# Study plan

# Name of study plan: Jaderné inženýrství - Aplikovaná fyzika ionizujícího zá ení

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Nuclear Engineering

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: Povinné p edm ty specializace

Minimal number of credits of the block: 0

The role of the block: PS

Code of the group: BSPJIAFIZ1

Name of the group: BS P\_JIB AFIZ 1st year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 16 courses

Credits in the group: 0

Note on the group: Podmínkou skládání zkoušky 01MANZ je získání zápočtu z 01MAN. Podmínkou skládání

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
02DEF1	History of Physics 1 Igor Jex, Miroslav Myška Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	Z	PS
02ELMA	Electricity and Magnetism  Iskender Yalcinkaya, Goce Chadzitaskos, Josef Schmidt, Jan Vysoký Jan  Vysoký Goce Chadzitaskos (Gar.)	Z,ZK	6	4+2	L	PS
01LAL	Linear Algebra 1 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		PS
01LALZ	Linear Algebra 1, exam Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	0P+0C		PS
01LAL2	Linear Algebra 2 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		PS
01MAN	Calculus 1  Miroslav Kolá, Pavel Strachota, Edita Pelantová Pavel Strachota Edita  Pelantová (Gar.)	Z	4	4+4		PS
01MANZ	Calculus 1, exam  Miroslav Kolá, Pavel Strachota, Edita Pelantová Pavel Strachota Pavel  Strachota (Gar.)	ZK	4	0P+0C		PS
01MAN2	Calculus 2 Severin Pošta, Miroslav Kolá, Edita Pelantová Miroslav Kolá Severin Pošta (Gar.)	Z,ZK	8	4P+4C		PS
02MECH	Mechanics Iskender Yalcinkaya, David Be Michal Jex David Be (Gar.)	Z	4	4+2	Z	PS
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, David Be, Filip Petrásek, Stanislav Skoupý, Antonín Hoskovec, Petr Novotný Antonín Hoskovec David Be (Gar.)	ZK	2	-	Z	PS
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	PS
02TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	PS
16UJRF1	Introductory Nuclear and Radiation Physics 1 Ladislav Musílek Ladislav Musílek (Gar.)	Z,ZK	4	2P+2C	L	PS

	Рет Спаюирка Рет Спаюирка (Gar.)					
18ZPRO	Basics of Programming Maksym Dreval, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	PS
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	the courses of this group of Study Plan: Code=BSPJIAFIZ1 Name	= D3 P_JID /	AFIZ 15L	year	Z	2
	History of Physics 1 he system of sciences. The relationship of man and nature. Natural sciences in ancient Or	riantand Crasss	Crook notus	ral philosoph		_
	ned. Arabic sciences. The relationship of man and nature. Natural sciences in ancient Or ned. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano E					-
as experimental science.	•	Bruno. Copernico	us, repiei, G	allieo, riuygi	ens. Hie bii	itii oi priysics
					Z,ZK	6
	Electricity and Magnetism o's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectric	ce Electric curre	nt and circui			_
<del>-</del>	pres, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. E				-	of the relativity
		Liectromagnetic	waves,iviaxw	eli equationi	Z	2
· ·	Linear Algebra 1	E Lincor manni	ngo 6 Motri	 non of linear	- 1	<del>-</del>
heorem.	r dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces.	. э. штеаг таррг	rigs. 6. iviali i	Jes of lifteat	ттаррітуѕ.	7. Flobellius
	Linear Algebra 1, avem				71/	2
	Linear Algebra 1, exam				ZK	
	Linear Algebra 2 and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector		\		Z,ZK	4
of determinants. 3. Calcul	y. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Melation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. try – exercises and examples. 7. Adjoint operators.					
O1MAN (	Calculus 1				Z	4
Basic calculus (real analy	ysis, functions of one real variable, differential calculus).					
14 N A N I 7	Calculus 1, exam				ZK	4
JIMANZ	Calculus 1, exam				<b>Z</b> I\	
O1MAN2 I. Continuation of different Real and complex powers Riemann definition), tech	Calculus 2  ntial calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence series, the Cauchy-Hadamard theorem, expansion of function into power series, summation through the cauchy-Hadamard theorem, expansion of function into power series, summatically the cauchy-Hadamard theorem, expansion of function into power series.	, ·	•	zolute and co	Z,ZK onditional control primitives,	definite integra
O1MAN2 I. Continuation of different Real and complex powers Riemann definition), tech	Calculus 2 ntial calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergeneries, the Cauchy-Hadamard theorem, expansion of function into power series, summation	, ·	•	zolute and co	Z,ZK onditional c	onvergence 3.
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O1MAN2  I. Continuation of different Real and complex powers Riemann definition), tech O2MECH  Introduction to physics, phen central force field, force	Calculus 2  ntial calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergences, the Cauchy-Hadamard theorem, expansion of function into power series, summation thingues of integration and application of integrals, Generalized Riemann integral  Mechanics  nysical quantities and units. Particle kinematics, basic types of motion and their superposition in the particles, two-body problems.	on of infinite serie	es. 4. Theory	colute and co of integrals: mensional e	Z,ZK conditional contributions of	onvergence 3. definite integra  4 motion, motion
O1MAN2  I. Continuation of different Real and complex powers Riemann definition), tech O2MECH  Introduction to physics, phen central force field, force continuum mechanics, ela	Calculus 2  ntial calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence series, the Cauchy-Hadamard theorem, expansion of function into power series, summatic hniques of integration and application of integrals, Generalized Riemann integral  Mechanics  nysical quantities and units. Particle kinematics, basic types of motion and theirsuperpositic es innoninertial reference frames. Mechanics of system of free particles, two-body problem lasticity, hydrodynamics. Sound.	on of infinite serie	es. 4. Theory	colute and co of integrals: mensional e id body, rota	Z,ZK onditional continuous primitives, Z quations of tion. Funda	onvergence 3. definite integra  4 f motion, motion imentals of
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Foundations of Physical Measurements 1 Solangel Rojas Torres, Libor Škoda, Petr Chaloupka Petr Chaloupka (Gar.)

Foundations of Physical Measurements 2
Petr Chaloupka Petr Chaloupka (Gar.)

ZK

ΚZ

2P+0C

0P+4L

Ζ

L

PS

PS

Code of the group: BSPJIAFIZ2

Name of the group: BS P\_JIB AFIZ 2nd year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 12 courses

Credits in the group: 0

02ZM1

02ZM2

Note on the group: Předmět 02TEF1 lze absolvovat až po absolvování předmětu 02MECHZ.

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
01ANB3	Calculus B 3 Miroslav Kolá, Milan Krbálek Miroslav Kolá Milan Krbálek (Gar.)	Z,ZK	8	4P+4C		PS
01ANB4	Calculus B 4 Ji í Mikyška, Miroslav Kolá , Milan Krbálek Milan Krbálek (Gar.)	Z,ZK	6	2P+4C		PS
12NME1	Numerical Methods 1 Pavel Váchal Pavel Váchal (Gar.)	Z,ZK	4	2+2	L	PS
16PSE	Topical Dosimetry Seminar  Kate ina Pila ová Kate ina Pila ová (Gar.)	Z	2	0P+2C		PS
02TEF1	Theoretical Physics 1 Petr Novotný Petr Novotný Igor Jex (Gar.)	Z,ZK	4	2+2	Z	PS
02TSFA	Thermodynamics and Statistical Physics Igor Jex, Jaroslav Novotný Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	PS
16ZIVB	Introduction to Ecology Hana Pr šová Hana Pr šová (Gar.)	KZ	2	2+0	Z	PS
16UJRF2	Introductory Nuclear and Radiation Physics 2 Ladislav Musílek Ladislav Musílek Ladislav Musílek (Gar.)	Z,ZK	4	2P+2C	Z	PS
02VOAF	Waves, Optics and Atomic Physics Josef Schmidt, Petr Novotný Jan Vysoký Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	PS
16ZDOZ1	Fundamentals of Radiation Dosimetry 1 Tomáš Trojek Tomáš Trojek Tomáš Trojek (Gar.)	Z,ZK	4	2+2		PS
16ZDOZ2N	Fundamentals of Radiation Dosimetry 2 Tomáš Trojek Tomáš Trojek Tomáš Trojek (Gar.)	Z,ZK	4	2P+2C	L	PS
16ZRIZ	Health risks of ionizing radiation Marie Davidková Marie Davidková (Gar.)	ZK	2	2P+0C	L	PS

