Study plan

Name of study plan: Quantum Technologies

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Quantum Technologies
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: BSPQT1 Name of the group: BS P_QTB 1st year Requirement credits in the group: Requirement courses in the group: In this group you have to complete at least 15 courses Credits in the group: 0 Note on the group:

Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Completion Credits Code Scope Semester Role members) Tutors, authors and guarantors (gar.) **History of Physics 1** 7 02DEE1 2 2+07 Ρ Igor Jex Martin Štefa ák Igor Jex (Gar.) **Electricity and Magnetism** Iskender Yalcinkaya, Josef Schmidt, Ji í Hrivnák, Goce Chadzitaskos, Jan Vysoký **Jan Vysoký** Josef Schmidt (Gar.) L 02ELMA Z,ZK 6 4+2 Р Linear Algebra 1 01LAL Ζ 2 2P+2C Р Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.) Linear Algebra 1, exam 01LALZ ΖK 2 0P+0C Р Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.) Linear Algebra 2 01LAL2 Z,ZK 4 2P+2C Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Р Dvo áková (Gar.) Calculus 1 01MAN Ζ 4 4 + 4Ρ Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.) Calculus 1, exam 01MANZ ΖK 4 0P+0C Ρ Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.) Calculus 2 4P+4C 01MAN2 Z,ZK 8 Р Miroslav Kolá, Edita Pelantová, Maksym Dreval Edita Pelantová Maksym Dreval (Gar.) **Mechanics** 02MECH Ζ 4 Ζ 4+2Р David B e Antonín Hoskovec David B e (Gar.) **Mechanics - Examination** Iskender Yalcinkaya, Goce Chadzitaskos, Stanislav Skoupý, Petr Novotný, David B e , Filip Petrásek, Antonín Hoskovec **Antonín Hoskovec** David 02MECHZ ΖK 2 Ζ _ Р Be (Gar.) **Preparatory Week** 00PT Ζ 2 Ζ Р týden Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.) **Heat and Molecular Physics** 02TER Z,ZK Δ 2+2 L Ρ Filip Petrásek Petr Novotný Petr Jizba (Gar.) Foundations of Physical Measurements 1 2 2P+0C Ζ 02ZM1 ΖK Ρ Solangel Rojas Torres, Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)

