Study plan

Name of study plan: Jaderná a ásticová fyzika

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Nuclear and Particle Physics

Type of study: Bachelor full-time

Required credits: 0

Elective courses credits: 180 Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 0

The role of the block: P

Code of the group: BSPJCF1

Name of the group: BS P_J FB 1st year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 14 courses

Credits in the group: 0

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

	zkoušky 01LALZ je získání zápočtu z 01	LAL.				
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
02ELMA	Electricity and Magnetism Iskender Yalcinkaya, Josef Schmidt, Ji í Hrivnák, Goce Chadzitaskos, Jan Vysoký Jan Vysoký Josef Schmidt (Gar.)	Z,ZK	6	4+2	L	Р
01LAL	Linear Algebra 1 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		Р
01LALZ	Linear Algebra 1, exam Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	0P+0C		Р
01LAL2	Linear Algebra 2 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		Р
01MAN	Calculus 1 Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	Z	4	4+4		Р
01MANZ	Calculus 1, exam Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	ZK	4	0P+0C		Р
01MAN2	Calculus 2 Miroslav Kolá, Edita Pelantová, Maksym Dreval Edita Pelantová Maksym Dreval (Gar.)	Z,ZK	8	4P+4C		Р
02MECH	Mechanics David Be Antonín Hoskovec David Be (Gar.)	Z	4	4+2	Z	Р
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, Stanislav Skoupý, Petr Novotný, David B e , Filip Petrásek, Antonín Hoskovec Antonín Hoskovec David B e (Gar.)	ZK	2	-	Z	Р
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	Р
02TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	Р
02ZM1	Foundations of Physical Measurements 1 Solangel Rojas Torres, Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	ZK	2	2P+0C	Z	Р
02ZM2	Foundations of Physical Measurements 2 Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	KZ	4	0P+4L	L	Р

18ZPRO	Basics of Programming Maksym Dreval, Nichita Vatamaniuc, Jan Vondruška, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	Р
Characteristics of	the courses of this group of Study Plan: Code=BSPJCF1 Name=B	SP_J FB1	st year			
02ELMA	Electricity and Magnetism		-	Z	,ZK	6
Electric charge, Coulon	nb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectri	ics. Electric curre	nt and circu	its, conducti	vity. Basics	of the relativity
theory. Electrodynamic	forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits.	Electromagnetic	waves, Max	well equation	ns.	
01LAL	Linear Algebra 1	-			Z	2
!	ar dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces.	5. Linear mappin	gs. 6. Matrio	es of linear	mappings. 7	7. Frobenius
theorem.			•		•	
01LALZ	Linear Algebra 1, exam				ZK	2
01LAL2	Linear Algebra 2			7	.ZK	4
	ix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector	r, diagonalization). 4. Hermitia	_	,	
	lity. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Me					
1.	culation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form.					
	etry exercises and examples. 7. Adjoint operators.	•		•		·
01MAN	Calculus 1				Z	4
Basic calculus (real and	alysis, functions of one real variable, differential calculus).			ı	'	
01MANZ	Calculus 1, exam				ZK	4
01MAN2	Calculus 2			Z	.ZK	8
-	ential calculus: Taylor´s Polynomials, Taylor´s formula 2. Infinite series: criteria of convergenc	ce, operations on	series, abs	1	, ,	-
	er series, the Cauchy-Hadamard theorem, expansion of function into power series, summatic					·
1	chniques of integration and application of integrals, Generalized Riemann integral		•			
02MECH	Mechanics				Z	4
!	physical quantities and units. Kinematics of a particle, basic types of motion and their super	rposition. Dynami	cs of a part	icle, solving	1	f motion for
	n, motion in a central force field, forces in non-inertial reference frames. Mechanics of a syst				•	
of a rigid body, rotation.		•				
02MECHZ	Mechanics - Examination				ZK	2
-	ect is the examination according to the plan of studies.					_
00PT	Preparatory Week				Z	2
02TER	Heat and Molecular Physics			7	ZK	4
	Fieat and Molecular Frigsics naterials, heat transfer; stationary and non-stationary heat conduction, heat transfer and per	notration: 1st and	2nd thorms	1	· 1	
· ·	systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials;					· ·
		Kirietic triedi y. ivi	axwell 5 vel			
02ZM1	Foundations of Physical Measurements 1	- Novelees		1	ZK	2
1	I for students of physical specializations (Experimental particle physics, Physical engineering	J, U	0,,	,		, ,
1	al of the lecture is to introduce the basics of physical measurements, the methods of proces	ising and evalual	on or acqui	ed data on a	a PC. Stude	nts learn the
basic habits of work in a	• •				1/7	
02ZM2	Foundations of Physical Measurements 2			1	KZ	4
_	I for students of physical specializations (Experimental particle physics, Physical engineering					- 1
	al of the lecture is to introduce the basics of physical measurements, the methods of proces	ssing and evaluati	on or acqui	red data on a	a PC. Stude	nts learn the
basic habits of work in a						
18ZPRO	Basics of Programming				Z	4
	mainly for students with little or no experience in programming. It familiarizes the students was	with the basic cor	cepts in pro	gramming a	nd with the	Python
programming language	·					

Code of the group: BSPJCF2

Name of the group: BS P_J FB 2nd year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 10 courses

Note on the group:

Credits in the group: 0

lze absolvovat až po absolvování předmětů 02ELMA a 02TEF1.

Předmět 02TEF1 lze absolvovat až po absolvování předmětu 02MECHZ.Předmět 02TEF2

Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) Experimental Physics 02EXF Jaroslav Adam, Barbara Antonina Trzeciak, Jaroslava Óbertová, Katarína K ížková Gajdošová **Jaroslava Óbertová** Katarína K ížková Gajdošová (Gar.) ZK 2 2P+0C Ζ Ρ **Experimental Laboratory 1** 02PRA1 ΚZ 0+4 Ζ Р Libor Škoda, Jaroslav Biel ík **Jaroslav Biel ík** Jaroslav Biel ík (Gar.) Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.) 02PRA2 ΚZ 6 0+4 L Р Calculus B 3 01ANB3 Z,ZK 8 4P+4C Ρ Miroslav Kolá, Milan Krbálek **Milan Krbálek** Miroslav Kolá (Gar.) Calculus B 4 Z,ZK 01ANB4 6 2P+4C Ρ Ji í Mikyška, Miroslav Kolá Ji í Mikyška Milan Krbálek (Gar.)

12NME1	Numerical Methods 1 Pavel Váchal Pavel Váchal (Gar.)	Z,ZK	4	2+2	L	Р
02TEF1	Theoretical Physics 1 Petr Novotný Michal Jex Igor Jex (Gar.)	Z,ZK	4	2+2	Z	Р
02TEF2	Theoretical Physics 2 Petr Novotný, Filip Petrásek Josef Schmidt Petr Novotný (Gar.)	Z,ZK	4	2+2	L	Р
02TSFA	Thermodynamics and Statistical Physics Igor Jex, Jaroslav Novotný Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	Р
02VOAF	Waves, Optics and Atomic Physics Josef Schmidt Jan Vysoký Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	Р

Characteristics of the courses of this group of Study Plan: Code=BSPJCF2 Name=BS P_J FB 2nd year

02EXF Experimental Physics ZK 2
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.

02PRA1 Experimental Laboratory 1

KZ 6

Lecture is intended especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear Engineering). But it can be also attended by students interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with theliterature), the implementation of the measurement (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation of results. At the same time practically extendthe knowledge gained in lectures on physics.

02PRA2 Experimental Laboratory 2

7

6

Lecture is intended especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear Engineering). But it can be also attended by students interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with theliterature), the implementation of the measurement (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation of results. At the same time practically extendthe knowledge gained in lectures on physics.

01ANB3 Calculus B 3

Z,ZK

8

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

4

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.

02TEF1

Theoretical Physics 1

Z,ZK

4

The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms as well as different approaches to description of dynamics (Newtons, 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).

02TEF2 Theoretical Physics 2

Z,ZK

(4

Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and classical field theory in the Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipole approximation.

02TSFA Thermodynamics and Statistical Physics

Z,ZK

. 4

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

Z.ZK

6

Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction to quantum 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.

Code of the group: BSPJCF3

Name of the group: BS P_J FB 3rd year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 10 courses

Credits in the group: 0

Note on the group:

Zkoušku z předmětu 01RMAF lze skládat až po složení všech zkoušek z Matematické

analýzy a Lineární algebry.