Characteristics of the courses of this group of Study Plan: Code=BSPJIAFIZ2 Name=BS P\_JIB AFIZ 2nd year Calculus B 3 1. Functional sequences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional series, power series, Series Expansion, Taylor's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation of variables, homogeneous equation and exact equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coefficients and special right-hand side, Euler differential equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and non-isolated point, boundary of set, completeness of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier series, trigonometric Fourier series and their convergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total derivatives and tangent plane, Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations. 01ANB4 Calculus B 4 Z,ZK 6 [1] Diferenciální po et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných . [4] Regulární zobrazení, zám na prom nných, nekartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstrukce Lebesgueovy míry. [7] Integrální po et funkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgueova v ta. Limita, spojitost a derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty. 12NME1 Numerical Methods 1 Z,ZK 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 principle programming language as a demonstration tool. The seminars are held in computer laboratory. **Topical Dosimetry Seminar** 16PSF The seminary is supposed to motivate the student's interest in the field of dosimetry and provide basic information about different applications of ionizing radiation in science, in research and in human life. The lectures are given by students and absolvents of DDAIR, who are currently employed at the department or in various organizations (SÚRO, v.v.i., ÚJF AV R v.v.i., ÚJV ež, MI, Hospital Na Homolce, FN v Motole, PTC Czech s.r.o., CERN, Fermilab). The lectures will focus not only on describing research and current topics in the field of dosimetry, but students will also learn more about Bachelor degree thesis topics and thus will learn more about their possible specialization during the studies and afterwards. Theoretical Physics 1 The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalism as well as diferent approaches to description of dynamics (Newton's, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is the first part of the course of classical theoretical physics (02TEF1, 02TEF2). 02TSFA Thermodynamics and Statistical Physics Z,ZK Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy. Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena. ΚZ Introduction to Ecology 2 167IVB The subject inform about basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the environment and evaluate economic indicators and sustainable development. 16UJRF2 Introductory Nuclear and Radiation Physics 2 Z,ZK The aim of the course is to provide students with basic knowledge about atomic nucleus and radiation physics, which is followed by other specialized lectures. The subject summarizes thematic areas: general properties of radioactive decay, alpha decay, proton radioactivity, beta decay, gamma emission, natural radioactivity, properties and types of nuclear reactions, nuclear fission, transuranium elements, thermonuclear reaction. Z,ZK 02VOAF Waves, Optics and Atomic Physics

Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction toquantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Broglie waves, the Schrodinger

equation, stationary states and spectra of finite systems.

16ZDOZ1 Fundamentals of Radiation Dosimetry 1 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. 16ZDOZ2N Fundamentals of Radiation Dosimetry 2 Z,ZK Fundamentals of biological effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Principles and methods of measurements in dosimetry. Determination of activity and neutron source emission. Measurements of absorbed dose and exposure. Health risks of ionizing radiation The aim of the course is to acquaint students with the radiobiological basics of radiation protection. The basis of the course is an introduction to the biological effects of ionizing radiation (IR) at the molecular, cellular and tissue levels, an overview of deterministic and stochastic effects of ionizing radiation, health harm, risk and its evaluation, basics of epidemiology.

Code of the group: BSPJIAFIZ3

Name of the group: BS P\_JIB AFIZ 3rd year

Requirement credits in the group:

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

Credits in the group: 0

Note on the group: Zkoušku z předmětu 01RMAF lze skládat až po složení všech zkoušek z Matematické

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
17BPJI1	Bachelor Thesis 1 Dušan Kobylka, Jan Rataj Jan Rataj (Gar.)	Z	5	5ZP		PS
17BPJI2	Bachelor Thesis 2 Dušan Kobylka, Jan Rataj Jan Rataj (Gar.)	Z	10	10ZP		PS
16DETE	Detectors of Ionizing Radiation Petr Pr ša Petr Pr ša Petr Pr ša (Gar.)	ZK	4	4+0	6	PS
17JARE	Nuclear Reactors Tomáš Bílý Tomáš Bílý Tomáš Bílý (Gar.)	ZK	2	2	L	PS
01NME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	PS
16OSE	Professional Seminar Kate ina Pila ová (Gar.)	Z	3	0P+4C		PS
01PRST	Probability and Statistics Tomáš Hobza Tomáš Hobza (Gar.)	Z,ZK	4	3+1	Z	PS
16UAZB	Principles of Ionizing-Radiation Applications Ladislav Musílek Kamil Augsten Ladislav Musílek (Gar.)	ZK	2	2+0	Z	PS
16RAON	Radiation Protection Tomáš Trojek, Darina Trojková, Miroslav Hýža, Dana Drábová, Ji í H Ika, Ladislav Tomášek, Ji í Martin ík Ji í Martin ík Tomáš Trojek (Gar.)	ZK	4	4+0	Z	PS
01RMAF	Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	7	4P+2C		PS
16ZPRD	Elementary Labs Petr Pr ša Petr Pr ša Ji í Martin ík (Gar.)	KZ	3	3L		PS

Characteristics of the courses of this group of Study Plan: Code=BSPJIAFIZ3 Name=BS P\_JIB AFIZ 3rd year 17BPJI1 Bachelor Thesis 1 5 Student on the basis of theses assignment and under leading of a supervisor individually processes given topic during 2 semesters. The subject is given by self-reliant work on given topic. The work is continuously check by a supervisor. 17BPJI2 **Bachelor Thesis 2** 7 10 Student on the basis of theses assignment and under leading of a supervisor individually processes given topic during 2 semesters. The subject is given by self-reliant work on given topic. The work is continuously check by a supervisor. **Detectors of Ionizing Radiation** Gas filled detectors (ionization chambers, proportional counters, Geiger-Müller counters, corona counters), organic and inorganic scintillation detectors, Cherenkov counters, evaluation of light by photomultiplier, parameters of PMT, semiconductor detectors, cryogenic detectors. 17JARE ΖK Nuclear Reactors 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 2 ΚZ Numerical Methods 2 The course is devoted to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations. It explains methods converting

01NME2

boundary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equations.

16OSE Professional Seminar In the first part of the seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requirements for bachelor's degree

projects at the faculty. The second part is designed as a practical training for the defence of the bachelor's degree project. The students give oral presentations of the current state of the research results achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibilities of improving the student's performance. Third part of the seminar deals with topical questions on nuclear and radiation physics, dosimetry, detectors of ionizing radiation, and radiation protection with focus on bachelor state final exams. Ph.D. students and academic staff lead this topical discussion with students about given questions and tries to help the students to accommodate learned knowledge form their studies in complex frame for application in practice.

01PRST	Probability and Statistics	Z,ZK	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 stat	ted and proved.			
On the basis of this the	erry the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are exp	olained.				
16UAZB	Principles of Ionizing-Radiation Applications	ZK	2			
Historical outline of app	blications, review of interaction of radiation with a matter, radiation sources, detectors and instrumentation, evaluation of radio	nuclide measuren	nents, use of			
penetration and scatte	ring of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the use	of ionizing radiati	on.			
16RAON	Radiation Protection	ZK	4			
The course covers the	basic principles of radiation protection. It describes not only the current approaches but also points to future developments. The	he course is acce	pted as training,			
which allows obtaining	special competence in radiation protection and learner receives appropriate certificate.					
01RMAF	Equations of Mathematical Physics	Z,ZK	7			
The subject of this cou	rise is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integr	al transformations	, and solution of			
partial differential equa	tions (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).					
16ZPRD	Elementary Labs	KZ	3			
The aim of the course	is to acquaint students with applications of ionizing radiation detectors and also with the principles of detection and spectrome	etry of ionizing rac	liation. Ionizing			
radiation detectors in the	nis course is considered as a device which produces an evaluable signal at the time of interaction (unlike dosimeters). The ain	n of the course is	to understand to			
basic principles of dete	ction and calibration of common instruments in the field of ionizing radiation measurement.					

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.

. 1010 011 1110 8	g. oap.	9	,			
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 Ková ová	Z	1	2+0		PV
00ETV	Ethics of Science and Technology  Jakub Hají ek <b>Jana Ková ová</b>	Z	1	0+2	L	PV
00RET	Rhetoric Jana Ková ová Jana Ková ová	Z	1	0+2		PV
00UPRA	Introduction to Law Martin ech Jana Ková ová	Z	1	0+2		PV
00UPSY	Introduction to Psychology  Jakub Hají ek <b>Jana Ková ová</b>	Z	1	0+2		PV

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

onaracteristics of the courses of this group of study Frant. Code=Boof OLVED Frante=Bo - oocial ociences									
00EKOT	Economy in Technology	Z	1						
The course introduces t	The course introduces the basics of micro- and macroeconomics.								
00ETV	00ETV Ethics of Science and Technology Z 1								
00RET	Rhetoric	Z	1						
The course is focused of	n the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the	ne composition of	public speech						
as well as to its nonvert	oal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are ar	integral part of th	ne 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  Michal Beneš	ZK	4		Z	PV

04XAPZK	English for Advanced Students Examination  Michal Beneš	ZK	4	Z	PV
04XCESZZK	Czech for Foreigners – Beginners - Examination Jana Ková ová, Slav na Brownová	ZK	4	Z	PV
04XCESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4	Z	PV
04XCESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Michal Beneš Jana Ková ová (Gar.)	ZK	4	Z	PV
04XFMZK	French for Intermediate Students Examination Michal Beneš	ZK	4	Z	PV
04XFPZK	French for Advanced Students Examination Michal Beneš	ZK	4	Z	PV
04XFZZK	French for Beginners Examination V ra Šlechtová	ZK	3	L	PV
04XNMZK	German for Intermediate Students Examination  Michal Beneš	ZK	4	Z	PV
04XNPZK	German for Advanced Students Examination  Michal Beneš	ZK	4	Z	PV
04XRMZK	Russian for Intermediate Students Examination  Michal Beneš	ZK	4	Z	PV
04XRPZK	Russian for Advanced Students Examination Michal Beneš	ZK	4	Z	PV
04XRZZK	Russian for Beginners Examination V ra Šlechtová	ZK	3	L	PV
04XSMZK	Spanish for Intermediate Students Examination Michal Beneš	ZK	4	Z	PV
04XSPZK	Spanish for Advanced Students Examination Michal Beneš	ZK	4	Z	PV
04XSZZK	Spanish for Beginners Examination V ra Šlechtová	ZK	3	L	PV

Characteristics of the courses of this group of Study Plan: Code=BSPJAZYKYZK Name=BS P languages English for Intermediate Students Examination ZK 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. English for Advanced Students Examination 04XAP7K 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 (110 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 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 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 ZK 4 French for Intermediate Students Examination 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. French for Advanced Students Examination 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 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 04XRMZK Russian for Intermediate Students Examination 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 Russian for Advanced Students Examination 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 3 Russian for Beginners Examination ZK 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

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.