02ZM2	Foundations of Physical Measurements 2 Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	ΚZ	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=BSPQT1 Name=B	S P_QTB 1st	year			
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 Or	rientand Greece,	Greek natu	ral philosoph	ers, Aristotle	. Physics in
Helenistic period, Archin	ned. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano B	Bruno. Copernicu	s, Kepler, G	alileo, Huyge	ens. The birth	n of physics
as experimental science	Newton and his work.					
	Electricity and Magnetism				,ZK	6
Electric charge, Coulom	b's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectr	ics. Electric curre	ent and circu	its, conducti	vity. Basics o	f the relativity
theory. Electrodynamic for	prces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits.	Electromagnetic	waves, Ma	xwell equation	ns.	
01LAL	Linear Algebra 1				Z	2
1. Vector space. 2. Linea	r dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces.	5. Linear mappir	ngs. 6. Matri	ces of linear	mappings. 7	. Frobenius
theorem.						
01LALZ	Linear Algebra 1, exam				ZK	2
01LAL2	Linear Algebra 2			Z	,ZK	4
Outline: 1. Inverse matrix	and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector	r, diagonalization). 4. Hermiti	an and quad	ratic forms. 5	5. Scalar
product and orthogonalit	y. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Me	ethods for calcula	ation of inve	rse matrices.	2. Methods	of calculation
	lation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form.	5. Scalar produc	t and orthog	onality. Calc	ulation of ort	hogonal
	try exercises and examples. 7. Adjoint operators.				I	
01MAN	Calculus 1				Z	4
Basic calculus (real anal	ysis, functions of one real variable, differential calculus).					
01MANZ	Calculus 1, exam				ZK	4
01MAN2	Calculus 2			Z	,ZK	8
1. Continuation of differe	ntial calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergen	ce, operations or	series, abs	solute and co	nditional cor	overgence 3.
	series, the Cauchy-Hadamard theorem, expansion of function into power series, summation	on of infinite serie	s. 4. Theory	of integrals:	primitives, d	efinite integral
	hniques of integration and application of integrals, Generalized Riemann integral			1	î	
1	Mechanics				Z	4
	physical quantities and units. Kinematics of a particle, basic types of motion and their supe		-	-	-	
	motion in a central force field, forces in non-inertial reference frames. Mechanics of a syst	tem of particles, t	wo-body pr	oblems, parti	cle collisions	s. Mechanics
of a rigid body, rotation.						
	Mechanics - Examination			.	ZK	2
	ct is the examination according to the plan of studies.					-
	Preparatory Week				Z	2
	Heat and Molecular Physics				,ZK	4
	aterials, heat transfer; stationary and non-stationary heat conduction, heat transfer and pe			, ,		u .
	stems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials	; kinetic theory: N	laxwell's ve			
	Foundations of Physical Measurements 1				ZK	2
	for students of physical specializations (Experimental particle physics, Physical engineering					
•	I of the lecture is to introduce the basics of physical measurements, the methods of proces	ssing and evaluat	ion of acqui	red data on a	a PC. Studer	its learn the
basic habits of work in a					1 /7	4
02ZM2	Foundations of Physical Measurements 2	a Nuclear'			KZ	4
	for students of physical specializations (Experimental particle physics, Physical engineering I of the lecture is to introduce the basics of physical measurements, the methods of process		0,			
basic habits of work in a		sing and evaluat	ion or acqui	ieu uala Uli a	a - 0. Studer	
					Z	4
	Basics of Programming mainly for students with little or no experience in programming. It familiarizes the students with	with the basic cou	ncente in pr	 ogramming a	1	-
programming language.			icopia in pr	ogramming d		541011
F. Sg. annung langaago.						

Code of the group: BSPQT2

Name of the group: BS P_QTB 2nd 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:

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

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
02PRA1	Experimental Laboratory 1 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	Z	Ρ
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	L	Ρ
01ANB3	Calculus B 3 Miroslav Kolá , Milan Krbálek Milan Krbálek Miroslav Kolá (Gar.)	Z,ZK	8	4P+4C		Р

