based on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, verb aspects, specific syntactic structures). Stress is put on independent oral and written communication.			

04XRP3	Russian for Advanced Students P3	Z	2
The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing, translation). The RP1 - RP3 courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The courses develop and expand these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students´ specialization, oral and written interpretation). Students develop their subtechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accurately and with confidence on technical topics.			
04XRZ1	Russian for Beginners Z1	Z	2
The course represents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian. Thus it begins with mastering the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking). Students will be able to read a short text with marked stress, understand its contents and summarize it.			
04XRZ2	Russian for Beginners Z2	Z	2
The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtechnical texts. Students will be able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also develop their vocabulary and master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.			
04XRZ3	Russian for Beginners Z3	Z	2
The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training various forms of reading skills and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be able to respond so as to be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.			
04XRZ4	Russian for Beginners Z4	Z	2
The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a certain percentage of unfamiliar words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs, differences in verb patterns from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), and practice oral and written communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g., Siberia), learn how to fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals.			
04XRZ5	Russian for Beginners Z5	Z	2
The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding, extracting and summarizing information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication skills are trained on everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication (verbal adjectives, participles, passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite request, etc.)			
04XSM1	Spanish for Intermediate Students M1	Z	2
The course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester course develops standard vocabulary and pays attention to further grammar topics (e.g., perífrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts or listening to them.			
04XSM2	Spanish for Intermediate Students M3	Z	2
The course develops the students´ knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific purposes in order to be able to work with specialized texts on the Internet.			
04XSM3	Spanish for Intermediate Students M3	Z	2
The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic style. They will be competent enough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short articles and summaries. The final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.			
04XSP1	Spanish for Advanced Students P1	Z	2
Course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication. Course prerequisites: level B2 of CEFR.			
04XSP2	Spanish for Advanced Students P2	Z	2
Course SP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax and focuses on independent written communication.			
04XSP3	Spanish for Advanced Students P3	Z	2
Course SP3 is the final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focused on written communication based on what students will need in their career.			
04XSZ1	Spanish for Beginners Z1	Z	2
Course SZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental grammar structures and will be able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish and will develop it.			
04XSZ2	Spanish for Beginners Students Z2	Z	2
Course SZ2 is based on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis will be chosen so as to enable them to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others such as the Czech Republic. Realia of Spanish-speaking countries are also included.			
04XSZ3	Spanish for Beginners Z3	Z	2
The course is based on course SZ2, and develops the student´s vocabulary and grammar structure. The course covers realia (history and culture) of the Spanish-speaking countries, mainly of Spain. It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative). It includes written and oral communication on a given general topic, for which the student is trained by reading texts or listening to them.			
04XSZ4	Spanish for Beginners Z4	Z	2
The course is based on course SZ3. It develops the student´s vocabulary and extends the knowledge of the culture and social customs of the Spanish speaking countries, mainly of Spain. It pays attention to further grammar topics (perífrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.			
04XSZ5	Spanish for Beginners Z5	Z	2
The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for specific purposes. In its final part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
00EKOT	Economy in Technology	Z	1
	The course introduces the basics of micro- and macroeconomics.		
00ETV	Ethics of Science and Technology	Z	1
00MAM1	Essentials of High School Course 1	Z	1
	Students are introduced to mathematical concepts and methods used in the introductory physics course.		
00MAM2	Essentials of High School Math Course 2	Z	1
	Review of basics of high school mathematics.		
00PT	Preparatory Week	Z	2
00RET	Rhetoric	Z	1
	The course is focused on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the composition of public speech as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of the course.		
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	Z	1
01MAT1	Mathematics 1	Z	4
	The course is devoted to the study of the basics of calculus of one variable. It includes an introduction to differential and integral calculus, with particular emphasis on applications in practical problems.		
01MAT2	Mathematics 2	Z	4
	The course, which is the continuation of Mathematics 1, is devoted to the integration techniques, improper Riemann integral, introduction to parametric curves (especially in polar coordinates), the basics of sequences and infinite series, and finally to the Taylor and power series and their applications.		
01MAT3	Mathematics 3	Z,ZK	4
	The subject summarises the most important notions and theorems related to the study of finite-dimensional vector spaces.		
01MAT4	Mathematics 4	Z,ZK	4
	Linear and non-linear differential equations of the first order. Linear differential equations of higher order with constant coefficients. Multivariable calculus and its applications.		