O4XSPZK Spanish for Advanced Students Examination

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.

O4XSZZK Spanish for Beginners Examination

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: BSPJIAFIZV

Name of the group: BS P\_JIB AFIZ Optional courses

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0 Note on the group:

Note on the g	•	1		1		
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
17BPROV	Safe operation of nuclear facilities Lenka Frýbortová, ubomír Sklenka Lenka Frýbortová (Gar.)	KZ	2	2P		V
02DEF2	History of Physics 2 Igor Jex Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	L	V
16EPAM	Exact Methods in Research of Historic Monuments  Ladislav Musílek Ladislav Musílek (Gar.)	ZK	2	2+0	Z	V
02EXF	Experimental Physics Barbara Antonina Trzeciak, Jaroslav Adam, Jaroslava Óbertová, Katarína K ížková Gajdošová <b>Jaroslava Óbertová</b> Katarína K ížková Gajdošová (Gar.)	ZK	2	2P+0C	Z	V
17ENEF	Experimental Neutron Physics Jan Rataj Jan Rataj (Gar.)	KZ	3	1P+2L	L	V
16KPR	Clinical Propaedeutic Jana Votrubová <b>Jana Votrubová</b> Jana Votrubová (Gar.)	ZK	2	2+0	Z	V
04AKS	English Conversation Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
16INZB	Medical Informatics for Engineers Tomáš Urban Tomáš Urban Jaroslav Kluso (Gar.)	KZ	2	1+1	1	٧
00MAM1	Essentials of High School Course 1 David Be	Z	1	0+1		٧
00MAM2	Essentials of High School Math Course 2 Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.)	Z	1	0+1		٧
15CH1	General Chemistry 1 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	٧
12PAS	Computer Algebra Systems Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	Z	V
16PADR	Practical Analysis of Data and Risks Kate ina Pila ová, Václav Št pán Václav Št pán (Gar.)	KZ	4	1P+3C	Z	V
16PNZ	Problems of Non-ionizing Radiation  Kamil Augsten Kamil Augsten Lenka Thinová (Gar.)	KZ	2	2P+0C	Z	V
18PRC1	Programming in C++ 1 Vladimír Jarý, Miroslav Virius Miroslav Virius (Gar.)	Z	4	2+2	Z	V
18PRC2	Programming in C++ 2 Vladimír Jarý, Miroslav Virius, Jakub Klinkovský <b>Miroslav Virius</b> Miroslav Virius (Gar.)	KZ	4	2+2	L	V
18PMTL	Programming in MATLAB Quang Van Tran, Jaromír Kukal Quang Van Tran Jaromír Kukal (Gar.)	KZ	4	4C	Z	٧
01STME	Statistical Methods with Applications Tomáš Hobza Tomáš Hobza Tomáš Hobza (Gar.)	ZK	2	2P+0C		٧
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 Aleš Materna Aleš Materna (Gar.)	Z	2	26C		V
17UING	Introduction to Engineering Jan Frýbort, Petr Haušild, Radek Mušálek Jan Frýbort (Gar.)	KZ	3	2P+1C	Z	V
12UNXAP	Introduction to UNIX Milan Kucha ik Milan Kucha ik Milan Kucha ik (Gar.)	Z	2	1P+1C	L	V
12UVP	Introduction to Scientific Computing Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	L	V
16UVJZ	Introduction to Decommissioning of Nuclear Facilities Tomáš Trojek, Lenka Thinová Lenka Thinová (Gar.)	Z,ZK	4	3P+1C	L	V
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1 Alena Doubková, Šimon Vaculín, Zde ka 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
12ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
12ZEL2	Basic Electronics 2 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	L	V
6ZONK	Basics of Oncology Anna Jelínek Michaelidesová Anna Jelínek Michaelidesová Anna Jelínek Michaelidesová (Gar.)	Z	2	2P+0C	L	V
16ZEDB	Basics of Experimantal Data Processing Kate ina Pila ová Kate ina Pila ová (Gar.)	ZK	2	2+0	Z	V
6ZOZ	Sources of Irradiation and Environment Ladislav Musílek, Ond ej Ko istka, Tomáš Urban, Václav Št pán, Lenka Thinová, Tomáš echák Václav Št pán Václav Št pán (Gar.)	KZ	4	2P+2C	L	V

Characteristics of the courses of this group of Study Plan: Code=BSPJIAFIZV Name=BS P\_JIB AFIZ Optional courses

17BPROV	Safe operation of nuclear facilities	KZ	2
The aim of the subjec	is to familiarize students with basic principles of nuclear safety.		
02DEF2	History of Physics 2	Z	2
Development of class	cal mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	lectricity and mag	netism -

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

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.

### 02FXF **Experimental Physics**

ZK

The goal of this subject is to introduce the students the principles of physics measurements, their techniques, methods and instruments that are used for such measurements, and the analysis of measured data

## 17FNFF **Experimental Neutron Physics**

K7

3

The course is focused on experimental methods and experiments in the field of neutron physics, mainly using radionuclide neutron sources. The lectures are devoted to the theoretical bases necessary for preparation and realization of the laboratory exercises and to the methods of experimental data processing and evaluation. Specifically, the lectures provide detailed description of neutron properties and their utilization, the characteristics of neutron sources, properties of prompt and delayed neutrons, selected methods of neutron detection, neutron transport in substances, production, formation and modification of neutron fields and neutron beams. The lectures are complemented by the laboratory exercises in the field of neutron detection, measurement of delayed neutrons, study of neutron transport in various substances, experiments with various neutron sources (252Cf, AmBe, D-D neutron generator), preparation and detection of photo-neutron source, calibration of the radionuclide neutron source. The experiments are realized at the VR-1 training reactor and its laboratories.

#### 16KPR Clinical Propaedeutic

Making students familiar with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemical examinations and anaesthesia 04AKS **English Conversation** 

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.

## 16INZB Medical Informatics for Engineers

ΚZ

2

Students are introduced into the basic concepts of using information technologies in medical application. They gain basic knowledge of UNIX, X-Windows, networking with TCP-IP protocol, types of storage and back-up of data, network and data security, and how to avoid data misuse. Next, they will be indroduced into the opportunities of achieving, processing, and storing medical images, formats of medical data (DICOM), native medical networks (PACS), and systems of pacient monitoring. Short basic excersises are included.

00MAM1	Essentials of High School Course 1	Z	1
00MAM2	Essentials of High School Math Course 2	Z	1
Review of basics of hig	h school mathematics.		
15CH1	General Chemistry 1	Z	3

The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical use are illustrated by examples solved in exercises.

#### 15CH2 General Chemistry 2

Z,ZK

3

The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using various examples, the fact that the validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are illustrated by examples solved in exercises.