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
02BPJC1	Bachelor Project 1 Jaroslava Óbertová Jaroslav Biel ík (Gar.)	Z	5	0P+5C	Z	Р
02BPJC2	Bachelor Project 2 Jaroslava Óbertová Jaroslav Biel ík (Gar.)	Z	10	0P+10C	L	Р
02DPD1	Detectors and Principles of Detection 1 Solangel Rojas Torres, Jesus Guillermo Contreras Martin Štefa ák Jesus Guillermo Contreras (Gar.)	ZK	2	2P+0C	Z	Р
02DPD2	Detectors and Principles of Detection 2 Solangel Rojas Torres, Jesus Guillermo Contreras Martin Štefa ák Jesus Guillermo Contreras (Gar.)	ZK	4	4P+0C	L	Р
02KM1	Quantum Mechanics 1 Martin Štefa ák Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	Z	Р
02KM2	Quantum Mechanics 2 Martin Štefa ák Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	L	Р
01RMAF	Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	7	4P+2C		Р
02SF	Subatomic Physics Jan epila, lurii Karpenko Jan epila Jan epila (Gar.)	Z,ZK	6	4+2	Z	Р
02SF2	Subatomic Physics 2 Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	Z,ZK	6	4+2	L	Р
02VS1	Workshop 1 Jaroslav Biel ik Jaroslav Biel ik (Gar.)	Z	1	7D	Z	Р

02 7 3 1	Jaroslav Biel ík Jaroslav Biel ík (Gar.)		'	10	_	-
haracteristics	s of the courses of this group of Study Plan: Code=BSPJCF3	Name=BS P_J FB	3rd year			
D2BPJC1	Bachelor Project 1	-			Z	5
	elor project is based on a topic approved by the administrators of the programme, de	epartment and by the dean.	The student	is guided by	the project s	supervisor
	jular meetings and discussions.			,		
2BPJC2	Bachelor Project 2				Z	10
bstract: The bache	elor project is based on a topic approved by the administrators of the programme, de	epartment and by the dean.	The student	is guided by	the project s	supervisor
uring common reg	jular meetings and discussions.			,		·
2DPD1	Detectors and Principles of Detection 1				ZK	2
bstract: The lectur	res introduce the main forms of interaction of some particles with matter. The goal is	that the student gets an ov	erview of wh	at type of pro	cesses are	possible and
n which situations t	they may be dominant. Some applications to Medicine and to study the fundamenta	I structure of matter are pre	sented.			
2DPD2	Detectors and Principles of Detection 2				ZK	4
bstract: The lectur	res introduce the main ideas needed to understand how detector systems work. It w	ill be focused on gaseous d	etecting prine	ciples, scintila	ating principl	es and
emiconductor dete	ecting principles. Basic information about various detector constructions is provided.					
2KM1	Quantum Mechanics 1			Z	',ZK	6
Abstract: The lecture	e describes the birth of quantum mechanics and description of one particle and more	e particles by elements of th	e Hilbert spa	ce as well as	its time evol	ution. Besid
hat it includes desc	cription of observable quantities by operators in the Hilbert space and calculation of	their spectra.				
)2KM2	Quantum Mechanics 2			Z	',ZK	6
Abstract: The lectur	re expands the introduction to quantum mechanics with more general formalism of c	quantum theory, approximate	e methods ar	nd path integ	ral. It summa	arizes the
erminology and me	ethods used in various applications of quantum mechanics and prepares the students	s for an effective scientific re	search and fo	ırther study, i	n particular,	of the mode
ormulations of qua	ntum field theory.					
1RMAF	Equations of Mathematical Physics			Z	z,ZK	7
The subject of this of	course is solving integral equations, theory of generalized functions, classification o	f partial differential equation	s, theory of i	ntegral transf	formations, a	and solution
artial differential e	quations (boundary value problem for eliptic PDE, mixed boundary problem for elipt	ic PDE).				
2SF	Subatomic Physics			Z	',ZK	6
he goal of these le	ectures is to present basic knowledge of particle physics. Students will become fami	liar with the structure of the	matter, with	elementary i	nteractions a	and with bas
aws of microcosmo	os. Lectures will include basics of quantum mechanics and the theory of relativity ne	eded for the description of	elementary p	articles beha	vior. Student	ts will also
ecome familiar wit	h basic accelerating principles and with current particle physics experimental cente	rs.				
)2SF2	Subatomic Physics 2			Z	z,ZK	6
he aim of the cour	rse is to teach students the basics of physics of atomic nucleus. Students will acquir	e knowledgeabout the basic	properties of	of atomic nuc	lei and the w	vay they car
e measured. They	will learn basic models, whichdescribe the structure of the atomic nucleus and nuc	lear reactions. Part of the le	ctures is also	getting fami	liar with thep	hysics of th
osmic radiation an	d applications of nuclear physics.					

Abstract: Students will participate on annual Workshop J F, where they will present results obtained during the work on their bachelor thesis. During other presentations from students

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Name of the block: Compulsory elective courses

Minimal number of credits of the block: 0

Workshop 1

The role of the block: PV

02VS1

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

and staff, they will also get familiar with scientific topics developed at the department and with methods other colleagues use for their scientific work.

Credits in the group: 0

Note on the group	Only one of these co	ourses is obliga	atory.			
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 Jana Ková ová	Z	1	0+2	L	PV
00RET	Rhetoric Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	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 Jana Ková ová	Z	1	0+2		PV

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

00EKOT	Economy in Technology	Z	1
The course introduces t	he basics of micro- and macroeconomics.		
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 nonverb	oal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an	integral part of the	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 Jana Ková ová, Slav na Brownová Jana Ková ová	ZK	4		Z	PV
04XAPZK	English for Advanced Students Examination Slav na Brownová, Darren Copeland Jana Ková ová	ZK	4		Z	PV
04XCESZZK	Czech for Foreigners Beginners - Examination Slav na Brownová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XFMZK	French for Intermediate Students Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4		Z	PV
04XFPZK	French for Advanced Students Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4		Z	PV
04XFZZK	French for Beginners Examination V ra Šlechtová V ra Šlechtová V ra Šlechtová (Gar.)	ZK	3		L	PV
04XNMZK	German for Intermediate Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	4		Z	PV
04XNPZK	German for Advanced Students Examination Miloslava echová Miloslava echová Miloslava echová (Gar.)	ZK	4		Z	PV
04XRMZK	Russian for Intermediate Students Examination Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4		Z	PV
04XRPZK	Russian for Advanced Students Examination Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4		Z	PV
04XRZZK	Russian for Beginners Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	3		L	PV
04XSMZK	Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo	ZK	4		Z	PV
04XSPZK	Spanish for Advanced Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Spanish for Advanced Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo	ZK	4		Z	PV
04XSZZK	Spanish for Beginners Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	3		L	PV

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

04XAMZK	English for Intermediate Students Examination	ZK	4
The course content	is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of tw	o parts - written (100 m	nin) and oral
20-30 min). The stu	dent is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English	h courses.	
4XAPZK	English for Advanced Students Examination	ZK	4
	is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the a		•
the three AP cour	ses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic	from the student's field	d of study.
4XCESZZK	Czech for Foreigners Beginners - Examination	ZK	4
he 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 t	the 04XCESZ1,2,3 cou	rses and can
nly be taken after s	successful completion of all three courses. Detailed information is to be obtained from the teacher.		
4XCESMZK	Czech for Intermediate Students Examination	ZK	4
	is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of t	the CESM1,2,3 courses	s and can only
e taken after succe	ssful completion of the 3 courses. Detailed information is to be obtained from the teacher.		
4XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4
	is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of t	the CESP1,2,3 courses	and can only
e taken after succe	ssful completion of the 3 courses. Detailed information is to be obtained from the teacher.		
4XFMZK	French for Intermediate Students Examination	ZK	4
	xamination as given by the study programme. The whole French programme is ended with an examination covering the cor	ntents of FM1-FM3. The	examination
	and oral part and is organized according to Examination Instructions, a document available on the web.		
4XFPZK	French for Advanced Students Examination	ZK	4
-	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an ora	al part and is organized	d according to
	tions, a document available on the web. Assessment of the presentation is included into the examination grading.		
4XFZZK	French for Beginners Examination	ZK	3
	xamination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The	e examination is ruled b	y the docume
	nation. Its content covers the levels FZ1 - FZ5.		
4XNMZK	German for Intermediate Students Examination	ZK	4
	is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an exam		-
	er the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 a	ssessment. More detail	led information
to be obtained fro		717	
4XNPZK	German for Advanced Students Examination	_ ZK	. 4
	is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination as given by the study plan. The explorate follows after possing the written part suggestibly and after obtaining the OANDS up		
	er the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 un obtained from the teacher.	graded assessment. W	ore detailed
		ZK	
4XRMZK	Russian for Intermediate Students Examination is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the	1	4
	eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given ins	-	-
4XRPZK	Russian for Advanced 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		•
	eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given ins	-	-
4XRZZK	Russian for Beginners Examination	ZK	3
4/17/2/17	is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the	ı	_
he course content			cquired iii i\Z
		-	r
RZ5. Students are	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given inst	tructions by the teacher	r. 1
RZ5. Students are 4XSMZK	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instance and Spanish for Intermediate Students Examination	tructions by the teacher	4
RZ5. Students are 4XSMZK he course content	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instance Spanish for Intermediate Students Examination s the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the	tructions by the teacher	4
RZ5. Students are 4XSMZK The course content on-graded assessr	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instance Spanish for Intermediate Students Examination s the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the ment for course SM3.Oral examination follows the written part.	tructions by the teacher ZK written part, students w	4 ill have obtaine
RZ5. Students are 04XSMZK The course content on-graded assessr 04XSPZK	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instances are given instances and a successful written examination. Students are given instances are given instances are given instances are given instances. Spanish for Intermediate Students Examination consists of two parts - written and oral; to be eligible for the ment for course SM3. Oral examination follows the written part. Spanish for Advanced Students Examination	tructions by the teacher ZK written part, students w	4 ill have obtaine 4
RZ5. Students are 4XSMZK he course content on-graded assessr 4XSPZK he course content	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instanced by Spanish for Intermediate Students Examination s the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the ment for course SM3. Oral examination follows the written part. Spanish for Advanced Students Examination s the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequipment of the presequence of two parts or two parts or two parts.	tructions by the teacher ZK written part, students w	4 ill have obtaine 4
RZ5. Students are 4XSMZK he course content on-graded assessr 4XSPZK he course content assed the written t	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instance and a successful written examination. Students are given instance and a successful written examination. Students are given instance and a successful written examination. Students examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the ment for course SM3. Oral examination follows the written part. Spanish for Advanced Students Examination space are spanination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequest. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student.	tructions by the teacher ZK written part, students w ZK isite for admission to or	4 ill have obtaine 4 ral part is havii
RZ5. Students are 4XSMZK he course content on-graded assessr 4XSPZK he course content assed the written t 4XSZZK	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instance and a successful written examination. Students are given instance and a successful written examination. Students are given instance and a successful written examination. Students examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the ment for course SM3. Oral examination follows the written part. Spanish for Advanced Students Examination is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequest. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student. Spanish for Beginners Examination	tructions by the teacher ZK written part, students w ZK uisite for admission to or	4 ill have obtain 4 ral part is havi
RZ5. Students are 4XSMZK he course content on-graded assessr 4XSPZK he course content assed the written t 4XSZZK	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instance in Spanish for Intermediate Students Examination s the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the ment for course SM3. Oral examination follows the written part. Spanish for Advanced Students Examination is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequest. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student. Spanish for Beginners Examination is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for	tructions by the teacher ZK written part, students w ZK uisite for admission to or	4 ill have obtaine 4 ral part is havi

Name of the block: Elective courses Minimal number of credits of the block: 0

The role of the block: V

Code of the group: BSPJCFV

Name of the group: BS P_J FB Optional courses

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

Credits in the group: 0

Note on the group:

Zápis předmětu 15CH2 podmíněn získáním zápočtu z předmětu 15CH1.