01MATZ1	Mathematics, Examination 1	ZK	2
01MATZ2	Mathematics, Examination 2	ZK	2
01PRSTB	Probability and Statistics B	KZ	4
	It is a basic course of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and continuing till the Kolmogorov definition. The notions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit theorems are stated and proved. On the basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explained.		
02DEF1	History of Physics 1	Z	2
	Physics and its place in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philosophers, Aristotle. Physics in Helenistic period, Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, Huygens. The birth of physics as experimental science. Newton and his work.		
02DEF2	History of Physics 2	Z	2
	Development of classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. Electricity and magnetism - electrostatics, galvanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann. The birth of modern quantum and relativistic physics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear energy, Elementary particles, standard model. The concept of Nature and Universe of today.		
02ELMA	Electricity and Magnetism	Z,ZK	6
	Electric charge, Coulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits, conductivity. Basics of the relativity theory. Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Electromagnetic waves, Maxwell equations.		
02KF	Quantum Physics	Z,ZK	3
	State description, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heisenberg uncertainty principle, quantization of angular momentum, solution of simple systems, hydrogen atom.		
02MECH	Mechanics	Z	4
	Introduction to physics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle, solving equations of motion for one-dimensional motion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles, two-body problems, particle collisions. Mechanics of a rigid body, rotation.		
02MECHZ	Mechanics - Examination	ZK	2
	The content of the subject is the examination according to the plan of studies.		
02PRAK	Experimental Laboratory	KZ	4
	Lecture is intended primarily for students who study branch Nuclear Chemistry engineering, or practically oriented bachelor's specializations of branch Nuclear engineering. But it can be also visited by students interested in the other specializations. During Experimental laboratory, students learn how to prepare for experiments (including work with the literature), the implementation of the measurement (acquire of different experimental procedures and routines), will teach writing the records of measurement, processing and evaluation of results. At the same time practically extend the knowledge gained in lectures on physics.		
02UFEC	Introduction to Elementary Particle Physics	Z	2
	The course provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject are presented.		
02ZJFY	Fundamentals of Nuclear Physics	Z,ZK	5
	This scientific field presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic domain, where much of our classical intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.		

04AKS	English Conversation	Z	1
The course will develop the student´s communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication. The student will develop their vocabulary for various communication situations and will master their communication strategy. They will also practise their listening skills in order to better follow and participate in discussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more confident speaker.			
04XAM1	English for Intermediate Students M1	Z	2
The course is designed for students who have successfully completed the full secondary school English language course at least at the A2 level of the Common European Framework of Reference for Languages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of professional oral and written communication situations. Thus it covers topics related to the student´s life and needs as well as topics of subtechnical interest. Attention is also paid to extending the knowledge of grammar issues used in EAP.			
04XAM2	English for Intermediate Students M2	Z	2
The AM2 course expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more on specific grammar, functions, and lexical items typical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided writing. If necessary, grammar revision is included.			
04XAM3	English for Intermediate Students M3	Z	2
The course develops the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnical vocabulary and independent understanding of professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication and their appropriate Czech equivalents. The course also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation on a chosen topic related to the student´s field.			
04XAMZK	English for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts - written (100 min) and oral (20-30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English courses.			
04XAP1	English for Advanced Students P1	Z	2
The course is designed for students who have successfully completed the full secondary school English language course (at least the B1 level of the Common European Framework of Reference for Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamentals of vocabulary, functions, grammar, and style typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, graph descriptions, etc). It also covers professional oral and written communication on topics related to the undergraduate´s life and needs. It develops skills for free professional writing (writing a CV, letter of application, polite request). If necessary, revision of selected grammar topics is included.			
04XAP2	English for Advanced Students P2	Z	2
The AP2 course is based on AP1, thus extending the student´s skills for working with subtechnical texts, and even with professional texts of chosen branches of science. According to the students´ needs it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorical functions (e.g., various types of descriptions, and, if possible, a case study). Increasing emphasis is placed on the undergraduate´s independent work with and reading of linguistically more demanding materials. The course extends the student´s subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writing including the sentence and paragraph structure, linking, cohesion and coherence in texts.			
04XAP3	English for Advanced Students P3	Z	2
The AP3 course is based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It includes training oral and written communication skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing an abstract) and, if possible, also preparing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal language both in oral and written communication.			