12PAS	Computer Algebra Systems	Z	2
-	oduction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is r	ealized in comput	er classrooms:
	skills with CAS by solving relatively simple and basic tasks from mathematics and physics.		
16PADR	Practical Analysis of Data and Risks	KZ	4
	s to provide students with a summary of basic theoretical knowledge, especially in the field of probability and statistics, usefu		
	rse is practical application of theoretical procedures, especially data analysis using available software solution. Students will of data and tiple	learn to perform o	comprehensive
analysis and evaluation		1/7	
16PNZ	Problems of Non-ionizing Radiation   iological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and me	KZ	ds of magnetic
· ·	ind as applied in various types of technical or medical equipment are given as well.	fillous used in her	us of magnetic
18PRC1	Programming in C++ 1	Z	4
1	nly the C programming language and non-object oriented features of the C++ language.	_	-
18PRC2	Programming in C++ 2	KZ	4
	object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template	1	
18PMTL	Programming in MATLAB	KZ	4
_	ronment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic an	1	algorithmization
and geometric represer	ntation of results.		_
01STME	Statistical Methods with Applications	ZK	2
The course consists of	selected methods of statistical data analysis such as: linear regression and correlation, analysis of variance, nonparametric r	nethods, continge	ncy tables, and
their application. The air	m is to illustrate the use of statistical procedures on examples. Solutions of concrete examples by use of statistical software a	are also included.	
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
	and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, present	ations and entire	documents in an
office suite.			
17UING	Introduction to Engineering	KZ	3
This course provides in	troduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and be	havior, basics of	manufacturing
and production, quality	assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be included.		
12UNXAP	Introduction to UNIX	Z	2
	g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfa		
	systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard	_	
	networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a c		
	scp, etc. Network applications	zompator. rection	( 001 11000.
12UVP	Introduction to Scientific Computing	Z	2
_	oduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with		
and technicval computing	ng, data analysis, data visualisation and algorithm development.		
16UVJZ	Introduction to Decommissioning of Nuclear Facilities	Z,ZK	4
The course aims to fam	iliarise students with the actual decommissioning process. The syllabus of the subject is built in the sense of the actual course	of the preparation	n and realization
_	project. It includes implementation of site decommissioning including legislative requirements to protect employees and the	_	nst radiation and
	heir categorization, transport, release to the environment and disposal. It deals with documentation and centralization of mor		
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1	Z,ZK	4
"	ystems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecul	•	
_	Il human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system	n and its physiolog	gy. Respiratory
16ZBAF2	of respiration. Excretory and genital tract.	7.71/	4
_	Fundamentals of Human Biology, Anatomy and Physiology 2 f cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, blo	Z,ZK	4 iew of perves
	d physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, endocrine gla	_	iew of fierves.
12ZEL1	Basic Electronics 1	Z,ZK	3
	imary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Cir		_
	c and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effectives.	•	
12ZEL2	Basic Electronics 2	Z,ZK	3
The subject follows up	with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic	themes of logical	circuits field.
16ZONK	Basics of Oncology	Z	2
1.Basics of cell biology	and human anatomy 2.Cell differentiation and introduction to epigenetics 3.DNA damage and mutagenesis – overview of the	best known mutat	ions - BRCA1/2,
1	ation to tumorigenesis – proto-oncogenes, oncogenes, anti-oncogenes 5.Tumour microenvironment - hypoxia, angiogenesis		
	and metastatic behaviour of tumours 7.Tumour types and their classification (TNM, Gleason) 8.Tumour histology, biopsies, to	umour markers 9.1	Diagnostics – an
	methods 10.Cancer treatment and its success rate		_
16ZEDB	Basics of Experimental Data Processing	ZK	2
-	sperimental data; univariate data; calibration; regression; multivariate data.	177	
16ZOZ	Sources of Irradiation and Environment noverview of the usage of ionizing radiation from its discovery and first applications to modern methods. It allows the student	KZ	sic knowledge
	usage. The subject deals with the fundamental issues related to ionizing radiation and the safety of dealing with the sources of	· ·	- 1
I assure to the ingradiation	assign subject sould will the fall amount follow to following fadiation and the safety of adulty with the souldes to	t. 1110 000136 II	.s.aaoo piaotioai

Code of the group: BSPJAZYKYZAP Name of the group: BS P jazyky zap Requirement credits in the group:

exercises with processing the data and subsequent presentation of the results.

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	Z	2	0+2	Z	V
04XAM2	English for Intermediate Students M2 V ra Šlechtová	Z	2	0+2	L	V
04XAM3	English for Intermediate Students M3 V ra Šlechtová	Z	2	0+2	Z	V
04XAP1	English for Advanced Students P1 V ra Šlechtová	Z	2	0+2	Z	V
04XAP2	English for Advanced Students P2 V ra Šlechtová	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 V ra Šlechtová	Z	2	0+2	Z	V
04XCESZ1	Czech for Foreigners - Beginners 1  Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESZ2	Czech for Foreigners - Beginners 2  Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESZ3	Czech for Foreigners - Beginners 3  Jana Ková ová (Gar.)	Z	2	2S	Z	V
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2	0+2	Z	V
04XCESM2	Czech for Foreigners - Intermediate 2  Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESM3	Czech for Foreigners - Intermediate 3 V ra Šlechtová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP1	Czech for Foreign Students - Advanced 1  Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP2	Czech for Foreigners - Advanced 2  Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESP3	Czech for Foreigners - Advanced 3 V ra Šlechtová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XFM1	French for Intermediate Students M1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFM2	French for Intermediate Students M2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFM3	French for Intermediate Students M3 V ra Šlechtová	Z	2	0+2	Z	V
04XFP1	French for Advanced Students P1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP2	French for Advanced Students P2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFP3	French for Advanded Students P3 V ra Šlechtová	Z	2	0+2	Z	V
04XFZ1	French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ3	French for Beginners Z3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ4	French for Beginners Z4  V ra Ślechtová	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Ślechtová	Z	2	0+4	L	V
04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 V ra Ślechtová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3 V ra Ślechtová	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 V ra Šlechtová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2  Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3 V ra Šlechtová	Z	2	0+2	Z	V
04XRM1	Russian for Intermediate Students M1 V ra Šlechtová 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	V ra Šlechtová	Z	2	0+2	Z	V
04XRP1	Russian for Advanced Students P1 V ra Šlechtová Zhanna Isaeva (Gar.)	Z	2	0+2	Z	٧
04XRP2	Russian for Advanced Students P2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	٧
04XRP3	Russian for Advanced Students P3 V ra Šlechtová	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 V ra Šlechtová 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  V ra Šlechtová	Z	2	0+4	Z	V
04XRZ5	Russian for Beginners Z5 V ra Šlechtová	Z	2	0+4	L	V
04XSM1	Spanish for Intermediate Students M1 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 V ra Šlechtová	Z	2	0+2	Z	٧
04XSP1	Spanish for Advanced Students P1 V ra Šlechtová Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	٧
04XSP2	Spanish for Advanced Students P2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	٧
04XSP3	Spanish for Advanced Students P3 V ra Šlechtová	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 V ra Šlechtová Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	٧
04XSZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	٧
04XSZ4	Spanish for Beginners Z4 V ra Šlechtová	Z	2	0+4	Z	٧
04XSZ5	Spanish for Beginners Z5 V ra Šlechtová	Z	2	0+4	L	٧
Characteristics of the	courses of this group of Study Plan: Code=BSPJAZYKYZ	AP Name=BS P	jazyky za	ıp		
	alish for Intermediate Students M1	•			7	2
-	tudents who have successfully completed the full secondary school English lang	uage course at least at	the A2 leve	l of the Com	_	_
	(CEFR). It provides an introduction into English for Specific and Academic Purp					
	communication situations. Thus it covers topics related to the student's life and					
•	grammar issues used in EAP.	·				•
	·					

Russian for Intermediate Students M3

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English for Intermediate Students M2 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.

English for Intermediate Students M3 04XAM3 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 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

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

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 on the English programme. Students will become acquainted with the main characteristics of Czech (phonetic	-	
acquire basic language and speaking skills. The course focuses on pronounciation exercises, simple social phrases, and oral and written communi		
communicative situations. The course covers roughly lessons 1-5 in "Chcete mluvit esky" by H. Remediosová and E. echová. At the end of the co	irse, the students v	will have reached
A1 (CEFR) approximately.  04XCESZ2	Z	2
04XCESZ2   Czech for Foreigners - Beginners 2 The language and communication competences acquired in CESZ1 are further developed. Students extend their knowledge of Czech declension a	_	I
communication of frequent topics. The course covers roughly lessons 6-10 in "Chcete mluvit—esky" by H. Remediosová and E.—echová. At the en		
have reached A2 (CEFR) approximately.		
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 bas	sic vocabulary,
correct pronunciation, deepening grammar, including grammar practice, and introducing 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		-
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 vocal	bulary 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 rein understanding common abbreviations, abbreviated words, and mathematical terms and formulas.	ading skills and th	ains the student
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 espirately	_	l .
lexicology and on developing the student's writing skills.	cially locused on c	stylistics and
04XCESP1	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	_	1
It is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of	-	
basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies are	d Student Life. Wri	itten 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 text	s 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 presenta	ion, and, finally, pr	esentation of the
student's project. Writing skills necessary for professional communication are trained.		1
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 the selection of the second section and the second section se		
will be able to communicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to information and to solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises,	ŭ	
skills gained in previous study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, p	-	
to an advert, French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, wo		-
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	. –	l .
and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scientific language (passives, nominalization, word formation).		
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	•	
participle structures, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in		
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	· ·	m French articles
and one's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and		
04XFP1   French for Advanced Students P1 FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both	Z	2 m. 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 ge		
to solve problems. FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are		
passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transaction		•
request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. To	pics of specialization	on: 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. Fe	eatures 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		
skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally c	overs a technical /a	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	=	-
The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be all level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Prav		•
(Francouzstina pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introduction		-
giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronuncial	•	-
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 or	I .	l .
French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agree		
thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral com-	nunication. Specifi	c 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
•	FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - P uations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for in		•
•	Reading covers short adapted texts of general interest first, and later popular science texts.	iormation and iod	a as part or
04XFZ4	French for Beginners Z4	Z	2
•	FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The c		
	ktbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lec ourse covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shop		
	now to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.	oping, weather, ur	iversity iii oui
-	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. The	y present it orally i	n the class. The
-	ered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.		
subjunctive clauses, ger	h science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cla rund, passive.	auses, typicai con	unctions,
04XNM2	German for Intermediate Students M2	Z	2
	ther more complex grammatical structures and their application in communication based on technical texts, such as the relation	n between technol	ogy and society,
=	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
· -	mation and reading aloud, and appropriate language for various purposes in oral and written communication. The course systen or professional discourse (participles, relative clauses).	natically revises of	ner grammatical
04XNM1	German for Intermediate Students M1	Z	2
1	rse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and	l l	
•	es (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repub	•	
	gether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicist communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	s, and the fundam	entals of IT
04XNM3	German for Intermediate Students M3	Z	2
-	ther more complex grammatical structures and their application in communication based on technical texts, such as the relation	=	_
the world at the beginning	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and	car technology et	c. Students
· -	mation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	natically revises ot	ner grammatical
04XNP1	or professional discourse (participles, relative clauses).  German for Advanced Students P1	Z	2
	od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be lev	_	
	en focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for		
<del>-</del>	tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on participles.	oractical everyday	communication,
i.e., telephoning. 04XNP2	Cormon for Advanced Students DO	7	2
	German for Advanced Students P2 students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend	Z   ling their general a	
=	duces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and		
· 1	V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).		
04XNP3	German for Advanced Students P3	Z	2
	B main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a va r accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vo	-	
	ing, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used		
•	rocess information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The	ne course also incl	udes translation
practice to and from Ger		7	
04XRM1	Russian for Intermediate Students M1 for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphab	Z   let (both printed a	2 nd handwritten)
-	nmunication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, aski		
,	nmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement	level of the RZ2 of	ourse. The
<u>.</u>	ne course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.		
	Russian for Intermediate Students M2 the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	Z	2
04XRM3	Russian for Intermediate Students M3	Z	2
	e knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, he	I	
in the timetable.			
04XRP1	Russian for Advanced Students P1	Z	2
•	ent for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, prang the fundamentals of technical language and training writing skills.	acticing more diffic	ult grammar
04XRP2	Russian for Advanced Students P2	Z	2
	RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives,	ı	
structures). Stress is put	t on independent oral and written communication.		
04XRP3	Russian for Advanced Students P3	Z	2
	RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphras evious knowledge of general language at secondary level (listening, reading, correct communication in everyday situations).	-	
	evious knowledge or general language at secondary lever (listerling, reading, correct communication in everyday situations). By is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and		
	cal vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write a		
technical topics.			
04XRZ1	Russian for Beginners Z1	Z	2
•	he first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russ or both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speak	•	٦
	stress, understand its contents and summarize it.	J,	1111000