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 Martin Štefa ák Igor Jex (Gar.)	Z	2	2+0	Z	V

02DEF2	History of Physics 2 Igor Jex Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	L	V
01FKO	Functions of Complex Variable Severin Pošta, Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	3	2+1		V
02FYS1	Physical Seminar 1 Martin Štefa ák Filip Petrásek (Gar.)	Z	2	0+2	Z	V
04AKS	English Conversation Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
00MAM1	Essentials of High School Course 1 David Be Martin Stefa ák	Z	1	0+1		V
00MAM2	Essentials of High School Math Course 2 Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.)	Z	1	0+1		V
02NSAD1	Simulations and Data Analysis Tools 1 Zden k Hubá ek Zden k Hubá ek Zden k Hubá ek (Gar.)	Z	2	2P+0C	Z	V
02NSAD2	Simulations and Data Analysis Tools 2 Zden k Hubá ek Zden k Hubá ek Zden k Hubá ek (Gar.)	Z	2	2+0		V
18NES1	Neural Networks 1 Zuzana Pet í ková Zuzana Pet í ková	KZ	5	2P+2C	L	V
01NME2	Numerical Methods 2	KZ	2	2+0	L	V
15CH1	Michal Beneš Michal Beneš (Gar.) General Chemistry 1	Z	3	2+1	Z	V
15CH2	Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.) General Chemistry 2	Z,ZK	3	2+1	L	V
01PRST	Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.) Probability and Statistics	 Z,ZK	4	3+1	Z	V
18PRC1	Tomáš Hobzá Tomáš Hobza (Gar.) Programming in C++ 1		4	2+2	 	V
	Vladimír Jarý, Miroslav Virius Miroslav Virius Miroslav Virius (Gar.) Programming in C++ 2				_	
18PRC2	Vladimír Jarý, Miroslav Virius, Jakub Klinkovský Miroslav Virius Miroslav Virius (Gar.)	KZ	4	2+2	L	V
02STR	Special Theory of Relativity David Be Martin Štefa ák David Be (Gar.)	ZK	2	2+0	L	V
TV-1	Physical Education	Z	1		Z	V
TV-2	Physical Education	Z	1		L	V
TV-3	Physical education	Z	1	0+2	Z	V
TV-4	Physical education	Z	1	0+2	L	V
02UFEC	Introduction to Elementary Particle Physics Jaroslav Biel ik, Marek Matas Jaroslav Biel ik (Gar.)	Z	2	2+0	Z	V
17UING	Introduction to Engineering Jan Frýbort, Petr Haušild, Radek Mušálek Jan Frýbort (Gar.)	KZ	3	2P+1C	Z	V
02UKP1	Introduction to Curves and Surfaces Ladislav Hlavatý Martin Štefa ák Ladislav Hlavatý (Gar.)	Z	2	1P+1C	L	V
02UKP2	Introduction to Curves and Surfaces 2 Ladislav Hlavatý Martin Štefa ák Ladislav Hlavatý (Gar.)	Z	2	1P+1C	Z	V
02UKT	Introduction to Quantum Theory Martin Štefa ák Martin Štefa ák Martin Štefa ák (Gar.)	Z	2	2+0		V
01UP1	Introduction to Probability 1 Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	3	1P+1C		V
01UP2	Introduction to Probability 2 Milan Krbálek, Michaela Krbálková Michaela Krbálková Milan Krbálek (Gar.)	Z,ZK	3	1P+1C		V
12UNXAP	Introduction to UNIX Milan Kucha ik Milan Kucha ik Milan Kucha ik (Gar.)	Z	2	1P+1C	L	V
12VKT	Vacuum Technology Richard Švejkar Vojt ch Petrá ek Vojt ch Petrá ek (Gar.)	KZ	4	2P+2L	Z	V
12PYTH	Scientific Programming in Python Pavel Váchal, Jakub Urban Pavel Váchal Pavel Váchal (Gar.)	Z	2	0+2	L	V
12VTV	Scientific and Technical Computing	Z	2	1+1	L	V
18ZALG	Ivan Procházka Ivan Procházka Ivan Procházka (Gar.) Basics of Algorithmization Vladimír Jarý, Miroslav Virius, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková, František Gašpar Vladimír Jarý Miroslav Virius (Gar.)	Z,ZK	4	2+2	L	V
17ZEL	Basics of Electronics Martin Kropík Martin Kropík Martin Kropík (Gar.)	KZ	3	2+2	Z	V
02ZSM	Introduction to the Standard Model Zden k Hubá ek Zden k Hubá ek Zden k Hubá ek (Gar.)	ZK	2	2+0		V
01ROZ1	Image Processing and Pattern Recognition 1	ZK	4	2+2	L	V
01ROZ2	Image Processing and Pattern Recognition 2	ZK	3	2+1	Z	V

Characteristics of the courses of this group of Study Plan: Code=BSPJCFV Name=BS P_J FB Optional courses

02DEF1 History of Physics 1 Z 2
Physics and its place in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philosophers, Aristotle. Physics in Helenistic period, Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, Huygens. The birth of physics as experimental science. Newton and his work.

	History of Physics 2	Z	2
-	I mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. El		
. •	ı, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmanı Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear er		
· ·	ncept of Nature and Universe of today.	3,	
	Functions of Complex Variable	Z,ZK	3
	utlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable are		
•	d the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Ca norphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy (
theorem.	iorphio unional, ununjuo continuation, totatou omgalamico, are maximam modaleo philopio, ziou inio e trocrom, tro dedecty t	ootimatoo, Laaron	1001100, 1001000
02FYS1	Physical Seminar 1	Z	2
	to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical	-	course of
	s are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equi		
	English Conversation the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communi	Z	1
· · · · · · · · · · · · · · · · · · ·	has stated a sommunication situations and will master their communication strategy. They will also practise their listening skills in orde		-
	ent will be trained to express their ideas clearly and according to current English usage, and become a more confident speak		
00MAM1	Essentials of High School Course 1	Z	1
	to mathematical concepts and methods used in the introductory physics course.		
00MAM2 Review of basics of high	Essentials of High School Math Course 2	Z	1
02NSAD1	Simulations and Data Analysis Tools 1	Z	2
	ations of high energy elementary particle collisions. ROOT and Pythia programs.	_ 1	-
02NSAD2	Simulations and Data Analysis Tools 2	Z	2
	de implementation and testing of a program for generating of particle collision. Results are reviewed.		
18NES1	Neural Networks 1	KZ	5
	leural Networks 1" is to acquaint students with basic models of artificial neural networks, algorithms for their learning, and ot	her related machi	ne learning
	o teach students how to apply these models and methods to solve practical tasks. Numerical Methods 2	KZ	2
	numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equation		_
	s to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equa	•	
15CH1	General Chemistry 1	Z	3
•	cepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical	al use are illustrat	ed by examples
solved in exercises.	O and and Oh and other O	7.71/	
15CH2 The subject is the contin	General Chemistry 2 uation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using	Z,ZK	3 les the fact that
•	ciples is not restricted only to chemical processes is documented. The significance and practical use of explained principles a		·
in exercises.			
It is a hasic course of or	Probability and Statistics	Z,ZK	4
•	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition an	d continuing till th	e Kolmogorov
definition. The notions a	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and srandom variable, distribution function of random variable and characteristics of random variable are treated and basic limit to	d continuing till the theorems are state	e Kolmogorov
definition. The notions a On the basis of this theo	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and random variable, distribution function of random variable and characteristics of random variable are treated and basic limit try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are expl	d continuing till the theorems are state lained.	e Kolmogorov ed and proved.
definition. The notions a On the basis of this theo 18PRC1	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and srandom variable, distribution function of random variable and characteristics of random variable are treated and basic limit to	d continuing till the theorems are state	e Kolmogorov
definition. The notions a On the basis of this theo 18PRC1 This course covers main	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to ry the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explained. Programming in C++ 1	d continuing till the theorems are state lained.	e Kolmogorov ed and proved.
definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the o	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explainly programming in C++ 1 In the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 In the C+;+ programming language and the Standard Template	d continuing till the theorems are stated in the stated in	e Kolmogorov ed and proved. 4
definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the covers	babability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to ry the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explainly programming in C++ 1 ly the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 bject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity	d continuing till the theorems are stated in its desired in its de	e Kolmogorov ed and proved.
definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the covers	babability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explored programming in C++ 1 It is the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 It is the C+;+ programming language and the Standard Template Special Theory of Relativity Owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals.	d continuing till the theorems are stated lained. Z KZ Library. ZK	e Kolmogorov ed and proved. 4 4 2
definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the o 02STR Students extend their kr	babability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explored programming in C++ 1 by the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 beject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals. Physical Education	d continuing till the theorems are stated lained. Z KZ Library. ZK Z	e Kolmogorov ed and proved. 4 4 2
definition. The notions a On the basis of this theo 18PRC1 This course covers mair 18PRC2 This course covers the o 02STR Students extend their kr TV-1 TV-2	bability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explored programming in C++ 1 by the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 beject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals. Physical Education Physical Education	d continuing till the theorems are state lained. Z KZ Library. ZK Z Z	e Kolmogorov ed and proved. 4 4 2 1
definition. The notions a On the basis of this theo 18PRC1 This course covers mair 18PRC2 This course covers the o 02STR Students extend their kr TV-1 TV-2 TV-3	bability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explored programming in C++ 1 by the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 beject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals. Physical Education Physical Education Physical education	d continuing till the theorems are state lained. Z KZ Library. ZK Z Z Z Z	e Kolmogorov ed and proved. 4 4 2 1 1 1
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definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the o 02STR Students extend their kr TV-1 TV-2 TV-3 TV-4 02UFEC	bability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to try the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explored programming in C++ 1 by the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 beject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals. Physical Education Physical Education Physical education	d continuing till the theorems are state lained. Z KZ Library. ZK Z Z Z Z Z	e Kolmogorov ed and proved. 4 4 2 1 1 1
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definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the or 02STR Students extend their km TV-1 TV-2 TV-3 TV-4 02UFEC The course provides an 17UING This course provides int and production, quality a 02UKP1 The goal of the lecture is Frenets formulae are expected and 19UKP2 The lecture extends the the mean and Gaussian 02UKT The aim of the lecture is	bability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to the programming in C++ 1 by the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explored programming in C++ 1 by the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 bject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals. Physical Education Physical Education Physical education Physical education Introduction to Elementary Particle Physics easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject at Introduction to Engineering oduction to Engineering oduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and belissurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be included. Introduction to Curves and Surfaces as an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts of plained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential particular to Curves and Surfaces 2 course 02UKP1. The properties of the first fundamental form are briefly summarized. The concept of the second fundamental curvature. Finally, the usual concepts of Riemann geometry are introduced. Introduction to Quantum Theory to introduce the basic principles of quantum theory and its interpretation on simple examples.	d continuing till the theorems are stated lained. Z KZ Library. ZK Z Z Z Z Z Are presented. KZ havior, basics of reart of the lecture a lained are form is introduced.	e Kolmogorov ed and proved. 4 4 2 1 1 1 2 3 nanufacturing 2 introduced re the examples 2 ed, leading to 2
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definition. The notions a On the basis of this theo 18PRC1 This course covers main 18PRC2 This course covers the course course course course and 17UING This course provides and 17UING This course provides into and production, quality and production, quality and production production course co	babability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and random variable, distribution function of random variable and characteristics of random variable are treated and basic limit to gradom variable, distribution function of random variable and characteristics of random variable are treated and basic limit to gradom variable, distribution parameters and hypothesis testing are explementally the C programming in C++ 1 by the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 bject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Special Theory of Relativity owledge of classical, non-quantum mechanics of the special theory of relativity fundamentals. Physical Education Physical Education Physical education Physical education Introduction to Elementary Particle Physics easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject a Introduction to Engineering oduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and belissurance, environmental impacts.). In addition, the introduction to scientific work and technical drawing will be included. Introduction to Curves and Surfaces an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts of plained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential particurvature. Finally, the usual concepts of Riemann geometry are introduced. Introduction to Quantum Theory to introduction to Probability 1	d continuing till the theorems are stated lained. Z KZ Library. ZK Z Z Z Z Z Are presented. KZ havior, basics of recorder of the lecture a lain form is introduced. Z Z,ZK Jeometry, Bertrand	e Kolmogorov ed and proved. 4 4 2 1 1 1 2 3 nanufacturing 2 introduced re the examples 2 ed, leading to 2 ds paradox