01ANB4	Calculus B 4 Ji í Mikyška, Miroslav Kol	lá Ji í Mikyška Milan Krbálek (Gar.)	Z,ZK	6	2P+4C		Р
12NME1	Numerical Methods Pavel Váchal Pavel Vách		Z,ZK	4	2+2	L	Р
02TEF1	Theoretical Physics Petr Novotný Michal Jex		Z,ZK	4	2+2	Z	Р
02TEF2	Theoretical Physics Petr Novotný, Filip Petrás	2 ek Josef Schmidt Petr Novotný (Gar.)	Z,ZK	4	2+2	L	Р
02TSFA		n d Statistical Physics ý Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	Р
12ULAT	Introduction to Lase Helena Jelínková, Jan Šu	e r Technique ilc Helena Jelínková Helena Jelínková (Gar.)	KZ	2	1+1	Z	Р
02VOAF	Waves, Optics and Josef Schmidt Jan Vyso		Z,ZK	6	4+2	Z	Р
Characteristics of the	courses of this grou	p of Study Plan: Code=BSPQT2 Name=B	S P_QTB 2nd	l year			
02PRA1 Ex	perimental Laboratory	1		-		KZ	6
Lecture is intended especial	y for students who intend to	study some of the physical specializations of FNSPE(bra	nch Physical Engi	neering, Nu	Iclear Engine	eering). But i	t can be also
attended by students interest	ed in the otherspecializations.	In Experimental laboratory students learn how to prepare	for experiments (in	ncludina wor	k with thelite	rature), the ir	nplementation
-		ocedures and routines), willteach writing the records of m		•			•
	dge gained in lectures on phy		ioaoaromoni, proo	oooling and	ovaluation o	11000110.7111	
							-
02PRA2 Ex	perimental Laboratory	2				KZ	6
Lecture is intended especial	y for students who intend to a	study some of the physical specializations of FNSPE(bra	nch Physical Engi	neering, Nu	clear Engine	eering). But i	t can be also
attended by students interest	ed in the otherspecializations.	In Experimental laboratory students learn how to prepare	for experiments (in	cluding wor	k with thelite	rature), the ir	nplementation
of the measurement (acquire	e of different experimental pro	ocedures and routines), willteach writing the records of m	neasurement, proc	essing and	evaluation o	f results. At t	he same time
	dge gained in lectures on phy		ioaoaioinioini, pioo	ooonig ana	orandanon o		
	.,	/5105.					
01ANB3 Ca	Iculus B 3				Z	<u>',ZK </u>	8
1. Functional sequences and	series - convergence range,	criteria of uniform convergence, continuity, limit, differen	ntiation and integra	tion of func	tional series	, power serie	s, Series
Expansion. Taylor's theorem	. 2. Ordinary differential equa	tions - equations of first order (method of integration fact	tor. equation of Be	rnoulli, sepa	aration of va	riables, hom	odeneous
		er (fundamental system, reduction of order, variation of pa	-	-			-
						•	•
		, norm, scalar product, neighborhood, interior and exteri					
		polynomials. Complete orthogonal systems. 4. Fourier se					
•		nctions of several variables - limit, continuity, partial and		ive, gradien	t, total deriva	atives and ta	ngent plane,
Taylor series, elementary ter	ms of vector analysis, Jacobi	matrix. 6. Functions defined implicitly by one or several	equations.				
01ANB4 Ca	Iculus B 4				Z	,ZK	6
		álních vektor . [2] Funkce zadané implicitn . [3] Taylorov	v adv funkce více	nom nný		· .	ní zám na
		i, vázané a globální extrémy funkce více prom nných. [6					
Integraini po et funkce vice	prom nnych - Riemann v a L	_ebesgue v integrál, základní vlastnosti, Fubiniova v ta,	v ta o substituci.	Levino a Le	besgueova	/ ta. Limita, i	spojitost a
					-		
derivace integrálu podle para	ametru. [8] Integrály po k ivká	ich a plochách. Integrální v ty.				,	
	ametru. [8] Integrály po k ivká merical Methods 1	ich a plochách. Integrální v ty.			Z	Z,ZK	4
12NME1 Nu	merical Methods 1		portant for physics	and techno	1	,ZK	•
12NME1 Nu There are explained the bas	merical Methods 1 c principles of numerical mat	hematics important for numerical solving of problems imp			logy. Method	Z,ZK	n of tasks very
12NME1 NU There are explained the bas important for physicists (ordi	merical Methods 1 c principles of numerical math nary differential equations, ra	hematics important for numerical solving of problems imp ndom numbers) are included in addition to the basic nur	merical methods. In		logy. Method	Z,ZK	n of tasks very
12NME1 Nu There are explained the bas important for physicists (ordi used as a principle program	merical Methods 1 c principles of numerical mati nary differential equations, ra ning language as a demonst	hematics important for numerical solving of problems imp	merical methods. In		logy. Method	Z,ZK dis for solution	n of tasks very t MATLAB is
12NME1 Nu There are explained the bas important for physicists (ordiused as a principle program	merical Methods 1 c principles of numerical math nary differential equations, ra	hematics important for numerical solving of problems imp ndom numbers) are included in addition to the basic nur	merical methods. In		logy. Method	Z,ZK	n of tasks very
12NME1NuThere are explained the basimportant for physicists (ordiused as a principle program02TEF1Th	merical Methods 1 c principles of numerical math nary differential equations, ra ming language as a demonstr eoretical Physics 1	hematics important for numerical solving of problems imp ndom numbers) are included in addition to the basic nur	nerical methods. Ir /.	ntegrated co	logy. Method omputational	Z,ZK Is for solution I environmen	n of tasks very t MATLAB is
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12NME1 Nu There are explained the bass important for physicists (ordiver the second secon	merical Methods 1 c principles of numerical math nary differential equations, ra- ming language as a demonstr eoretical Physics 1 to analytical mechanics. The Newtons, Lagrange, Hamilton tem of constrained mass poir classical theoretical physics eoretical Physics 2 in physics. Mechanics of poin- sical electrodynamics and Sta- ics and statistical physics. The otionfrom a statistical point of ly radiation). The Boltzmann of roduction to Laser Tech radiation sources; laser print mode-locking. aves, Optics and Atomi- nics and electromagnetism: m cs. Introduction to quantum p nd spectra of finite systems. D: BSPQT3 Ip: BS P_QTB 3rd dits in the group: rses in the group up: 0	hematics important for numerical solving of problems imp ndom numbers) are included in addition to the basic nur ration tool. The seminars are held in computer laboratory students acquire knowledge of the basic concepts of the and Hamilton-Jacobi equations). The efficiency of these tas, and of a rigid body. Advanced parts of the course co (02TEF1, 02TEF2). Int mass, rigid body and continuum. The special theory of II's equations in the Minkowski space-time, electromagne atistical Physics ermodynamic potential, the Joule Thomson effect, condition view (classical and quasiclassical regime within the fram equation is used to discusses simple transport phenomer innique ciple; classification of lasers; characterization and rough c Physics nodes, standing and travelling waves, wave packets indis hysics: black body radiation, quantum of energy, photoef d year : In this group you have to complete in the section of th	tete at least	htegrated co niltonian for ated on eler integral pri tic mechanic ctric media, he Braun-L nd grand-ca bus types of ave optics: p effect, the o	Ilogy. Method omputational Z malisms as v nentary exain nciples of m Z ics and class electromagi electromagi f lasers; lase f lasers; lase z colarization, de Broglie w	Z,ZK Is for solution Is for solution environment Z,ZK Imples like the echanics. The Imples like the Z,ZK Imples like Z,ZK Imples	A of tasks very t MATLAB is 4 At approaches e two-body e subject is 4 ory in the n in the dipole 4 istical entropy. ii gas, models 2 autions. The 6 diffraction, arodinger