04XAPZK	English for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to apply their knowledge obtained in the three AP courses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from the student´s field of study.			
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2
The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the student´s vocabulary for various social situations.			
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and reading skills and trains the student in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.			
04XCESM3	Czech for Foreigners - Intermediate 3	Z	2
The last course revises morphological topics covered earlier and extends the student´s knowledge of more difficult language phenomena. It is especially focused on stylistics and lexicology and on developing the student´s writing skills.			
04XCESMZK	Czech for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESM1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.			
04XCESP1	Czech for Foreign Students - Advanced 1	Z	2
The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common European Framework of Reference. It is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of science. Students are taught the basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies and Student Life. Written practice includes communication with teachers and faculty administrators.			
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extends the student´s knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and specialist texts placing greater emphasis on individual work.			
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
The course develops the student´s knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, and, finally, presentation of the student´s project. Writing skills necessary for professional communication are trained.			
04XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4
The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.			
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
The course is designed for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and grammar features) and they will acquire basic language and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication in the most common everyday situations. The course covers roughly lessons 1-3 of Čeština Express (Czech Express) by L. Holá and P. Bořilová.			

04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and conjugation system and practise basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bořilová.			
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on building up basic vocabulary, fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce simple texts and they practise frequent types of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons 5-7 in Čeština expres 1.			
04XCESZZK	Czech for Foreigners Beginners - Examination	ZK	4
The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04XCESZ1,2,3 courses and can only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.			
04XFM1	French for Intermediate Students M1	Z	2
French - intermediate FM The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to transmit general and technical information and to solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, systemizes and expands language skills gained in previous study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work based on these texts.			
04XFM2	French for Intermediate Students M2	Z	2
Course FM2 builds on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science texts, features typical for technical and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science and technology, French scientists, artists and architects. Description of an object, device, shapes, dimensions, material.			
04XFM3	French for Intermediate Students M3	Z	2
The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and infinitive clauses, participle structures, compound tenses). Text summary. -Students prepare a written paper which will be delivered in form of an oral presentation in-class. The paper is linked to the field of students´ future specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work compiled from French articles and one´s own knowledge/experience. -Longer monologues on topics /situations set for the examination are prepared. Text structure, cohesion and coherence.			
04XFMZK	French for Intermediate Students Examination	ZK	4
The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination consists of a written and oral part and is organized according to Examination Instructions, a document available on the web.			
04XFP1	French for Advanced Students P1	Z	2
FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general and technical information and to solve problems. FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repeated and expanded: subjonctif, passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics of specialization: mathematics, internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.			
04XFP2	French for Advanced Students P2	Z	2
With the link to P1 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on given topics. Features typical of technical and scientific communication are stressed (passive voice, nominalization, word formation).			
04XFP3	French for Advanded Students P3	Z	2
The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering environment. Special skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covers a technical /applied science topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.			
04XFPZK	French for Advanced Students Examination	ZK	4
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized according to Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading.			
04XFZ1	French for Beginners Z1	Z	2
French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life , in socializing and in professional life. The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at elementary level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners (Francouzština pro začátečky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4 : introductions, personal information, asking and giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grammar.			
04XFZ2	French for Beginners Z2	Z	2
The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook: Pravda - Pravdová : French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagreement, apology, thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Specific topics covered: How does the machine work? A few expressions concerning the study. Name of University and Faculty.			
04XFZ3	French for Beginners Z3	Z	2
The course builts upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravdová: French for Beginners. Topics, functions and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for information and loud as part of pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.			
04XFZ4	French for Beginners Z4	Z	2
The course builds up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The contents is roughly covered with lessons 19 - 23 of the textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lecture notes French for Engineering Students of FJFI. The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopping, weather, university in our country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.			
04XFZ5	French for Beginners Z5	Z	2
All four skills acquired in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They present it orally in the class. The general contents is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. Topics: on physics from lecture notes, success of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate clauses, typical conjunctions, subjunctive clauses, gerund, passive.			

04XFZZK	French for Beginners Examination	ZK	3
The content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is ruled by the document Instruction for examination. Its content covers the levels FZ1 - FZ5.			