01UP2	Introduction to Probability 2	Z,ZK	3
	ntinuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction		
•	nerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristic	s. 6. Elementary m	nethods for point
	ing pseudorandom numbers from the selected distribution.		
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	computer. Network	(services:
•		1/7	
12VKT	Vacuum Technology	KZ	4
•	concepts and relations; diffusion,flow of rarefied gases. Flow and current of gas, conductivity. Interaction of gas with solid sur matter; evaporation, condensation;Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and their		
	finalter, evaporation, condensation, vacuum generation. Fumping proces, olumative pressure, Fumping speed Fumps and their ding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Adso		•
	pumpsVacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. Ma		
and seals.Practical exe		atorialo aria vacaa	iii componento
12PYTH	Scientific Programming in Python	Z	2
	s to learn the fundamentals of the modern Python programming language with a focus on scientific computing. Emphasis is p	- 1	l
	s performed in an interactive form of practical exercises, whose topics can be tailored to the content of other subjects or stude		
	earch. In the introductory part of the course, students learn the basic features of Python?from basic types to object oriented or		
greater part of the cours	se focuses on specific features of Python for scientific programming. Presented are the main numerical libraries NumPy, SciF	Py and the Matplot	tlib graphics
ibrary. We show how to	generate efficient code, how to combine Python with other languages, what tools are available.		
12VTV	Scientific and Technical Computing	Z	2
The students get familia	ar with methods of solving of computational problems in the scientific and technical practice, and with methods of their progra	amming. The cours	se is oriented
mainly to programming	in the Fortran language.		
18ZALG	Basics of Algorithmization	Z,ZK	4
This course is devoted	to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the	he algorithm comp	olexity.
17ZEL	Basics of Electronics	KZ	3
_ectures provide basic	information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and	d solution of electr	ical circuits with
hem. Next, lectures dea	al with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor compo	onents with more	layers (thyristors
,	ntinue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/o	digital converters.	Lectures are
	nic laboratory exercises.		
02ZSM	Introduction to the Standard Model	ZK	2
•	ons, baryons, mesons, symmetry, symmetry group, quarks, gluons, partons, standard model of electroweak and strong intera	actions, quantum o	hromodynamics
· · · · · · · · · · · · · · · · · · ·	cattering cross section.		
01ROZ1	Image Processing and Pattern Recognition 1	ZK	4
•	on image processing and pattern recognition. Major attention is paid to image sampling and quantization, image preprocessing (•	•
	rring, Wiener filtering, blind deconvolution), edge detection, morphology and geometric transformations and warping. Numero	ous applications a	nd experimental
esults are presented in	addition to the theory.		

01ROZ2 Image Processing and Pattern Recognition 2 ZK

The course is a continuation of ROZ1. Major attention is paid to features for shape description and recognition, and to general pattern recognition techniques. Numerous applications and experimental results are presented in addition to the theory.

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

Credits in the group: 0 Note on the group.

Note on the gi	oup.					
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAM1	English for Intermediate Students M1 Jana Ková ová	Z	2	0+2	Z	V
04XAM2	English for Intermediate Students M2 Jana Ková ová	Z	2	0+2	L	V
04XAM3	English for Intermediate Students M3 Jana Ková ová	Z	2	0+2	Z	V
04XAP1	English for Advanced Students P1 Jana Ková ová	Z	2	0+2	Z	V
04XAP2	English for Advanced Students P2 Jana Ková ová	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 Jana Ková ová	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 Jana Ková ová (Gar.)	Z	2	28	Z	V

04XCESM1	Czech for Foreigners - Intermediate 1 Jana Ková ová Jana Ková ová (Gar.)	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 Jana Ková ová 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 Jana Ková ová 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 V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP1	French for Advanced Students P1	Z	2	0+2	Z	V
04XFP2	V ra Šlechtová V ra Šlechtová (Gar.) French for Advanced Students P2	Z	2	0+2	L	V
04XFP3	V ra Šlechtová V ra Šlechtová (Gar.) French for Advanded Students P3	Z	2	0+2	Z	V
04XFZ1	V ra Šlechtová V ra Šlechtová (Gar.) French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2	Z	2	0+4	Z	V
04XFZ3	V ra Šlechtova V ra Šlechtová (Gar.) French for Beginners Z3	Z	2	0+4	L	V
04XFZ4	V ra Šlechtová V ra Šlechtová (Gar.) French for Beginners Z4 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ5	V ra Šlechtova V ra Šlechtova (Gar.) French for Beginners Z5	Z	2	0+4	L	V
04XNM2	V ra Šlechtová V ra Šlechtová (Gar.) German for Intermediate Students M2	Z	2	0+4	L	V
	Miloslava echová Miloslava echová (Gar.) German for Intermediate Students M1	Z	2	0+2	Z	
04XNM1	Miloslava echová Miloslava echová (Gar.) German for Intermediate Students M3		_		_	V
04XNM3	Miloslava echová Miloslava echová (Gar.) German for Advanced Students P1	Z	2	0+2	Z	V
04XNP1	Miloslava echová Miloslava echová (Gar.) German for Advanced Students P2	Z	2	0+2	Z .	V
04XNP2	Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XRM1	Russian for Intermediate Students M1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRM2	Russian for Intermediate Students M2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRM3	Russian for Intermediate Students M3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP1	Russian for Advanced Students P1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP2	Russian for Advanced Students P2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRP3	Russian for Advanced Students P3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRZ1	Russian for Beginners Z1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ2	Russian for Beginners Z2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ3	Russian for Beginners Z3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ4	Russian for Beginners Z4 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ5	Russian for Beginners Z5 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XSM1	Spanish for Intermediate Students M1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSM2	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSM3	Spanish for Intermediate Students M3	Z	2	0+2	Z	V
04XSP1	Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Spanish for Advanced Students P1	Z	2	0+2	Z	V

04XSP2	Spanish for Advanced Students P2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSP3	Spanish for Advanced Students P3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSZ1	Spanish for Beginners Z1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ2	Spanish for Beginners Students Z2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ4	Spanish for Beginners Z4 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ5	Spanish for Beginners Z5 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V