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
02BPQT1	Bachelor Thesis 1 Aurél Gábor Gábris Martin Štefa ák (Gar.)	Z	5	0P+5C	Z	Р
02BPQT2	Bachelor Thesis 2 Aurél Gábor Gábris Martin Štefa ák (Gar.)	Z	10	0P+10C	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 Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	L	Р
11KPRA1	Quantum Laboratory 1 Ladislav Kalvoda Ladislav Kalvoda (Gar.)	КZ	4	4L	Z	Р
02KPRA2	Quantum Laboratory 2 Jan epila Jan epila Jan epila (Gar.)	KZ	4	4L	L	Р
01PRST	Probability and Statistics Tomáš Hobza Tomáš Hobza Tomáš Hobza (Gar.)	Z,ZK	4	3+1	Z	Р
01RMAF	Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	7	4P+2C		Р
12KOE	Fundamentals of Classical Optics and Electrodynamics Ivan Richter, Pavel Kwiecien, Milan Ši or Pavel Kwiecien Ivan Richter (Gar.)	ZK	4	4P	L	Р
	courses of this group of Study Plan: Code=BSPQT3 Name=B	S P_QTB 3rd	year			
Bachelors thesis on the select and regular checking of the p 02BPQT2 Bachelors thesis on the select bachelors t	chelor Thesis 1 ted topic under the supervision of a selected supervisor, based on the assignment approject under preparation by the supervisor is performed by means of personal consul chelor Thesis 2 ted topic under the supervision of a selected supervisor, based on the assignment approject under preparation by the supervisor is performed by means of personal consult	tations.			Z	10
02KM1 Qua Abstract: The lecture describe	antum Mechanics 1 es the birth of quantum mechanics and description of one particle and more particles b observable quantities by operators in the Hilbert space and calculation of their spectr	by elements of the	Hilbert spac		,ZK	6 tion. Besides
02KM2 Qua Abstract: The lecture expande	antum Mechanics 2 s the introduction to quantum mechanics with more general formalism of quantum the ed in various applications of quantum mechanics and prepares the students for an effec	eory, approximate		d path integ		
In the first part of the semest	antum Laboratory 1 er, the students will gain basic practical skills in laser physics and usually used measu tion of low-dimensional systems, physics of low temperatures and basic structure and			ues. In the s	-	4 e students
02KPRA2 Qua	antum Laboratory 2 gned to master the operation of devices used in physics and technology dealing with e				KZ	4 en such that
the student will become acco	stumed with demanding parts of experimental physics and demonstrate quantum effe		quantumie			en such that
It is a basic course of probab definition. The notions as ran	bability and Statistics ility theory and mathematical statistics. The probability theory is build gradually begin dom variable, distribution function of random variable and characteristics of random v e basic methods of mathematical statistics such as estimation of distribution paramet	ariable are treated	d and basic	on and conti limit theorer	-	-
The subject of this course is partial differential equations (Jations of Mathematical Physics solving integral equations, theory of generalized functions, classification of partial diffe boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).	erential equations,	, theory of ir	ntegral trans		7 d solution of
The lecture is focused on the theory, physical optics, mater nonlinear response in optical the basics of diffraction theor of instrumental optics. It also	Indamentals of Classical Optics and Electrodynamics basics of classical optics and electrodynamics, which is important especially in relation ial aspects of optical phenomena, introduction to geometrical optics, and fundamenta media, including anisotropic ones. Attention is also given to beam optics. Further, it for y and holography. It explains the relation between wave optics and ray optics, describ includes the basics of guided waves and resonators - the theory of guided waves in v m and optical resonator theory.	als of nonlinear op ocuses on the imp les light propagation	tics, includir dications of on in term o	The lecture ng dispersion statistical pr f rays, and c	n theory of line operties of lig outlines the fur	ear and nt, explains ndamentals
	k: Compulsory elective courses of credits of the block: 0 bock: PV					