04XNM1	German for Intermediate Students M1	Z	2
The objective of the course is to level off the students´ skills in the German language. The course focuses on revision of more difficult phenomena and structures (e.g. the passive) and word formation processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Republic and Germany, current environmental issues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists, and the fundamentals of IT terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.			
04XNM2	German for Intermediate Students M2	Z	2
The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses).			
04XNM3	German for Intermediate Students M3	Z	2
The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses).			
04XNMZK	German for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. More detailed information is to be obtained from the teacher.			
04XNP1	German for Advanced Students P1	Z	2
This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the beginning of the course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It revises and develops more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical everyday communication, i.e., telephoning.			
04XNP2	German for Advanced Students P2	Z	2
The course develops the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending their general and subtechnical vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and practising formal communication, both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).			
04XNP3	German for Advanced Students P3	Z	2
The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variety of less common situations (traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocabulary range in fields such as nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By means of a presentation, students are trained to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The course also includes translation practice to and from German.			
04XNPZK	German for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed information is to be obtained from the teacher.			
04XRM1	Russian for Intermediate Students M1	Z	2
The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (both printed and handwritten), basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking the way and giving directions), they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement level of the RZ2 course. The contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.			
04XRM2	Russian for Intermediate Students M2	Z	2
The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.			
04XRM3	Russian for Intermediate Students M3	Z	2
The course develops the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, however, for half of the time allotted in the timetable.			
04XRMZK	Russian for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RM1 - RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher.			
04XRP1	Russian for Advanced Students P1	Z	2
The entrance requirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, practicing more difficult grammar structures, understanding the fundamentals of technical language and training writing skills.			
04XRP2	Russian for Advanced Students P2	Z	2
The course is based on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, verb aspects, specific syntactic structures). Stress is put on independent oral and written communication.			
04XRP3	Russian for Advanced Students P3	Z	2
The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing, translation). The RP1 - RP3 courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The courses develop and expand these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students´ specialization, oral and written interpretation). Students develop their subtechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accurately and with confidence on technical topics.			
04XRPZK	Russian for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RP1 - RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions by the teacher.			

04XRZ1	Russian for Beginners Z1	Z	2
The course represents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian. Thus it begins with mastering the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking). Students will be able to read a short text with marked stress, understand its contents and summarize it.			
04XRZ2	Russian for Beginners Z2	Z	2
The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtechnical texts. Students will be able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also develop their vocabulary and master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.			
04XRZ3	Russian for Beginners Z3	Z	2
The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training various forms of reading skills and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be able to respond so as to be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.			
04XRZ4	Russian for Beginners Z4	Z	2
The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a certain percentage of unfamiliar words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs, differences in verb patterns from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), and practice oral and written communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g., Siberia), learn how to fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals.			
04XRZ5	Russian for Beginners Z5	Z	2
The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding, extracting and summarizing information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication skills are trained on everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication (verbal adjectives, participles, passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite request, etc.)			
04XRZZK	Russian for Beginners Examination	ZK	3
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RZ1 - RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions by the teacher.			
04XSM1	Spanish for Intermediate Students M1	Z	2
The course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester course develops standard vocabulary and pays attention to further grammar topics (e.g., perífrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts or listening to them.			
04XSM2	Spanish for Intermediate Students M3	Z	2
The course develops the students´ knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific purposes in order to be able to work with specialized texts on the Internet.			
04XSM3	Spanish for Intermediate Students M3	Z	2
The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic style. They will be competent enough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short articles and summaries. The final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.			
04XSMZK	Spanish for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course SM3.Oral examination follows the written part.			
04XSP1	Spanish for Advanced Students P1	Z	2
Course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication. Course prerequisites: level B2 of CEFR.			
04XSP2	Spanish for Advanced Students P2	Z	2
Course SP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax and focuses on independent written communication.			
04XSP3	Spanish for Advanced Students P3	Z	2
Course SP3 is the final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focused on written communication based on what students will need in their career.			
04XSPZK	Spanish for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is having passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student.			
04XSZ1	Spanish for Beginners Z1	Z	2
Course SZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental grammar structures and will be able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish and will develop it.			
04XSZ2	Spanish for Beginners Students Z2	Z	2
Course SZ2 is based on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis will be chosen so as to enable them to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others such as the Czech Republic. Realia of Spanish-speaking countries are also included.			