U4XSZ4	Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)		2	0+4		V
04XSZ5	Spanish for Beginners Z5 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
Characteristics of the	e courses of this group of Study Plan: Code=BSPJAZYKYZA	P Name=BS P	iazvky za	ın		
04XAM1 En The course is designed for s of Reference for Languages	nglish for Intermediate Students M1 students who have successfully completed the full secondary school English languate (CEFR). It provides an introduction into English for Specific and Academic Purpose a communication situations. Thus it covers topics related to the student's life and ne	ge course at least at es (ESP, EAP), i.e., i	t the A2 level	of the Comentals of voc	cabulary and s	style typical
	grammar issues used in EAP.					
The AM2 course expects the	nglish for Intermediate Students M2 e student to have completed the AM1 course. It develops their skills for work with so SP and EAP (e.g., definition, existence and classification of phenomena, object desc		_	-	-	
The course develops the skil understanding of profession	nglish for Intermediate Students M3 Ills that enable students to cope with features typical of professional style. Increasing the texts. Great emphasis is placed on distinguishing different levels of formal and in proceed includes studying abstracts and rules for writing them as well as basic rules for proceedings.	formal oral and writte	en communi	cation and t	heir appropria	ate Czech
04XAP1 En	nglish for Advanced Students P1				Z	2
of Reference for Languages grammar, and style typical o covers professional oral and	students who have successfully completed the full secondary school English langua - CEFR). It provides an introduction into English for Specific and Academic Purpos of professional oral and written communication situations (fundamentals of terms in written communication on topics related to the undergraduate's life and needs. It dev to revision of selected grammar topics is included.	es (ESP, EAP), i.e., mathematics and ph	into the fund nysics, definit	damentals o tions, graph	f vocabulary, f descriptions,	functions, etc). It also
The AP2 course is based or the students' needs it conce of descriptions, and, if possi The course extends the stud	nglish for Advanced Students P2 n AP1, thus extending the student's skills for working with subtechnical texts, and eventrates on chosen grammar topics, but mainly intends to develop understanding of ible, a case study). Increasing emphasis is placed on the undergraduate's independent's subtechnical vocabulary, and includes fundamental notions of chosen branch, cohesion and coherence in texts.	syntactic structures dent work with and re	and typical reading of ling	rhetorical fu guistically m	inctions (e.g., nore demandir	various type
The AP3 course is based on communication skills and ful also preparing a project on a	nglish for Advanced Students P3 AP2 and expects the student to work without any guidance with authentic profession nctions (e.g., expressing an opinion, agreement, and objections; taking part in discreasive or chosen topic and presenting it. The course places emphasis on distinguis	ussion, note-taking;	summarizing	ı, writing an	abstract) and	l, if possible,
communication. 04XCESZ1 Cz	zech for Foreigners - Beginners 1				7	2
The course is designed for sacquire basic language and	students of the English programme. Students will become acquainted with the main speaking skills. The course focuses on pronunciation exercises, simple social phra is roughly lessons 1-3 of estina Express (Czech Express) by L. Holá and P. Bo ilon	ses, and oral and wr			nmar features)) and they w
The language and communi	zech for Foreigners - Beginners 2 ication competences acquired in CESZ1 are further developed. Students deepen th . The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilov	-	declension	and conjug	Z ation system a	2 and practise
04XCESZ3 Cz The course further develops fixing correct pronunciation a	zech for Foreigners - Beginners 3 s the language and communication competences acquired in the XCESZ1 and XCE and deepening grammar, features through practice, as well as introducing the CzecThey also practise understanding texts in terms of main ideas or looking for specific of the communication of th	SZ2 courses. The te h culture. Students a	are asked to	produce sin	nple texts and	they practis
	zech for Foreigners - Intermediate 1 rrect pronunciation, important morphological phenomena, prepositional phrases, and	d verb forms as well a	as on extend	ing the stude	Z ent´s vocabula	2 ary for variou
The course develops the top	zech for Foreigners - Intermediate 2 pics covered in CESM1 and is then focused on more difficult grammar phenomena.	It practices writing,	speaking, an	nd reading s	Z kills and trains	2 s the studen
04XCESM3 Cz	bbreviations, abbreviated words, and mathematical terms and formulas. zech for Foreigners - Intermediate 3 phological topics covered earlier and extends the student's knowledge of more diff	cult language pheno	omena. It is e	especially fo	Z cused on styli	2 istics and
lexicology and on developing	g the student's writing skills.					
The prerequisite of the cours It is focused partly on revision basics of functional style of	zech for Foreign Students - Advanced 1 se is very good knowledge of the Czech language, i.e., communicative competences on of standard language structures, but mainly on practising more complex gramma engineering and professional communication, both in spoken and written form. The h teachers and faculty administrators.	itical structures typic	al of the styl	e of science	e. Students ar	e taught the

includes communication with teachers and faculty administrators.

04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extends the emphasis on individual	student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical awork.	nd specialist texts	placing greater
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
· ·	e student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation	on, and, finally, pre	esentation of the
	g skills necessary for professional communication are trained.	7	
04XFM1	French for Intermediate Students M1 M The objective of this three-semester course is to improve and further develop communication in the French language in bo	Z th written and oral	2 I form Students
	cate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tra-		
	problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, sy	=	
•	study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, per		
	ture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work		
04XFM2 Course FM2 builds on F	French for Intermediate Students M2 M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science	Z texts. features typi	2 ical for technical
	(passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scie		
scientists, artists and ar	chitects. Description of an object, device, shapes, dimensions, material.		
04XFM3	French for Intermediate Students M3	Z	2
	n improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (a mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cl		
	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w		
and one's own knowled	ge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and c	coherence.	
04XFP1	French for Advanced Students P1	Z	2
	e objective of this three-semester course is to improve and further develop communication in the French language in both wr		
	in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit gene The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are re		
•	it, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactiona	-	- 1
request, answer to an a	elvert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topi	cs of specializatio	n: mathematics,
	stry. Reading of technical and popular science texts, further work with these texts and interpretation.		
04XFP2	French for Advanced Students P2	Z	2
	ents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication or communication are stressed (passive voice, nominalization, word formation).	n given topics. Fea	atures typical of
04XFP3	French for Advanded Students P3	Z	2
	n systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in	engineering envir	onment. Special
	ter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cov	ers a technical /ap	pplied science
topic. It is a creative wo	k compiled from 3 French sources. Preparation of several set topics for oral examination.		
047074		7	
	French for Beginners Z1	Z Socializing and in	2 professional life.
French for beginners Th		socializing and in p	orofessional life.
French for beginners Th The course includes Fre	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in s	socializing and in perfect to communicate	orofessional life. at elementary
French for beginners Th The course includes Fre level, actively using the (Francouzština pro za a	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in sench for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda te ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions,	socializing and in p to communicate ová, French for be personal informa	orofessional life. at elementary ginners
French for beginners The course includes Fre level, actively using the (Francouzština pro za a giving the directions, sin	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in sench for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda text. It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, apple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation.	socializing and in p to communicate ová, French for be personal informa	orofessional life. at elementary ginners tion, asking and
French for beginners The course includes Fre level, actively using the (Francouzština pro za a giving the directions, sin 04XFZ2	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in search for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda te ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, nople instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciat French for Beginners Z2	socializing and in particle to communicate by the communicate by the communicate personal information and grammar.	orofessional life. at elementary ginners tion, asking and
French for beginners The course includes Fre level, actively using the (Francouzština pro za a giving the directions, sir 04XFZ2 The course is linking up	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in sench for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda text. It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, apple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation.	socializing and in page to communicate by french for beginning personal information and grammar. Z he textbook: Prave	orofessional life. at elementary ginners tion, asking and 2 da - Pravdová:
French for beginners The course includes Fre level, actively using the (Francouzština pro za a giving the directions, sin 04XFZ2 The course is linking up French for Beginners . A thanking, travelling, map	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in sent of respecific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdo teken knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdo teken knowledge with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, not instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation for Beginners Z2 with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the diditional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication is practiced.	socializing and in page to communicate by and in personal information and grammar. Z he textbook: Pravent - disagreement	orofessional life. at elementary ginners tion, asking and 2 da - Pravdová: t, apology,
French for beginners The course includes Fre level, actively using the (Francouzština pro za a giving the directions, sin 04XFZ2 The course is linking up French for Beginners . A thanking, travelling, may How does the machine	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in senth for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda te ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, apple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciat French for Beginners Z2 with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the diditional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication work? A few expressions concerning the study. Name of University and Faculty.	socializing and in particular to communicate ová, French for beginner personal information and grammar. Z he textbook: Pravient - disagreemen unication. Specific	orofessional life. at elementary ginners tion, asking and 2 da - Pravdová: t, apology, topics covered:
French for beginners The course includes Frelevel, actively using the (Francouzština pro za a giving the directions, sin 04XFZ2 The course is linking up French for Beginners . A thanking, travelling, may How does the machine 04XFZ3	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in senth for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda te ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, apple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciat French for Beginners Z2 with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the diditional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication for Beginners Z3 French for Beginners Z3	socializing and in the to communicate by a french for being personal information and grammar. Z he textbook: Pravient - disagreemen unication. Specific	orofessional life. at elementary ginners tion, asking and 2 da - Pravdová: t, apology, topics covered:
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04XNM3 German for Intermediate Students M3	Z	2
The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relative course introduces of the course introduced of		
the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers a	٠,	
practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course syst phenomena important for professional discourse (participles, relative clauses).	ematically revises o	tner grammatical
04XNP1 German for Advanced Students P1	Z	2
This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be	1	1
course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading techniques)		
more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses of	*	
i.e., telephoning.		
04XNP2 German for Advanced Students P2	Z	2
The course develops the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extends the students of t		
vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding a		I communication,
both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech		
O4XNP3 German for Advanced Students P3 The course consists of 3 main parts (general communicative cituations, grammar and technical topics). Students will develop their vessibulary in a	Z	2
The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a (traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the	-	
nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are us		
students are trained to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form.		-
practice to and from German.		
04XRM1 Russian for Intermediate Students M1	Z	2
The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alpha		•
basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, a		
they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement of the source correspond approximately to the R73 source, but for helf of the time alletted in the timestable.	int level of the RZ2	course. The
contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.	7	
04XRM2 Russian for Intermediate Students M2 The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	Z	2
04XRM3 Russian for Intermediate Students M3	Z	2
The course develops the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5,	_	_
in the timetable.	nowever, for riali of	the time anotted
04XRP1 Russian for Advanced Students P1	Z	2
The entrance requirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures,	l	I
structures, understanding the fundamentals of technical language and training writing skills.	J	J
04XRP2 Russian for Advanced Students P2	Z	2
The course is based on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passive	s, verb aspects, spe	ecific syntactic
structures). Stress is put on independent oral and written communication.		
04XRP3 Russian for Advanced Students P3	Z	2
The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraph	-	
courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral a	•	
develop their subtechnical vocabulary and practice guick and correct communication in professional situations. They will be able to both speak writ	•	,
technical topics.	o according and wi	ar comiderios cir
04XRZ1 Russian for Beginners Z1	Z	2
The course represents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Ru	ussian. Thus it begin	s with mastering
the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and spe	aking). Students wil	I be able to read
a short text with marked stress, understand its contents and summarize it.		
04XRZ2 Russian for Beginners Z2	Z	2
The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short		
able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They we want to find a sentence of the property of the sentence of th	ill also develop thei	r vocabulary and
master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.		
04XRZ3 Russian for Beginners Z3 The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for tr.	Z	2 of roading skills
and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will	_	_
understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4 Russian for Beginners Z4	Z	2
The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts w	1	I
words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular v	erbs, differences in	verb patterns
from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time		
communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g., Siberia), learn	how to fill in
forms, look up the information from the timetable, learn about Russian holidays and typical meals.		
04XRZ5 Russian for Beginners Z5 The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. unders	Z	2
information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts.		_
everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communical		
passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite req		
04XSM1 Spanish for Intermediate Students M1	Z	2
The course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-ser	1	Į.
vocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, neg	•	•
subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts		Υ
O4XSM2 Spanish for Intermediate Students M3	Z	2
The course develops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for able to work with specialized texts on the Internet	or specific purposes	s in order to be
able to work with specialized texts on the Internet.		