st 1 course
gatory.

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
OORET	Rhetoric Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2		PV

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

00RET Rhetoric

The course is focused on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the composition of public speech as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of the course.

1

7

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 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 V ra Šlechtová (Gar.)	ZK	4		Z	PV
04XFPZK	French for Advanced Students Examination V ra Šlechtová 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 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 Zhanna Isaeva (Gar.)	ZK	4		Z	PV
04XRPZK	Russian for Advanced Students Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4		Z	PV
04XRZZK	Russian for Beginners Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	3		L	PV
04XSMZK	Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	4		Z	PV
04XSPZK	Spanish for Advanced Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	4		Z	PV
04XSZZK	Spanish for Beginners Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	3		L	PV

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

04XAMZK	English for Intermediate Students Examination	ZK	4
The course content is the	e examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two par	ts - written (100 m	nin) and oral
(20-30 min). The studen	t is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English cou	irses.	
04XAPZK	English for Advanced Students Examination	ZK	4
The course content is th	e examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability	to apply their know	wledge obtained
in the three AP courses	The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from	the student's field	d of study.
0.41/050771/			
04XCESZZK	Czech for Foreigners Beginners - Examination	ZK	4
	CZECN for Foreigners Beginners - Examination e examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 0-		4 rses and can
The course content is the			4 rses and can
The course content is the	e examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04		4 rses and can 4
The course content is the only be taken after succe 04XCESMZK	e examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04 essful completion of all three courses. Detailed information is to be obtained from the teacher.	4XCESZ1,2,3 cou	4