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04XRZ2	Russian for Beginners Z2	Z	2
	of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and shorts		
	using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will be able to use it is uniting.	ill also develop their	vocabulary ar
	atical 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
	on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for tra	_	-
<del>-</del> :	oduces 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
	press their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4	Russian for Beginners Z4	Z	2
	n RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with		-
	ration in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular ve		
-	imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time)		
	ore specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (experience)	e.g., Siberia), learn	how to fill in
	ormation from the timetable, learn about Russian holidays and typical meals.		
04XRZ5	Russian for Beginners Z5	Z	2
he course expects the	e student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understa	anding, extracting a	nd summarizir
nformation from a sp	ecialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. (	Communication skill	ls are trained o
veryday topics. Stud	ying grammar is based on professional and technical texts and only includes items typically used in professional communicati	ion (verbal adjective	es, participles,
assive voice). Stude	nts develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite requ	uest, etc.)	
04XSM1	Spanish for Intermediate Students M1	Z	2
he course is designed	ed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-sem	nester course devel	ops standard
ocabulary and pays	attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, neg	ative form of the im	perative, and
subjunctive), to writte	n 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 students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish fo	or specific purposes	in order to be
· · · · · · · · · · · · · · · · · · ·	cialized texts on the Internet.		
04XSM3	Spanish for Intermediate Students M3	Z	2
	supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of aca		_
	ernet in Spanish and search for information of their specialization or field of interest. Students will use the information to write		
•	amme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.		
04XSP1	Spanish for Advanced Students P1	Z	2
-	on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communications.		_
of CEFR.	7, 100 c announ grannian topoc, 100 control of 100 control of 5 particles of 5 particles of 100 control of 100	Million Course prores	14.0.100. 1010. 2
04XSP2	Spanish for Advanced Students P2	Z	2
	cond part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and s		<del>-</del>
vritten communicatio		iyiilax and locuses i	on independe
		7	2
04XSP3	Spanish for Advanced Students P3		_
	al part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is	s locused on written	Communicati
	tts will need in their career.		
04XSZ1	Spanish for Beginners Z1	Z	2
	t stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and funda	-	ructures and v
	tte at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish		
)4XSZ2	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 enal
	nort adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and o	others such as the (	Czech Republ
	saking countries are also included.		
			2
Realia of Spanish-sp	Spanish for Beginners Z3	Z	_
Realia of Spanish-spo 04XSZ3	Spanish for Beginners Z3 on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture)	1	
Realia of Spanish-spo 04XSZ3 The course is based		of the Spanish-spea	aking countrie
Realia of Spanish-spo 04XSZ3 The course is based nainly of Spain. It pa	on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture)	of the Spanish-spea	aking countrie
Realia of Spanish-spo 04XSZ3 The course is based mainly of Spain. It pay communication on a general	on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) is attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperation given general topic, for which the student is trained by reading texts or listening to them.	of the Spanish-spea	aking countrie en and oral
Realia of Spanish-spo 04XSZ3 The course is based mainly of Spain. It pay communication on a so 04XSZ4	on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) is attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperation general topic, for which the student is trained by reading texts or listening to them.  Spanish for Beginners Z4	of the Spanish-spea ive). It includes writt	aking countrie en and oral 2
Realia of Spanish-spo 04XSZ3  The course is based an ainly of Spain. It pays to the communication on a span of the course is based.	on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) is attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperation given general topic, for which the student is trained by reading texts or listening to them.	of the Spanish-spea ive). It includes writt	aking countrie en and oral 2 tries, mainly o

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

00MAM2	Essentials of High School Math Course 2	Z	1
2257	Review of basics of high school mathematics.		
00PT	Preparatory Week	Z	2
00RET	Rhetoric	Z	1
	sed on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an		
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	<u>Z</u>	1
01ANB3	Calculus B 3	Z,ZK	8
	uences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional	•	
	r's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation	•	
	equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coel		-
side, Euler different	ial equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and	non-isolated poir	nt, boundary
of set, completenes	s of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier	er series, trigonom	etric Fourier
series and their co	nvergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total d		gent plane,
0441104	Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations		
01ANB4	Calculus B 4	Z,ZK	6
	o et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] F kartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstr	-	
	unkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgue	•	, , , ,
9	derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.	,	
01LAL	Linear Algebra 1	Z	2
	Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of li	near mappings. 7.	Frobenius
	theorem.		
01LAL2	Linear Algebra 2	Z,ZK	4
	e matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian and	-	
-	onality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse matri		
of determinants.	3. Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonalit	y. Calculation of o	rthogonal
041.01.7	complements. 6. Geometry – exercises and examples. 7. Adjoint operators.	71/	
01LALZ	Linear Algebra 1, exam	ZK	2
01MAN	Calculus 1	Z	4
01MAN2	Basic calculus (real analysis, functions of one real variable, differential calculus).	Z,ZK	8
	Calculus 2  differential calculus: Taylor´s Polynomials, Taylor´s formula 2. Infinite series: criteria of convergence, operations on series, absolute ar		
	nower series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integr		-
		als: primitives. def	inite integral l
	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral	als: primitives, def	inite integral
01MANZ	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral	als: primitives, def	inite integral
01MANZ 01NME2			
01NME2	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral  Calculus 1, exam	ZK KZ	4 2
01NME2 The course is devot	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral  Calculus 1, exam  Numerical Methods 2	ZK KZ It explains method	4 2
01NME2 The course is devot bound 01PRST	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral  Calculus 1, exam  Numerical Methods 2  ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations. lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial difference by Probability and Statistics	ZK KZ It explains method rential equations. Z,ZK	4 2 s converting
01NME2 The course is devot bound 01PRST It is a basic course	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral  Calculus 1, exam  Numerical Methods 2  ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations.  lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial difference of probability and Statistics  of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and of the probability theory is build gradually beginning with the classical definition and the probability theory and mathematical statistics.	ZK KZ It explains method rential equations. Z,ZK continuing till the k	4 2 s converting 4 Colmogorov
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01NME2 The course is devot bounc 01PRST It is a basic course definition. The notic	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral  Calculus 1, exam  Numerical Methods 2  ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations. lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial difference of probability and Statistics  Probability and Statistics  of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and come as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the passic of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing.	ZK KZ It explains method rential equations. Z,ZK continuing till the rorems are stated and are explained.	4 2 s converting 4 Colmogorov and proved.
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01NME2 The course is devot bounc 01PRST It is a basic course definition. The notic On the	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral  Calculus 1, exam  Numerical Methods 2  ed to numerical solution of boundary-value problems and inital-boundary-value problems for ordinary and partial differential equations. lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial difference of probability and Statistics  Probability and Statistics  of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and one as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the explain parameters and hypothesis testin such as estimation of distribution parameters and hypothesis testin Equations of Mathematical Physics  course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral trees.	ZK KZ It explains method rential equations. Z,ZK continuing till the korems are stated and are explained. Z,ZK	4 2 s converting 4 Colmogorov and proved.
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02TEF1 Theoretical Physics 1 Z,ZK The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalism as well as diferent approaches to description of dynamics (Newton's, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is the first part of the course of classical theoretical physics (02TEF1, 02TEF2). 02TER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynamic principle, ideal and real gas, entropy; non-chemical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory. Maxwell's velocity distribution,equipartition theorem. Thermodynamics and Statistical Physics Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena. 02VOAF Waves, Optics and Atomic Physics Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction toquantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Broglie waves, the Schrodinger equation, stationary states and spectra of finite systems. Foundations of Physical Measurements 1 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. Foundations of Physical Measurements 2 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 04AKS **English Conversation** 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 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 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 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 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 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 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 7K 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 (110 min) and oral (30 min) and includes also oral presentation of a topic from the student's field of study. Czech for Foreigners - Intermediate 1 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 Ζ 2 Czech for Foreigners - Intermediate 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.