04XSM3	Spanish for Intermediate Students M3	Z	2
The course books are s	upplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acade	emic style. They v	vill be competent
enough to use the Inter	net in Spanish and search for information of their specialization or field of interest. Students will use the information to write s	hort articles and	summaries. The
final part of the progran	nme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.		
04XSP1	Spanish for Advanced Students P1	Z	2
Course concentrates or	n more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicati	on. Course prere	quisites: level B2
of CEFR.			
04XSP2	Spanish for Advanced Students P2	Z	2
Course SP2 is the second	nd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sy	ntax and focuses	on independent
written communication.			
04XSP3	Spanish for Advanced Students P3	Z	2
Course SP3 is the final	part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is f	ocused on writter	communication
based on what students	s will need in their career.		
04XSZ1	Spanish for Beginners Z1	Z	2
Course SZ1 is the first	stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundam	ental grammar st	ructures and will
be able to communicate	e at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish a	nd will develop it.	
04XSZ2	Spanish for Beginners Students Z2	Z	2
Course SZ2 is based or	n course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and le	exis will be choser	n so as to enable
them to understand sho	ort adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and ot	hers such as the	Czech Republic.
Realia of Spanish-spea	king countries are also included.		
04XSZ3	Spanish for Beginners Z3	Z	2
The course is based or	course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of	the Spanish-spe	aking countries,
mainly of Spain. It pays	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative	e). It includes writ	ten and oral
communication on a give	ven general topic, for which the student is trained by reading texts or listening to them.		
04XSZ4	Spanish for Beginners Z4	Z	2
The course is based or	course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanis	sh speaking coun	tries, mainly of
Spain. It pays attention	to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of t	he imperative, an	d subjunctive),
to written and oral com	munication 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 s	supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish	for specific purp	oses. In its final
part, the general Spani	sh course based on the course book will end with presentations and, finally, a written and oral examination.		

List of courses of this pass:

Code	Name of the course	Completion	Credits
00EKOT	Economy in Technology	Z	1
	The course introduces the basics of micro- and macroeconomics.	!	'
00ETV	Ethics of Science and Technology	Z	1
00MAM1	Essentials of High School Course 1	Z	1
!	Students are introduced to mathematical concepts and methods used in the introductory physics course.	ı	1
00MAM2	Essentials of High School Math Course 2	Z	1
'	Review of basics of high school mathematics.	•	1
00PT	Preparatory Week	Z	2
00RET	Rhetoric	Z	1
	ised 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	Z	1
01ANB3	Calculus B 3	Z,ZK	8
Expansion, Taylo equation and exact side, Euler different of set, completenes	puences 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 coetial equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and is of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourion or several equations of series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations.	of variables, hom fficients and special d non-isolated poir er series, trigonom derivatives and tan	ogeneous al right-hand nt, boundary etric Fourier
01ANB4	Calculus B 4	Z,ZK	6
prom nných, nel	o et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] ľ 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 Lebesgu derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.	ukce Lebesgueov	y míry. [7]
01FKO	Functions of Complex Variable	Z.ZK	3
The course starts fr	om outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable are exon and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caucl	rplained in detail: th	ne derivative

theorem, roots of a holomorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy estimates, Laurent series, residue theorem.

01LAL 1. Vector space. 2	Linear Algebra 1 Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of li theorem.	Z inear mappings. 7.	2 Frobenius
01LAL2	Linear Algebra 2	Z,ZK	4
Outline: 1. Invers	se matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian and	d quadratic forms.	5. Scalar
product and orthog	onality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse matri	ces. 2. Methods of	calculation
	3. Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonality		
	complements. 6. Geometry exercises and examples. 7. Adjoint operators.	,	
041.41.7		71/	
01LALZ	Linear Algebra 1, exam	ZK	2
01MAN	Calculus 1	Z	4
	Basic calculus (real analysis, functions of one real variable, differential calculus).		
01MAN2	Calculus 2	Z,ZK	8
	differential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence, operations on series, absolute an		ergence 3
	power series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integr		٠ ا
rtodi dila complex p	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral	alo. primilivoo, aon	into intograi
04848817		714	
01MANZ	Calculus 1, exam	ZK	4
01NME2	Numerical Methods 2	KZ	2
The course is devot	ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations.	It explains methods	s converting
bound	lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differ	ential equations.	
01PRST	Probability and Statistics	z,zk	4
ı		, , , , , , , , , , , , , , , , , , ,	- 1
	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and of	_	-
	ons as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the		ana provea.
	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing	ig are explained.	
01RMAF	Equations of Mathematical Physics	Z,ZK	7
The subject of this	course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral tr	ansformations, and	d solution of
•	partial differential equations (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).		
01ROZ1	Image Processing and Pattern Recognition 1	ZK	4
l l			
-	rse on image processing and pattern recognition. Major attention is paid to image sampling and quantization, image preprocessing (nois		-
snarpening, and de	e-blurring, Wiener filtering, blind deconvolution), edge detection, morphology and geometric transformations and warping. Numerous	applications and ex	xperimentai
	results are presented in addition to the theory.		
01ROZ2	Image Processing and Pattern Recognition 2	ZK	3
The course is a cor	ntinuation of ROZ1. Major attention is paid to features for shape description and recognition, and to general pattern recognition techn	iques. Numerous a	applications
	and experimental results are presented in addition to the theory.		
01UP1	Introduction to Probability 1	Z,ZK	3
	rith oddettorn to infoodability in probability and combinatorics 3.Probability and combinatorics 3.Probability and get in finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and get in the finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and get in the finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and get in the finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and get in the finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and get in the finite set of possible results.		-
		· · · · · · · · · · · · · · · · · · ·	
4.Conditional proba	ability, Bayes theorem, medical diagnosis, Simpsons paradox 5.Random variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and mean variable with discrete state space, its distribution and discrete state space, its distribution and discrete state space, its distribution and discrete state space and discrete state space and discrete state space and discrete state space and discrete state space.	/alue 6.Problems ir	nvolving the
	calculation of mean value 7.Probabilistic method in graph theory 8.Random algorithms, Morris algorithm and its variants		
01UP2	Introduction to Probability 2	Z,ZK	3
1. One-dimensiona	l continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction of	probability and co	nnection to
measure theory. 4. I	Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics. 6.	Elementary metho	ds for point
	estimations. 7. Generating pseudorandom numbers from the selected distribution.		-
02BPJC1	Bachelor Project 1	Z	5
	chelor project is based on a topic approved by the administrators of the programme, department and by the dean. The student is guide	l .	
Abstract. The bac		ed by the project s	upei visoi
	during common regular meetings and discussions.		
02BPJC2	Bachelor Project 2	Z	10
Abstract: The bac	chelor project is based on a topic approved by the administrators of the programme, department and by the dean. The student is guide	ed by the project s	upervisor
	during common regular meetings and discussions.		
02DEF1	History of Physics 1	Z	2
	ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo		
	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, F	•	-
r leieriistic periou,		luygens. The birth	or priyaica
	as experimental science. Newton and his work.		
02DEF2	History of Physics 2	Z	2
Development of	f classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	lectricity and magr	netism -
electrostatics, galv	anism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann.	The birth of moder	n quantum
and relativistic p	hysics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear en	ergy, Elementary p	particles,
	standard model. The concept of Nature and Universe of today.		
02DPD1	Detectors and Principles of Detection 1	ZK	2
	·	I	
Abstract: The lectu	res introduce the main forms of interaction of some particles with matter. The goal is that the student gets an overview of what type o		ossible and
	in which situations they may be dominant. Some applications to Medicine and to study the fundamental structure of matter are pre		
02DPD2	Detectors and Principles of Detection 2	ZK	4
Abstract: The le	ctures introduce the main ideas needed to understand how detector systems work. It will be focused on gaseous detecting principles	, scintilating princip	oles and
	semiconductor detecting principles. Basic information about various detector constructions is provided.		
02ELMA	Electricity and Magnetism	Z,ZK	6
	ulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits, cond		
_	·		- 1
	Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Electromagnetic waves, N		
02EXF	Experimental Physics	ZK	2
The goal of this sub	pject is to introduce the students the principles of physics measurements, their techniques, methods and instruments that are used for	such measureme	nts, and the
	analysis of measured data.		
02FYS1	Physical Seminar 1	Z	2
	levoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physics		
	inics. The problems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical labora	-	
iviecila	and the production are directly studied and presented by the students themselves, with the possibility to use FC and physical labora	nory oquipmento.	