04XSZ3	Spanish for Beginners Z3	Z	2
The course is based on course SZ2, and develops the student´s vocabulary and grammar structure. The course covers realia (history and culture) of the Spanish-speaking countries, mainly of Spain. It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative). It includes written and oral communication on a given general topic, for which the student is trained by reading texts or listening to them.			
04XSZ4	Spanish for Beginners Z4	Z	2
The course is based on course SZ3. It develops the student´s vocabulary and extends the knowledge of the culture and social customs of the Spanish speaking countries, mainly of Spain. It pays attention to further grammar topics (perífrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.			
04XSZ5	Spanish for Beginners Z5	Z	2
The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for specific purposes. In its final part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination.			

04XSZZK	Spanish for Beginners Examination	ZK	3
The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination only if he/she has passed the written examination test.			
12NMEA	Numerical Methods for Scientists and Engineers	KZ	3
There are explained the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Methods for solution of tasks very important for physicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computational environment MATLAB is used as a demonstration tool. The seminars are held in computer laboratory and PASCAL is used as a principle programming language and MATLAB is also used.			
14TED	Creating Electronic Documents	Z	2
Basic skills for creating and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentations and entire documents in an office suite.			
15ANAL1	Analytical Chemistry 1	Z	5
Introduction, methods of analytical chemistry, scheme of analytical procedures. Sampling and preparation of Hample. Precipitation reactions, solubility product, factores influencing solubility. Gravimetry. Statistical evaluation of results. Precipitation titrations, titration curve, endpoint indication. Complex-formation reactions, stability constant, factors influencing stability of complexes. Chelatometric titrations, titration curve, endpoint indication. Qualitative analysis of cations and anions, application of precipitation and complex-formation reactions for separation and identification of ions. Acid-base reactions, acids, basis, acidity function, salts, hydrolysis of salts, buffers, acid-base indicators. Acid-base titrations, titration curves, detrmination of strong and weak acids, bases and salts. Acid-base reactions in nonaqueous solvents.			
15ANALY2	Analytical Chemistry 2	Z,ZK	5
Analytická chemie 2 navazuje na předmět Analytická chemie 1. Kurz je zaměřen na instrumentální metody analytické chemie a zpracování výsledků analýzy.			
15ANCH1		Z,ZK	5
15ANCH2	Inorganic Chemistry 2	Z,ZK	5
The first part of course is devoted to systematical chemistry of elements. The properties of representative elements, transition elements and chemistry of coordination compounds are characterised. Selected chapters in the second part of course deal with catalysis, organometallic compounds and chemistry of solid state. The role of metal ions in biological environment is discussed at the end of course.			
15ANP	Practical Training in Inorganic Chemistry	Z	4
Basic practical course dealing with synthesis and characterization of inorganic compounds. Students get practical training in syntheses of inorganic compounds by acid- base and oxidation-reduction reactions, complex formation reactions and reactions in melt.			
15APLA	Laboratory Training in Analytical Chemistry	Z	4
First part of laboratory exercises is oriented to qualitative analysis of cations and anions using wet chemistry procedures. Quantitative determination of analyte based upon various titration procedures follows. In the last part of exercises students become acquainted with basic instrumental methods of chemical analysis.			
15BPCH1	Bachelor Thesis 1	Z	5
Background research and results of research			
15BPCH2	Bachelor Thesis 2	Z	10
Background research and results of research			
15CHEM	Analytical Calculations and Chemometry Principals	ZK	2
Lecture deals with basic principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, basic data distributions, one- and two-tailed significance testing, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, seminar part consists of equation solving, titration stoichiometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. pH calculations, calculations in potentiometry, coulometry, spectrophotometry and separation methods, solving of complex forming equilibria.			
15DEIZ	Practical Exercises in Detection of Ionizing Radiation	KZ	3
This laboratory exercise is a practical introduction to fundamental principles of detection of ionizing radiation (IR), interaction of IR with matter, and functionality and settings of particular types of detectors and detection systems.			
15DIZ	Detection of Ionizing Radiation	ZK	2
The first part of the course deals with the definitions, properties, and application of the detectors of ionising radiation (IR). In the second part, a detailed overview of the gas detectors, scintillation detectors, detectors for high energy IR, semiconductor detectors, and integrating solid state detectors is given. The last part of the course reviews the principles of the statistical treatment of data, and limits of detection.			