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04XCESM3	Czech for Foreigners - Intermediate 3	Z	2
The last course i	revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especia	ally focused on sty	listics and
	lexicology and on developing the student's writing skills.		
04XCESMZK	Czech for Intermediate Students Examination	ZK	4
	nt is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CES	I	l
	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
	,	I .	ı
	the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common Europ		
	y on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of sci		•
basics of function	nal style of engineering and professional communication, both in spoken and written form. The topics include University Studies and S	Student Life. Writte	n practice
	includes communication with teachers and faculty administrators.		1
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extend	ds the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and	specialist texts pla	cing greater
	emphasis on individual work.		
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
	ps the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation,	and, finally, presen	tation of the
	student's project. Writing skills necessary for professional communication are trained.		
04XCESPZK		ZK	4
	int is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CES	I	
The course conte	be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.	or 1,2,5 courses ar	iu can only
041/05074			
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
	gned for students on the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and g		
	anguage and speaking skills. The course focuses on pronounciation exercises, simple social phrases, and oral and written communic		
communicative situ	uations. The course covers roughly lessons 1-5 in "Chcete mluvit esky" by H. Remediosová and E. echová. At the end of the course,	the students will ha	ave reached
	A1 (CEFR) approximately.		
04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
The language and	communication competences acquired in CESZ1 are further developed. Students extend their knowledge of Czech declension and co	onjugation system	and practise
communication o	of frequent topics. The course covers roughly lessons 6-10 in "Chcete mluvit esky" by H. Remediosová and E. echová. At the end of	the course, the st	udents will
	have reached A2 (CEFR) approximately.		
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
	er develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on	_	l .
	tion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and		-
	ney also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons		
		ZK	1
04XCESZZK	ı	I	4
The course conte	ent is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04X	CESZ1,2,3 course	es and can
	only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.		
1 111VLN11		_	
04XFM1	French for Intermediate Students M1	Z	2
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French - intermedice will be able to compose information and to skills gained in presente to an advert, O4XFM2 Course FM2 builds and scientific lare O4XFM3 The course is focus participle structure field of students' for any one O4XFMZK. The content is the O4XFP1 FP advanced course able to community to solve problems. passé composé-im request, answer to O4XFP2 With the link to P1  O4XFP3 The course is focus skill - translation of O4XFPZK	ate FM The objective of this three-semester course is to improve and further develop communication in the French language in both ommunicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to travious study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, persor French culture and geography. Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, we remain an experiment of the provious study are systemized and expanded. Reading popular science texts and supplemence acquired in previous study are systemized and expanded. Reading popular science text anguage (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science scientists, artists and architects. Description of an object, device, shapes, dimensions, material.  French for Intermediate Students M3  sed on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subtres, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-clauture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work of the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of consists of a written and oral part and is organized according to Examination Instructions, a document available on the well French for Advanced Students P1  rese The objective of this three-semester course is to improve and further develop communication in the French language in both writte incate in social interaction and in academic, scientific and work environment. They will be able to use the language to transactional lean advert, environmental issues, success of French science	written and oral for ansmit general and emizes and expandenal statement, requork based on these Z ts, features typical ence and technology Z pordinate and infinities. The paper is lined compared from Freedom and coherence Z K of FM1-FM3. The expandent of the paper is lined and expanded exters, CV, personation of specialization: min.  Z iven topics. Features Z K gineering environments a technical /application of sorganized and is organized and sorganized and seminated and sorganized and sorganized and sorganized and sorganized and sorganized and seminated and sorganized	m. Students technical ds language uest, answer texts.  2 for technical y, French  2 tive clauses, aked to the ench articles  4 transmination  2 trudents will remation and ds subjonctif, I statement, nathematics,  2 es typical of  2 lent. Special ided science
French - intermedicion will be able to composition and to skills gained in presente to an advert, O4XFM2 Course FM2 builds and scientific lare O4XFM3 The course is focus participle structure field of students' for any one O4XFMZK. The content is the O4XFP1 FP advanced course able to community to solve problems. passé composé-im request, answer to O4XFP2 With the link to P1  O4XFP3 The course is focus skill - translation of O4XFPZK	ate FM The objective of this three-semester course is to improve and further develop communication in the French language in both ommunicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to transolve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, syste vious study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, persor French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, we remain a geography. Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts and use in FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science text anguage (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science (passives, nominalization, word formation).  French for Intermediate Students M3  sed on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subtress, sources). Text success of passives are successed in the development of inguistic competence acquired during the follow-up courses. Syntactic structures (subtress, sourcess). Text structures are successed for successed for successed for success	written and oral for ansmit general and emizes and expandenal statement, requork based on these Z ts, features typical ence and technology Z pordinate and infinities. The paper is lined compared from Freedom and coherence Z K of FM1-FM3. The expandent of the paper is lined and expanded exters, CV, personation of specialization: min.  Z iven topics. Features Z K gineering environments a technical /application of sorganized and is organized and sorganized and seminated and sorganized and sorganized and sorganized and sorganized and sorganized and seminated and sorganized	m. Students technical ds language uest, answer texts.  2 for technical y, French  2 tive clauses, aked to the ench articles  4 transmination  2 trudents will remation and ds subjonctif, I statement, nathematics,  2 es typical of  2 lent. Special ided science

04XFZ1	French for Beginners Z1	Z	2
•	objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in soci		
	nch for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to he knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravo		- 1
· -	e ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, pe	_	
giving the directio	ons, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronu	nciation and gramm	ar.
04XFZ2	French for Beginners Z2	Z	2
	with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the		
•	Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement of the control of the	•	
thanking, travelling, map o	of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication to the Modes the machine work? A few expressions concerning the study. Name of University and Faculty.	cation. Specific topic	s covered:
04XFZ3	French for Beginners Z3	Z	2
ı	FTERIOR DEGITIOES 23 FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pra		
•	ituations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for info		- 1
	pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.		
04XFZ4	French for Beginners Z4	Z	2
· · · · · · · · · · · · · · · · · · ·	FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The cor		
	book French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lectur ourse covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp		٠ ١
Students of 1 31 i. The co	country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet	_	Sity iii Oui
04XFZ5	French for Beginners Z5	Z	2
	FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They pr	esent it orally in the	
general contents is cover	ered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. To	pics: on physics from	m lecture
notes, success of Fren	nch science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cla	auses, typical conjui	nctions,
0.43/5771/	subjunctive clauses, gerund, passive.		
04XFZZK	French for Beginners Examination	ZK	3
The content is the examin	nation as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examin Instruction for examination. Its content covers the levels FZ1 - FZ5.	ation is ruled by the	document
04XNM1	German for Intermediate Students M1	Z	2
	se is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and st		
word formation proce	esses (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repu	blic and Germany, o	current
	ogether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists		tals of IT
	nology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and unders		
04XNM2	German for Intermediate Students M2	Z	2
	ner more complex grammatical structures and their application in communication based on technical texts, such as the relation be ing of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and o	•	•
<del>-</del>	nation and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati		
	phenomena important for professional discourse (participles, relative clauses).	-	
04XNM3	German for Intermediate Students M3	Z	2
	ner more complex grammatical structures and their application in communication based on technical texts, such as the relation be		- 1
•	ing of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and on a the language of mathematics, computers and on a the language for various purposes in oral and written communication. The course systemati	0,	
practise reading for inform	phenomena important for professional discourse (participles, relative clauses).	cally revises offici gi	ammancai
04XNMZK	German for Intermediate Students Examination	ZK	4
ı	examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination of		ts - written
and oral, which cover the	e courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment	ent. More detailed in	formation
	is to be obtained from the teacher.		
04XNP1	German for Advanced Students P1	Z	2
· -	od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be level	_	- 1
	en focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for d uctures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on pra	,	
more annount grammar out	i.e., telephoning.	onedi every day com	
04XNP2	German for Advanced Students P2	Z	2
The course develops the s	students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending	their general and su	ıbtechnical
· -	luces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and pra	-	nunication,
	itten and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indi	rect speech).	
04XNP3	German for Advanced Students P3	L L	2
	B main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varie accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the voca	=	
	ing, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used.		
students are trained to pro	ocess information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The complex and difficult texts and present it to the class in a simplified oral form.	ourse also includes	translation
,	practice to and from German.		
04XNPZK	German for Advanced Students Examination	ZK	4
	e examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination of		
and oral, which cover tr	ne courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded information is to be obtained from the teacher.	ı assessinent. Möre	uetalled
04XRM1	Russian for Intermediate Students M1	Z	2
ı	or students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (	I I	
<del>-</del>	munication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking		
they can use basic grai	mmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement l		rse. The
	contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetab	ile.	