201/14		7 717	_
02KM1	Quantum Mechanics 1	Z,ZK	6
Abstract: The lectur	e describes the birth of quantum mechanics and description of one particle and more particles by elements of the Hilbert space as we	Il as its time evoluti	on. Besides
	that it includes description of observable quantities by operators in the Hilbert space and calculation of their spectra.		
001/1/0		7.71/	
02KM2	Quantum Mechanics 2	Z,ZK	6
Abstract: The lec	ture expands the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and patl	າ integral. It summa	arizes the
terminology and me	ethods used in various applications of quantum mechanics and prepares the students for an effective scientific research and further stu	dy, in particular, of	the modern
	formulations of quantum field theory.		
02MECH	Mechanics	7	4
		. – .	· ·
Introduction to ph	ysics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle, sc	lving equations of	motion for
one-dimensional m	notion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles, two-body problems,	particle collisions.	Mechanics
	of a rigid body, rotation.		
02MECHZ	Mechanics - Examination	ZK	2
UZIVIECHZ		ZN I	
	The content of the subject is the examination according to the plan of studies.		
02NSAD1	Simulations and Data Analysis Tools 1	Z	2
<u> </u>	Data analysis and simulations of high energy elementary particle collisions. ROOT and Pythia programs.		_
22112122			
02NSAD2	Simulations and Data Analysis Tools 2	Z	2
	Individual work will include implementation and testing of a program for generating of particle collision. Results are reviewe	d.	
02PRA1	Experimental Laboratory 1	KZ	6
	·		_
	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear Engineering)		
attended by student	s interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with the	eliterature), the imp	lementation
of the measuremer	it (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	on of results. At the	same time
	practically extendthe knowledge gained in lectures on physics.		
0000040		1/7	•
02PRA2	Experimental Laboratory 2	KZ	6
Lecture is intended	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear Ei	ngineering). But it o	can be also
attended by student	s interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with th	eliterature), the imp	lementation
	at (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation		
		311 O1 1000110.7 tt ti10	odino umo
	practically extendthe knowledge gained in lectures on physics.		
02SF	Subatomic Physics	Z,ZK	6
The goal of these le	ectures is to present basic knowledge of particle physics. Students will become familiar with the structure of the matter, with element	arv interactions an	d with basic
	nos. Lectures will include basics of quantum mechanics and the theory of relativity needed for the description of elementary particles	•	
laws of fillerocosi		, benavior. Otagent	3 Will also
	become familiar with basic accelerating principles and with current particle physics experimental centers.		
02SF2	Subatomic Physics 2	Z,ZK	6
The aim of the cou	irse is to teach students the basics of physics of atomic nucleus. Students will acquire knowledgeabout the basic properties of atomic	c nuclei and the wa	y they can
	will learn basic models, whichdescribe the structure of the atomic nucleus and nuclear reactions. Part of the lectures is also getting		
bo mododrod: moj		iaiiiiai wiiii iiopii	y 0.00 01 1.10
	cosmic radiation and applications of nuclear physics.		
02STR	Special Theory of Relativity	ZK	2
'	Students extend their knowledge of classical, non-quantum mechanics of the special theory of relativity fundamentals.	'	
027554		Z,ZK	4
02TEF1	Theoretical Physics 1		-
	roduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms		
to description of c	lynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementar	y examples like the	two-body
problem, the motion	on 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).		,
007550		7.714	
02TEF2	Theoretical Physics 2	Z,ZK	4
Tensors and tran	sformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and	d classical field the	ory in the
Minkowski space-ti	me. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electron	nagnetic radiation i	n the dipole
·	approximation.	0	•
00755	···	7.71	
02TER	Heat and Molecular Physics	Z,ZK	4
Thermal expansion	of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynami	c principle, ideal ar	nd real gas,
entropy; non-chemi	cal systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity dist	ribution, equipartiti	on theorem.
02TSFA	Thermodynamics and Statistical Physics	Z,ZK	4
	nodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chateli		
Basics of many boo	dy descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical	ensemble, Fermi ç	gas, models
	of crystals and the black body radiation). The Boltzmann equation is usedto discusses simple transport phenomena.		
OOLIEEC			2
		' 7 '	_
02UFEC	Introduction to Elementary Particle Physics	Z	
The cours	Introduction to Elementary Particle Physics se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the su		d.
The cours 02UKP1	Introduction to Elementary Particle Physics se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the sum of the su	ubject are presente	d. 2
The cours 02UKP1 The goal of the le	Introduction to Elementary Particle Physics se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the su Introduction to Curves and Surfaces secture is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts for	bject are presente Z or the curves are ir	d. 2 ntroduced
The cours 02UKP1 The goal of the le	Introduction to Elementary Particle Physics se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the su Introduction to Curves and Surfaces secture is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts for the explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential part of the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature.	bject are presente Z or the curves are ir	d. 2 ntroduced
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02ZM1			
	Foundations of Physical Measurements 1	ZK	2
	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can		-
other branches. I	ne goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data basic habits of work in a physics lab.	on a PC. Stude	nts learn the
02ZM2	Foundations of Physical Measurements 2	KZ	4
	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can		1
	ne goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data		-
	basic habits of work in a physics lab.		
02ZSM	Introduction to the Standard Model	ZK	2
Particles, leptons,	nadrons, baryons, mesons, symmetry, symmetry group, quarks, gluons, partons, standard model of electroweak and strong interaction	s, quantum chro	omodynamics
04416	(QCD), cross section, scattering cross section.	7	1
04AKS	English Conversation	Z ion The student	1
	r various communication situations and will master their communication strategy. They will also practise their listening skills in order to		-
•	iscussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more conf		
04XAM1	English for Intermediate Students M1	Z	2
The course is design	ned for students who have successfully completed the full secondary school English language course at least at the A2 level of the Co	mmon Europea	ın Framework
	inguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of v	•	
professional oral a	and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical inte	rest. Attention is	also paid to
04XAM2	extending the knowledge of grammar issues used in EAP.	7	
•	English for Intermediate Students M2 expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more on	_	2
	pical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided with the course		
	revision is included.	g), g
04XAM3	English for Intermediate Students M3	Z	2
The course develop	os the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnica	vocabulary and	l independent
-	professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication a		
equivalents. The co	ourse 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
0.43/4.8.471/	student's field.	71/	1 4
04XAMZK	English for Intermediate Students Examination ent is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts.	ZK	4
	30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three Ei	-	iii) aliu olai
04XAP1	English for Advanced Students P1	Z	2
	gned for students who have successfully completed the full secondary school English language course (at least the B1 level of the Co	-	1
of Reference for	Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamenta	als of vocabulary	, functions,
	e typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, gra	•	-
covers professiona	oral and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writing (wri	ting a CV, letter o	of application,
04XAP2	polite request). If necessary, revision of selected grammar topics is included. English for Advanced Students P2	Z	2
-	based on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen bran-		. –
	s it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorical		_
	d, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguistically	functions (e.g.,	various types
The course extend			
	s the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writin	more demandi	ng materials.
	paragraph structure, linking, cohesion and coherence in texts.	more demanding the	ng materials. sentence and
04XAP3	paragraph structure, linking, cohesion and coherence in texts. English for Advanced Students P3	more demanding including the s	ng materials. sentence and
04XAP3 The AP3 course is	paragraph structure, linking, cohesion and coherence in texts. English for Advanced Students P3 based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It inc	more demanding including the second Z	ng materials. sentence and 2 al and written
04XAP3 The AP3 course is communication sk	paragraph structure, linking, cohesion and coherence in texts. English for Advanced Students P3 based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It incills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing	more demanding including the second Z Judes training or an abstract) and	ng materials. sentence and 2 al and written d, if possible,
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04XCESP3	Czech for Foreigners - Advanced 3	Z	2
The course develop	s the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation,	and, finally, preser	ntation of the
	student's project. Writing skills necessary for professional communication are trained.		
04XCESPZK	Czech for Foreign Students - Advanced 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	P1,2,3 courses a	nd can only
	be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.		
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
	ned for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and g		1
_	lage and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication	·	-
	situations. The course covers roughly lessons 1-3 of estina Express (Czech Express) by L. Holá and P. Bo ilová.		
04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
	communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and cor	niugation system a	1
33	basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.	,. 5	
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
	r develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on	_	1
	nciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce		-
	alogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly	-	
	1		omia onproo
04XCESZZK	Czech for Foreigners Beginners - 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 04X		1
The course conte	only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.	02021,2,0 00010	oo ana oan
04XFM1	French for Intermediate Students M1	Z	2
	l I	_	I
	ate FM The objective of this three-semester course is to improve and further develop communication in the French language in both w mmunicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tra		
	solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, syste	•	
	rious study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, persor	•	0 0
	French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, wo		
		7	
04XFM2	French for Intermediate Students M2		2
	on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science text		
and scientific lan	guage (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scie	nce and technolog	gy, French
0.4)/51.40	scientists, artists and architects. Description of an object, device, shapes, dimensions, material.	7	
04XFM3	French for Intermediate Students M3	Z	2
	ed on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (sub		
participie structur	es, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cla:	ss. I ne paper is iir	nkea to the
field of otyphopto' fur			
	ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work	compiled from Fre	ench articles
and one	ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work s's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi	compiled from Front and coherence	ench articles
and one	ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work e's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi French for Intermediate Students Examination	compiled from Front and coherence ZK	ench articles e. 4
and one	ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work of sown knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi French for Intermediate Students Examination e examination as given by the study programme. The whole French programme is ended with an examination covering the contents of	compiled from From and coherence ZK f FM1-FM3. The e	ench articles e. 4
and one 04XFMZK The content is the	ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work of sown knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi French for Intermediate Students Examination examination as given by the study programme. The whole French programme is ended with an examination covering the contents o consists of a written and oral part and is organized according to Examination Instructions, a document available on the web	compiled from From and coherence ZK f FM1-FM3. The educed.	ench articles 4 xamination
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and one 04XFMZK The content is the 04XFP1 FP advanced cours	ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work e's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi French for Intermediate Students Examination e examination as given by the study programme. The whole French programme is ended with an examination covering the contents o 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 se The objective of this three-semester course is to improve and further develop communication in the French language in both written	compiled from From and coherence ZK f FM1-FM3. The educe Z z and Call form. Sen and oral form. Sen	ench articles 4 examination 2 Students will
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notes, success of Fi	rench science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate clauses, t	orally in th	e class. The
04XFZZK			
	Subjunctive clauses, gerund, passive.	ypical conju	unctions,
I .	French for Beginners Examination	ZK	3
	mination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is		1
	Instruction for examination. Its content covers the levels FZ1 - FZ5.	,	
04XNM1	German for Intermediate Students M1	Z	2
•	urse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and structures		
· ·	cesses (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Republic and together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists, and th	-	
	ninology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandabi		iliais Ul II
04XNM2	German for Intermediate Students M2	Ž	2
l l	other more complex grammatical structures and their application in communication based on technical texts, such as the relation between t	technology	I
_	nning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car tech		
practise reading for info	rmation and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically rev	vises other	grammatica
0.47/NIN40	phenomena important for professional discourse (participles, relative clauses).		
04XNM3	German for Intermediate Students M3 other more complex grammatical structures and their application in communication based on technical texts, such as the relation between t	Z	and society
	nning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car tech	0,	•
	rmation and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically rev	٠,	
	phenomena important for professional discourse (participles, relative clauses).		
04XNMZK		ZK	4
	he examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting		
and oral, which cover t	the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. Mor is to be obtained from the teacher.	re detailed	information
04XNP1	German for Advanced Students P1	Z	2
l l	good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off a	_	1
course. The course is	then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It	revises and	d develops
more difficult grammar s	structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical ev	eryday com	nmunication,
0.47/NIDO	i.e., telephoning.		
04XNP2	German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending their ge	Z eneral and s	2
· · · · · · · · · · · · · · · · · · ·	oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and practising		
both v	written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect spe	ech).	
04XNP3	German for Advanced Students P3	Z	2
	of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variety of leading to the communicative situations of the communicative situation situation situation situations of the communicative situation situation situat		
•	ar accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocabulary i	•	
		· -	
·	eering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By mea		
·			s translation
·	pering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By mean process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The course a practice to and from German.	ZK	4
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04XRP3 Russian for Advanced Students P3	Z	2
The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing		
courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The	•	
these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students´ specialization, oral and wri levelop their subtechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accu		
technical topics.	ately and with confider	ice on
04XRPZK Russian for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge		· 1
- RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instru		
04XRZ1 Russian for Beginners Z1		2
The course represents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian.		
he Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking).	-	- 1
a short text with marked stress, understand its contents and summarize it.		
04XRZ2 Russian for Beginners Z2	Z	2
The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subter	chnical texts. Students	will be
ble to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also	•	ry and
master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in v		
04XRZ3 Russian for Beginners Z3		2
The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training		
and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be a state of an advantage of the state of an advantage of the state of the s	able to respond so as to	o be
understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4 Russian for Beginners Z4	ı	2
The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a ce		
words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs, from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), are	•	
communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g.,	•	
forms, look up the information from the timetable, learn about Russian holidays and typical meals.	,,	
04XRZ5 Russian for Beginners Z5	Z	2
The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding	_	
nformation from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Comm	-	- 1
everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication (v	erbal adjectives, partic	iples,
passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, pol	ite request, etc.)	
04XRZZK Russian for Beginners Examination		3
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge	= :	n RZ1
- RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instru	ctions by the teacher.	
04XSM1 Spanish for Intermediate Students M1	Ζ	2
The course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester and the secondary school is the secondary school of the secondary school o	•	
vocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading text		, and
04XSM2 Spanish for Intermediate Students M3	Z	2
The course develops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific productions are gradually acquainted with fundamentals of Spanish for specific productions.	-	
able to work with specialized texts on the Internet.	one purpoded in order	10 50
04XSM3 Spanish for Intermediate Students M3	Z	2
The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic	l l	
enough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short	articles and summarie	s. The
final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral exa	mination.	
04XSMZK Spanish for Intermediate Students Examination	ZK	4
he 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 pa	rt, students will have ob	tained
non-graded assessment for course SM3.Oral examination follows the written part.		
04XSP1 Spanish for Advanced Students P1	Z	2
Course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication.	Course prerequisites: le	vel B2
of CEFR.		
04XSP2 Spanish for Advanced Students P2		2
Course SP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax written communication.	and locuses on indepe	maent
	Z	2
04XSP3 Spanish for Advanced Students P3 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 focus	_	
based on what students will need in their career.	ed on whiten commun	loation
04XSPZK Spanish for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for account of 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 account of the course content is the examination as given by the study plan.	II.	-
passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the	· · · · · · · · · · · · · · · · · · ·	١
04XSZ1 Spanish for Beginners Z1	Z	2
Course SZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamenta	l l	
be able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanis	sh and will develop it.	
04XSZ2 Spanish for Beginners Students Z2	Z	2
Course SZ2 is based on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis		
hem to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others	such as the Czech Rep	public.
Realia of Spanish-speaking countries are also included.		
04XSZ3 Spanish for Beginners Z3	l l	2
The course is based on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the mainly of Spain. It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative).		
communication on a given general topic, for which the student is trained by reading texts or listening to them.	oragos writteri ariu	Jiui
5		