	71/	4
04XCESPZK Czech for Foreign Students - Advanced Examination	ZK	4
The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the C	CESP1,2,3 courses	and can only
be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.		
04XFMZK French for Intermediate Students Examination	ZK	4
The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the content	s of FM1-FM3. The	e examination
consists of a written and oral part and is organized according to Examination Instructions, a document available on the web.		
04XFPZK French for Advanced Students Examination	ZK	4
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral particular sector of the sect	art and is organized	d according to
Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading.		
04XFZZK French for Beginners Examination	ZK	3
The content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination consisting of oral and written part.	amination is ruled b	by the document
Instruction for examination. Its content covers the levels FZ1 - FZ5.		
04XNMZK German for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examina	tion consisting of tv	vo parts - written
and oral, which cover the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 asses	sment. More detai	led information
is to be obtained from the teacher.		
04XNPZK German for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examinati	on consisting of tw	o parts - written
and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungrad	led assessment. M	ore detailed
information is to be obtained from the teacher.		
04XRMZK Russian for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the kno	wledge and skills a	cquired in RM1
- RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instruct	tions by the teach	er.
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 kno	wledge and skills a	cquired in RP1
- RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instruc	tions by the teache	r.
04XRZZK Russian for Beginners Examination	ZK	3
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the kno	wledge and skills a	cquired in RZ1
- RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instruct	ions by the teache	r.
04XSMZK Spanish for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the writt	en part, students w	ill have obtained
non-graded assessment for course SM3. Oral examination follows the written part.		
04XSPZK Spanish for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite	for admission to o	ral part is having
passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student.		
04XSZZK Spanish for Beginners Examination	ZK	3
The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral	examination only i	f he/she has
passed the written examination test.	-	

Name of the block: Elective courses

Minimal number of credits of the block: 0

The role of the block: V

Code of the group: BSPQTV Name of the group: BS P_QTB Optional courses Requirement credits in the group: Requirement courses in the group: Credits in the group: 0 Note on the group:

Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Completion Credits Code Scope Semester Role members) Tutors, authors and guarantors (gar.) **History of Physics 2** 02DEF2 Ζ 2 2+0 L V Igor Jex Igor Jex (Gar.) **Detectors and Principles of Detection 1** 02DPD1 ΖK 2 2P+0C Ζ Solangel Rojas Torres, Jesus Guillermo Contreras Martin Štefa ák Jesus V Guillermo Contreras (Gar.) **Detectors and Principles of Detection 2** 02DPD2 4P+0C ΖK 4 L V Solangel Rojas Torres, Jesus Guillermo Contreras Martin Štefa ák Jesus Guillermo Contreras (Gar.) **Experimental Physics** 02EXF ΖK 2 2P+0C Ζ Jaroslav Adam, Barbara Antonina Trzeciak, Jaroslava Óbertová, Katarína K ížková Gajdošová **Jaroslava Óbertová** Katarína K ížková Gajdošová (Gar.) V Functions of Complex Variable Severin Pošta, Pavel Š oví ek Pavel Š oví ek (Gar.) 01FKO Z,ZK 3 2+1 V **Physical Seminar 1** Ζ Ζ 02FYS1 2 0+2 V Martin Štefa ák Filip Petrásek (Gar.)