0.41//D140			
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	_	
04XRM3 The course develop	Russian for Intermediate Students M3 s the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, howe in the timetable.	Zever, for half of the t	2 ime allotted
04XRMZK	Russian for Intermediate Students Examination	ZK	4
	is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled		=
	ents are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given inst	-	
04XRP1	Russian for Advanced Students P1	Z	2
-	Russian for Advanced Students F1  Jirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, prac	_	
	structures, understanding the fundamentals of technical language and training writing skills.	doing more difficul	grammar
04XRP2	Russian for Advanced Students P2	Z	2
The course is bas	ed on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, ve structures). Stress is put on independent oral and written communication.	rb aspects, specifi	c syntactic
04XRP3	Russian for Advanced Students P3	7	2
	d on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing		
	od previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The		
	r study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and wi		-
	chnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write acc	=	-
	technical topics.	aratory arra with oo	1111001100 011
04XRPZK	Russian for Advanced Students Examination	ZK	4
_	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge.		-
	ents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instr		
04XRZ1	Russian for Beginners Z1	7	2
_	Russian for Degriffiers 21  nts the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian	Thus it bogins wit	
	et (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking	_	-
the Russian aiphac	a short text with marked stress, understand its contents and summarize it.	J. Otadento Will be i	able to read
04XRZ2	<u> </u>	Z	2
	Russian for Beginners Z2 ter of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subte		
	e using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also		
able to communica	master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in		abulal y allu
04XRZ3		Z	2
-	Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training	_	_
	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be		_
and listerling) and	understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.	able to respond so	as to be
04XRZ4		Z	2
	Russian for Beginners Z4 I on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a c	_	
	unication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs		
	lality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), a		b patterns
·	n more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g.		nd written
		•	
		•	
04XR75	forms, look up the information from the timetable, learn about Russian holidays and typical meals.	., Siberia), learn ho	ow to fill in
04XRZ5	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5	., Siberia), learn ho	ow to fill in
The course expects	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5 the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding)	, Siberia), learn ho	ow to fill in  2 ummarizing
The course expects information from a	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5 the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Committees the committee of the committ	., Siberia), learn ho Z g, extracting and s nunication skills ar	w to fill in  2 ummarizing e trained on
The course expects information from a everyday topics. S	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5 the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication grammar is based on professional and technical texts and only includes items typically used in professional communication (	Z  g, extracting and s nunication skills ar verbal adjectives,	w to fill in  2 ummarizing e trained on
The course expects information from a severyday topics. Severyday topics.	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understandin specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possible of the control of the cont	Z g, extracting and s nunication skills ar (verbal adjectives, blite request, etc.)	2 ummarizing e trained on participles,
The course expects information from a severyday topics. Spassiv 04XRZZK	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Commutudying grammar is based on professional and technical texts and only includes items typically used in professional communication (service). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possional for Beginners Examination)	Z g, extracting and s nunication skills ar (verbal adjectives, slite request, etc.)  ZK	2 ummarizing e trained on participles,
The course expects information from a severyday topics. Spassiv 04XRZZK	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Commutudying grammar is based on professional and technical texts and only includes items typically used in professional communication (service). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possional for Beginners Examination).  Russian for Beginners Examination  tis the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge.	Z g, extracting and s nunication skills ar (verbal adjectives, olite request, etc.)  ZK dge and skills acqu	2 ummarizing e trained on participles, 3 ired in RZ1
The course expects information from a severyday topics. Spassiv 04XRZZK The course content - RZ5. Stud	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Computing grammar is based on professional and technical texts and only includes items typically used in professional communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possional for Beginners Examination).  Russian for Beginners Examination  It is the examination as given by the study plan. The course is completed by taking a written and oral examination. Students are given instructions are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions.	Z g, extracting and s nunication skills ar (verbal adjectives, olite request, etc.)  ZK dge and skills acqu	2 ummarizing e trained on participles, 3 ired in RZ1
The course expects information from a severyday topics. Severyday	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Commutativity grammar is based on professional and technical texts and only includes items typically used in professional communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possional for Beginners Examination  It is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledges are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions.	Z g, extracting and s nunication skills ar verbal adjectives, lite request, etc.) ZK dge and skills acqu uctions by the teac	2 ummarizing e trained on participles, 3 ired in RZ1 cher.
The course expects information from a severyday topics. Severyday topics for a severyday topics. Severy	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Common tudying grammar is based on professional and technical texts and only includes items typically used in professional communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possional skills (writing a CV) are sent as a successful written and oral examination testing the knowledgents are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructionally spanish for Intermediate Students M1 igned for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semestic students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school.	Z g, extracting and s nunication skills ar verbal adjectives, lite request, etc.) ZK dge and skills acqu uctions by the teac Z eer course develops	2 ummarizing e trained on participles,  3 ired in RZ1 cher.  2 s standard
The course expects information from a severyday topics. Severyday topics of the course content of the course is desevocabulary and page 15 of the course is deserved.	forms, look up the information from the timetable, learn about Russian holidays and typical meals.  Russian for Beginners Z5  the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Computing grammar is based on professional and technical texts and only includes items typically used in professional communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, possional skills (writing about the professional information obtained by reading skills (writing skills (w	Z g, extracting and s nunication skills ar verbal adjectives, lite request, etc.) ZK dge and skills acqu uctions by the teac Z er course develops e form of the impe	2 ummarizing e trained on participles,  3 ired in RZ1 cher.  2 s standard rative, and
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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 focu- based on what students will need in their career.	sed on written con	nmunication	
04XSPZK	Spanish for Advanced Students Examination	ZK	4	
	t is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for a			
	passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the			
04XSZ1	Spanish for Beginners Z1	Z	2	
	first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundament	_		
04XSZ2	communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Span  Spanish for Beginners Students Z2	7	2 2	
	ed 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		
	d short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and other			
	Realia of Spanish-speaking countries are also included.			
04XSZ3	Spanish for Beginners Z3	Z	2	
	ed on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative)		-	
mainly of Spain.	communication on a given general topic, for which the student is trained by reading texts or listening to them.	. It includes writter	i aliu Ulai	
04XSZ4	Spanish for Beginners Z4	Z	2	
The course is bas	ed on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish	speaking countries	s, mainly of	
Spain. It pays atte	ntion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	•	ubjunctive),	
0.4)/0.75	to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listenii	ng to them.		
04XSZ5	Spanish for Beginners Z5 are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for	r specific purposes	2 s In its final	
THE COURSE BOOKS	part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examina		3. III 113 IIIIai	
04XSZZK	Spanish for Beginners Examination	ZK	3	
	ent is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral ex	amination only if h	e/she has	
	passed the written examination test.			
12NME1	Numerical Methods 1	Z,ZK	4	
•	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Me icists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computat			
important for priys	used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.	onal environment	IVIAI LAD IS	
12PAS	Computer Algebra Systems	Z	2	
Practically oriente	d introduction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is real	ized in computer c	lassrooms:	
	students acquire basic skills with CAS by solving relatively simple and basic tasks from mathematics and physics.			
12UNXAP	Introduction to UNIX	Z	2	
· ·	operating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfac ting systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working wi			
	reter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard to			
· ·	mputer networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a computer networks.	•		
	hardware sharing, mail, scp, etc. Network applications			
12UVP	Introduction to Scientific Computing	Z	2	
Practically oriente	ed Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with s and technicval computing, data analysis, data visualisation and algorithm development.	ome basic tools for	rt scientific	
12ZEL1	Basic Electronics 1	Z,ZK	3	
	des primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circu			
circuits includ	e symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient efforts	ects inside linear c	ircuits.	
12ZEL2	Basic Electronics 2	Z,ZK	3	
-	ws up with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic th	emes of logical cire		
14TED	Creating Electronic Documents  ating and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentation	As and entire docu	2 ments in an	
Dasic skills for crea	office suite.	is and entire docu	illelits III ali	
15CH1	General Chemistry 1	Z	3	
	nt concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical u	se are illustrated b	y examples	
	solved in exercises.			
15CH2	General Chemistry 2	Z,ZK	3	
<u>-</u>	continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using verprinciples is not restricted only to chemical processes is documented. The significance and practical use of explained principles are	· · · · · · · · · · · · · · · · · · ·		
the validity of these	in exercises.	iliustrateu by exam	ipies soiveu	
16DETE	Detectors of Ionizing Radiation	ZK	4	
	s (ionization chambers, proportional counters, Geiger-Müller counters, corona counters), organic and inorganic scintillation detectors, C	herenkov counters	s, evaluation	
	of light by photomultiplier, parameters of PMT, semiconductor detectors, cryogenic detectors.			
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2	
	of historic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further radiationsm), analytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence a			
aronacomagneti	photogrammetry.	, olo alla olliel I	,	
16INZB	Medical Informatics for Engineers	KZ	2	
Students are intro	oduced into the basic concepts of using information technologies in medical application. They gain basic knowledge of UNIX, X-Windo	_		
protocol, types of storage and back-up of data, network and data security, and how to avoid data misuse. Next, they will be indroduced into the opportunities of achieving, processing,				
=	medical images, formats of medical data (DICOM), native medical networks (PACS), and systems of pacient monitoring. Short basic of Clinical Propagatouries			
16KPR Making students fa	Clinical Propaedeutic miliar with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemical	ZK examinations and a	2 anaesthesia	
	, F. y			