04XSZ4			
	Spanish for Beginners Z4	Z	2
	ed on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish attion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the		
	o written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listenir	•	ibjunctive),
04XSZ5	Spanish for Beginners Z5	Z	2
	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish fo	_	
	part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examina	tion.	
04XSZZK	Spanish for Beginners Examination	ZK	3
The course conte	nt is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination consists of two parts - written and oral.	amination only if h	e/she has
	passed the written examination test.		
12NME1	Numerical Methods 1	Z,ZK	4
•	I the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Met cists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computati		
important for physi	used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.	onar onvironmont	IVII) (II E) (IB 10
12PYTH	Scientific Programming in Python	Z	2
	se is to learn the fundamentals of the modern Python programming language with a focus on scientific computing. Emphasis is place	d on effective solu	tions to real
problems. The co	urse is performed in an interactive form of practical exercises, whose topics can be tailored to the content of other subjects or studer	nt theses. Students	are also
-	g research. In the introductory part of the course, students learn the basic features of Python?from basic types to object oriented or		_
greater part of th	e course focuses on specific features of Python for scientific programming. Presented are the main numerical libraries NumPy, SciPy	and the Matplotlib	graphics
12UNXAP	library. We show how to generate efficient code, how to combine Python with other languages, what tools are available. Introduction to UNIX	Z	2
_	ן perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfac	_	
•	ing systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working with		
	eter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard to		
X-windows. Con	puter networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a computer networks.	omputer. Network	services:
	hardware sharing, mail, scp, etc. Network applications		
12VKT	Vacuum Technology	KZ	4
•	basic concepts and relations; diffusion,flow of rarefied gases. Flow and current of gas, conductivity. Interaction of gas with solid surface		
· · · · · ·	olid matter; evaporation, condensation; Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and their pro	-	· ·
	n, Sliding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Adsorp etter pumpsVacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. Mater		
NEO pumps, ion g	and seals. Practical exercises.	iais and vacuum c	omponents
12VTV	Scientific and Technical Computing	Z	2
	familiar with methods of solving of computational problems in the scientific and technical practice, and with methods of their program	_	
	mainly to programming in the Fortran language.		
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 units used in chemistry are introduced in the course General Chemistry I.	se are illustrated b	y examples
	solved in exercises.		
15CH2	General Chemistry 2	Z,ZK	3
•	ontinuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using v	•	
the validity of these	principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are in exercises.	illustrated by exam	ipies soivea
17UING	Introduction to Engineering	KZ	
	es introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and beha		3
			3 nufacturing
;	and production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be	vior, basics of mar	
17ZEL		vior, basics of mar	
17ZEL	and production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be	vior, basics of mar e included. KZ	nufacturing 3
17ZEL Lectures provide be them. Next, lectures	Basics of Electronics asic information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and solution with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor components.	vior, basics of mar e included. KZ lution of electrical hts with more layer	3 circuits with s (thyristors
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