15EXK1	Excursion 1	Z	1
The excursion aims at mediating the students the acquaintance with various radiochemical and radiation methods used in practice.			
15FCHN1	Physical Chemistry 1	Z,ZK	5
The introductive part is devoted to the recapitulation of the thermodynamic systems and thermodynamic properties of ideal and real gases. Next chapters are devoted to the first, second and third law of thermodynamics and their applications. Last but not least, attention is devoted also to the thermodynamic, phase and chemical equilibriums as well as to the elementals of nonequilibrium thermodynamics.			
15FCHN2	Physical Chemistry 2	Z,ZK	5
Lecture of Physical Chemistry 2 focuses on thermodynamics of solutions, particularly on electolytes. Basics of colloidal chemistry extend the theory of solvents in the end of the lecture.			
15INSN1	Instrumental Methods 1	ZK	3
Overview of selected modern instrumental methods of research and analysis, theoretical fundamentals, instrumental technique, utilization and application.			
15JACH1	Nuclear Chemistry 1	Z,ZK	3
Concept and history of nuclear chemistry and radiochemistry, nuclear entities, nuclear reactions, natural and artificial radioactivity. Kinetics of nuclear reactions, laws of radioactive decay. Energetics of nuclear reactions, mass and energy balance of nuclei and energy of alpha, beta decay, gamma deexcitation in nuclear reactions.			
15JACH2	Nuclear Chemistry 2	Z,ZK	4
The following topics are discussed in detail in the course: Nuclear reactions yield, reaction cross section, excitation function. Fission reaction, spontaneous fission. Chemistry of atoms formed in a nuclear reaction, local temperature, atomic recoil and recoil energy, recoil of atom bound in a molecule, hot atom chemistry, retention, Szilard Chalmers reaction.			
15LABT	Practical Training in Laboratory Technique	Z	3
This course covers basic laboratory training and is designed for students of "Chemistry in Science", "Teaching of Chemistry", and "Biology". The course puts the laboratory experience of the students gained at secondary school to an equal level and gets them ready for all following laboratory trainings. After absolving of the course, the students have the basic skills including handling the most frequently used laboratory equipments (pH-meter, UV-Vis spectrophotometer, vacuum rotary evaporator) and have the necessary information about safety rules as well as about writing laboratory diaries. The training is organized in blocks of four hours a week. The students work in groups of two according to a firm schedule so that each group absolve the complete set of (all) 10 exercises during semester. In the exercises, measurements of properties of unknown samples, basic synthetic and purification operations and basic methods of analyses are involved.			
15MZD	Measurement and Data Handling	Z,ZK	3
Characteristics of statistical distribution functions (one-dimensional data), hypotesis testing, analysis of variance (ANOVA), correlation analysis, regression, statistical analysis of multidimensional data; chemometrics; testing of analytical methods; numerical methods and computers in data processing			

15OCH	General Chemistry	Z,ZK	6
General chemistry, classification of substances, concentrations, chemical reactions and equations, stoichiometric calculations, atoms and molecules, chemical bond, the states of matter, chemical thermodynamics, first law of thermodynamics, thermochemistry, second law of thermodynamics, entropy, Gibbs energy, phase and chemical equilibria, electrochemistry, pH, reaction kinetics, kinetic equation, Arrhenius' equation.			
15ORCA1	Organic chemistry 1	Z	2
Structure of organic compounds, properties of covalent bond, reactions on covalent bonds. Nomenclature of organic compounds (main chain, group, locants, prefixes and suffixes) . Spatial structures of organic compounds, double bond isomers, chirality, enantiomers and diastereomeric compounds. Configuration and conformation, relationships. Lewis structures, formal charges, acidity, hard and soft acids and bases. Resonance, aromaticity, classification of substituents, reactivity of polycyclic arenes. Intermediates: carbocations, carbanions, carbenes, radicals - electronic structure. Basic overview on alkanes and cycloalkanes, alkenes, arenes, halogenderivatives, organometallic compounds, alcohols and ethers, organic compounds of sulfur, nitrogen, phosphorus, silicon, other elements and carbonyl compounds chemistry.			
15ORCA2	Organic chemistry 2	Z,ZK	6
Introduction to the second group of organic compounds, carboxylic acids and their derivatives, heterocyclic compounds, important natural compounds, industrial organic compounds and pharmaceuticals - industrial and natural. Introduction to the metods of structural analysis.			