**160SE** Professional Seminar In the first part of the seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requirements for bachelor's degree projects at the faculty. The second part is designed as a practical training for the defence of the bachelor's degree project. The students give oral presentations of the current state of the research results achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibilities of improving the student's performance. Third part of the seminar deals with topical questions on nuclear and radiation physics, dosimetry, detectors of ionizing radiation, and radiation protection with focus on bachelor state final exams. Ph.D. students and academic staff lead this topical discussion with students about given questions and tries to help the students to accommodate learned knowledge form their studies in complex frame for application in practice. 16PADR Practical Analysis of Data and Risks The aim of the course is to provide students with a summary of basic theoretical knowledge, especially in the field of probability and statistics, useful for data and risk analysis. The main content of the course is practical application of theoretical procedures, especially data analysis using available software solution. Students will learn to perform comprehensive analysis and evaluation of data and risks. 16PNZ Problems of Non-ionizing Radiation ΚZ 2 Subject is focused on biological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and methods used in fields of magnetic resonance and ultrasound as applied in various types of technical or medical equipment are given as well. Topical Dosimetry Seminar The seminary is supposed to motivate the student's interest in the field of dosimetry and provide basic information about different applications of ionizing radiation in science, in research and in human life. The lectures are given by students and absolvents of DDAIR, who are currently employed at the department or in various organizations (SÚRO, v.v.i., ÚJF AV R v.v.i., ÚJV ež, MI, Hospital Na Homolce, FN v Motole, PTC Czech s.r.o., CERN, Fermilab). The lectures will focus not only on describing research and current topics in the field of dosimetry, but students will also learn more about Bachelor degree thesis topics and thus will learn more about their possible specialization during the studies and afterwards. Radiation Protection 16RAON ZK 4 The course covers the basic principles of radiation protection. It describes not only the current approaches but also points to future developments. The course is accepted as training, which allows obtaining special competence in radiation protection and learner receives appropriate certificate. Principles of Ionizing-Radiation Applications Historical outline of applications, review of interaction of radiation with a matter, radiation sources, detectors and instrumentation, evaluation of radionuclide measurements, use of penetration and scattering of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the use of ionizing radiation. Introductory Nuclear and Radiation Physics 1 16UJRF1 The aim of the course is to provide students with basic knowledge about atomic nucleus and radiation physics, which is followed by other specialized lectures. The subject summarizes thematic areas: development of opinions on micro-wave and radiation physics, basic characteristics of the atom and nucleus, binding energy, measurement of mass and dimensions of the nuclei, the most important nuclear models. General characteristics of the interaction of ionizing radiation with the matter, interaction of alpha, beta, gamma and neutron radiation, passage of radiation beams through the matter, radiation effects in matter. 16UJRF2 Introductory Nuclear and Radiation Physics 2 Z,ZK The aim of the course is to provide students with basic knowledge about atomic nucleus and radiation physics, which is followed by other specialized lectures. The subject summarizes thematic areas: general properties of radioactive decay, alpha decay, proton radioactivity, beta decay, gamma emission, natural radioactivity, properties and types of nuclear reactions, nuclear fission, transuranium elements, thermonuclear reaction. 16UVJZ Introduction to Decommissioning of Nuclear Facilities Z,ZK The course aims to familiarise students with the actual decommissioning process. The syllabus of the subject is built in the sense of the actual course of the preparation and realization of the decommissioning project. It includes implementation of site decommissioning including legislative requirements to protect employees and the environment against radiation and waste management in their categorization, transport, release to the environment and disposal. It deals with documentation and centralization of monitoring systems. 16ZBAF1 Fundamentals of Human Biology, Anatomy and Physiology 1 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. Fundamentals of Human Biology, Anatomy and Physiology 2 16ZBAF2 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. Fundamentals of Radiation Dosimetry 1 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. 167DO72N Fundamentals of Radiation Dosimetry 2 Z,ZK 4 Fundamentals of biological effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Principles and methods of measurements in dosimetry. Determination of activity and neutron source emission. Measurements of absorbed dose and exposure. 16ZEDB Basics of Experimental Data Processing 7K 2 Statistical analysis of experimental data; univariate data; calibration; regression; multivariate data. 16ZIVB Introduction to Ecology K7 2 The subject inform about basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the environment and evaluate economic indicators and sustainable development. 1.Basics of cell biology and human anatomy 2.Cell differentiation and introduction to epigenetics 3.DNA damage and mutagenesis – overview of the best known mutations - BRCA1/2, TP53, RAS 4.From mutation to tumorigenesis - proto-oncogenes, oncogenes, anti-oncogenes 5.Tumour microenvironment - hypoxia, angiogenesis a necrosis 6.Cancer stem cells, circulating tumour cells and metastatic behaviour of tumours 7.Tumour types and their classification (TNM, Gleason) 8.Tumour histology, biopsies, tumour markers 9.Diagnostics – an overview of best known methods 10. Cancer treatment and its success rate 16707 Sources of Irradiation and Environment K7 4 The subject provides an overview of the usage of ionizing radiation from its discovery and first applications to modern methods. It allows the student to acquire the basic knowledge about ionizing radiation usage. The subject deals with the fundamental issues related to ionizing radiation and the safety of dealing with the sources of IR. The course includes practical exercises with processing the data and subsequent presentation of the results. 16ZPRD **Elementary Labs** K7 The aim of the course is to acquaint students with applications of ionizing radiation detectors and also with the principles of detection and spectrometry of ionizing radiation. Ionizing radiation detectors in this course is considered as a device which produces an evaluable signal at the time of interaction (unlike dosimeters). The aim of the course is to understand to basic principles of detection and calibration of common instruments in the field of ionizing radiation measurement. 16ZRIZ Health risks of ionizing radiation The aim of the course is to acquaint students with the radiobiological basics of radiation protection. The basis of the course is an introduction to the biological effects of ionizing radiation (IR) at the molecular, cellular and tissue levels, an overview of deterministic and stochastic effects of ionizing radiation, health harm, risk and its evaluation, basics of epidemiology.

17BPJI1	Bachelor Thesis 1	Z	5
Student on the ba	risis of theses assignment and under leading of a supervisor individually processes given topic during 2 semesters. The subject is giv	en by self-reliant v	vork on given
	topic. The work is continuously check by a supervisor.		
17BPJI2	Bachelor Thesis 2	Z	10
Student on the ba	isis of theses assignment and under leading of a supervisor individually processes given topic during 2 semesters. The subject is given	en by self-reliant v	vork on given
	topic. The work is continuously check by a supervisor.		
17BPROV	Safe operation of nuclear facilities	KZ	2
	The aim of the subject is to familiarize students with basic principles of nuclear safety.	<u> </u>	,
17ENEF	Experimental Neutron Physics	KZ	3
The course is focu	sed on experimental methods and experiments in the field of neutron physics, mainly using radionuclide neutron sources. The lecture	s are devoted to t	he theoretica
	or preparation and realization of the laboratory exercises and to the methods of experimental data processing and evaluation. Specifical	• •	
•	tron properties and their utilization, the characteristics of neutron sources, properties of prompt and delayed neutrons, selected metho		
	ances, production, formation and modification of neutron fields and neutron beams. The lectures are complemented by the laboratory		
	urement of delayed neutrons, study of neutron transport in various substances, experiments with various neutron sources (252Cf, A		
	d detection of photo-neutron source, calibration of the radionuclide neutron source. The experiments are realized at the VR-1 training		
17JARE	Nuclear Reactors	ZK	2
	d power issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety systems		
	generations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. Pre		, ,
Western-type	PWR (Westinghouse, KWU, Framatom). VVER-type reactors , Temelín nuclear power plant. Boiling water reactors. Heavy water reactors.	ctors, fast breeder	reactors,
high-temperature	e gas cooled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF an	d INPRO initiatives	s. Evaluation
and	selection of proposed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role of nuclear power in	ong-term outlook	
17UING	Introduction to Engineering	KZ	3
	ides introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and bel		anufacturing
	and production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing wi	Il be included.	
18PMTL	Programming in MATLAB	KZ	4
Introducing Matla	b environment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic anal	ysis, statistics, alg	orithmization
	and geometric representation of results.		
18PRC1	Programming in C++ 1	Z	4
	This course covers mainly the C programming language and non-object oriented features of the C++ language.	1	'
18PRC2	Programming in C++ 2	KZ	4
This	course covers the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standar	d Template Library	/.
18ZPRO	Basics of Programming	Z	4
	intended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in progra	amming and with the	he Python
	programming language.		
TV-1	Physical Education		
		Z	1
TV-2	·	Z	1 1
TV-2	Physical Education	Z	· ·
	·		· ·

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