15PINS	Laboratory Practice in Instrumental Methods	KZ	2
Practical training of students in the use of selected modern instrumental methods and techniques for determination of required parameters			
15POCHA	Organic Chemistry Practical	Z	4
The basic practices of organic chemistry have the task to teach students the basics of laboratory techniques and methodology of work in the organic laboratory. Synthetic tasks are chosen so that the students are acquainted with basic chemical operations, and to obtain information on the preparation and properties of organic compounds. Students thus have to supplement the theoretical knowledge from the lectures of organic chemistry.			
15POLE	Theory of Electromagnetic Field and Waves	Z,ZK	4
The course comprises of three parts: the first part contains selected passages of the theory of the electromagnetic field, the second part is dedicated to the wave motion and the optics, and the third part is the introduction to the atomic physics.			
15PRFCH	Practical Exercises in Physical Chemistry	Z	5
Principles of fundamental physico-chemical phenomena are demonstrated in ten exercises. Basic thermodynamic, kinetic and electrochemical characteristics, as equilibrium constants, rate constant, buffer capacity etc., are determinated. Required data are obtained by means of chemical analysis (e.g. titration, extraction) and by common instrumental methods (UV-VIS spectrophotometry, polarography, potentiometry, conductometry, electrolysis, viscosimetry). Emphasis is given on appropriate interpretation of measured data and their mathematical and statistical evaluation.			
15RATEC	Practical Exercises in Radiochemical Techniques	KZ	2
The exercise is oriented on the training of students in laboratory praxis and work with open radioactive sources through basic lab operations such as pipetting, extraction and chromatography techniques. Training is also focused on decontamination of surfaces and clean-up of the accident, work behind shielding and in a glove box.			
15SBP	Bachelor Thesis Seminar	Z	1
The aim is to prepare students to write and defend bachelor thesis, including work with information sources and to acquire basic presentation skills.			
15TOXA	Toxicology	ZK	2
Overview of basic toxicology, containing general and special toxicology, toxicological data, legislation and basic aspects of chemical compounds handling. In general toxicology aspects of toxicity, metabolism, biodistribution and elimination has been described, as well as toxicological effects, evaluation of toxicity, indexes, and biological tests. In special toxicology part selected group of organic compounds, inorganic compounds, natural compounds and warfare were described from toxicity behaviour. In legislation part REACH, international and national regulation is described.			
15ZBCHA	Fundamentals of Biochemistry	ZK	2
The course covers the whole field of a general biochemistry as well as basic biochemical pathways. The special attention is paid to make students understand interconnection of cell processes essential for the life.			
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2
Aims and methods of historic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further radiation methods, dendrochronology, archaeomagnetism), analytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence analysis and other methods), photogrammetry.			
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1	Z,ZK	4
Organization of living systems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecular genetics. Cell cycle, mitosis, their regulation. General human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system and its physiology. Respiratory system and physiology of respiration. Excretory and genital tract.			
16ZBAF2	Fundamentals of Human Biology, Anatomy and Physiology 2	Z,ZK	4
Heart and physiology of cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, blood clotting. Overview of nerves. CNS. Visual system and physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, endocrine glands.			
16ZDOZ1	Fundamentals of Radiation Dosimetry 1	Z,ZK	4
History, development, and objectives of dosimetry. Quantities and units used for description of sources, fields, interactions of ionizing radiation, ionizations, energy transfer and absorption. Fundamentals of the effects of ionizing radiation.			
17BPROV	Safe operation of nuclear facilities	KZ	2
The aim of the subject is to familiarize students with basic principles of nuclear safety.			
17JARE	Nuclear Reactors	ZK	2
Introduction. World power issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety systems, containment. Classification of reactors into IV generations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. Pressurized water reactors (PWR). Western-type PWR (Westinghouse, KWU, Framatom). VVER-type reactors , Temelín nuclear power plant. Boiling water reactors. Heavy water reactors, fast breeder reactors, high-temperature gas cooled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF and INPRO initiatives. Evaluation and selection of proposed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role of nuclear power in long-term outlook			
18ZALG	Basics of Algorithmization	Z,ZK	4
This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the algorithm complexity.			
18ZPRO	Basics of Programming	Z	4
This course is intended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in programming and with the Python programming language.			
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1
TV-3	Physical education	Z	1
TV-4	Physical education	Z	1