04AKS	English Conversation	Z	1	0+2	L	V
12LAS	Jana Ková ová Jana Ková ová (Gar.) Laser Systems	Z,ZK	3	2+1	L	v
	Václav Kube ek Václav Kube ek Václav Kube ek (Gar.) Essentials of High School Course 1				L	
00MAM1	David B e Martin Štefa 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
12MOF	Molecular Physics Jan Proška, Martin Michl Martin Michl Jan Proška (Gar.)	ZK	2	2+0	L	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
18NES2	Neural Networks 2 František Vold ich, Zuzana Pet í ková Zuzana Pet í ková Zuzana Pet í ková (Gar.)	KZ	3	0P+2C	L	v
15CH1	General Chemistry 1 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	v
15CH2	General Chemistry 2 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	V
18PRC1	Programming in C++ 1	Z	4	2+2	Z	V
18PRC2	Vladimír Jarý, Miroslav Virius Miroslav Virius Miroslav Virius (Gar.) Programming in C++ 2 Vladimír Jarý, Miroslav Virius, Jakub Klinkovský Miroslav Virius Miroslav	KZ	4	2+2	L	v
18PPY1	Virius (Gar.) Programming in Python 1	Z	2	2C	L	v
11SFIPL	Jakub Klinkovský, Matej Mojzeš Jakub Klinkovský Jakub Klinkovský (Gar.) Seminar on Solid State Physics	KZ	2	1+1		v
-	Ladislav Kalvoda Ladislav Kalvoda Ladislav Kalvoda (Gar.) Special Theory of Relativity					
02STR	David B e Martin Štefa ák David B e (Gar.)	ZK	2	2+0	L	V
TV-1 TV-2	Physical Education	Z	1		Z	V
TV-2	Physical Education	Z	1	0+2	L Z	V V
TV-3	Physical education	Z	1	0+2	 L	v v
	Physical education Creating Electronic Documents				L	
14TED	Aleš Materna, Ji í Martin ík Aleš Materna Aleš Materna (Gar.)	Z	2	26C		V
12UFN	Introduction to Photonics and Nanostructures Ivan Richter, Pavel Kwiecien, Jan Proška Ivan Richter Ivan Richter (Gar.)	KZ	3	2P+1C	L	V
02UFEC	Introduction to Elementary Particle Physics Jaroslav Biel ik, Marek Matas Jaroslav Biel ik Jaroslav Biel ik (Gar.)	Z	2	2+0	Z	V
11UFPLN	Introduction to Solid State Physics Petr Kolenko	ZK	2	2+0	L	V
11UFP	Introduction to Solid State Physics Petr Kolenko Petr Kolenko (Gar.)	ZK	3		L	V
17UING	Introduction to Engineering Jan Frýbort, Petr Haušild, Radek Mušálek Jan Frýbort (Gar.)	KZ	3	2P+1C	Z	V
02UKT	Introduction to Quantum Theory Martin Štefa ák Martin Štefa ák (Gar.)	Z	2	2+0		V
12UMF	Introduction to Modern Physics Jan Pšikal Jan Pšikal Jan Pšikal (Gar.)	Z	3	2+1	L	V
12UNXAP	Introduction to UNIX	Z	2	1P+1C	L	V
12UVP	Milan Kucha ík Milan Kucha ík (Gar.) Introduction to Scientific Computing	Z	2	1P+1C	L	V
12VKT	Milan Ši or Milan Ši or Milan Ši or (Gar.) Vacuum Technology	KZ	4	2P+2L	Z	v
12PYTH	Richard Švejkar Vojt ch Petrá ek Vojt ch Petrá ek (Gar.) Scientific Programming in Python	Z	2	0+2		v
12VTV	Pavel Váchal, Jakub Urban Pavel Váchal Pavel Váchal (Gar.) Scientific and Technical Computing	Z	2	1+1		v
12ZPLT	Ivan Procházka Ivan Procházka Ivan Procházka (Gar.) Basic Laser Technique Laboratory	KZ	6	0+4		V
	Václav Kube ek, Josef Blažej Josef Blažej Václav Kube ek (Gar.) Basic Electronics 1		_	-		
12ZEL1	Jaroslav Pavel Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
12ZEL2	Basic Electronics 2 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	L	V
12ZFS	Fundamentals of Photonic Structures Ivan Richter, Ji í tyroký Ivan Richter Ivan Richter (Gar.)	Z,ZK	2	2P	L	V
11ZFP	Basic to Solid State Physics Ladislav Kalvoda, Eva Mihóková Ladislav Kalvoda (Gar.)	ZK	3		Z	V
11ZFPL	Basic to Solid State Physics Eva Mihóková	KZ	2	26P+0C	Z	v

02DEF2	s of the courses of this group of Study Plan: Code=BSPQTV Name=BS P_QTB Optional cour		0
	History of Physics 2	Z	2
	ssical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach.		
-	inism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzm		
	ics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear	energy, Elementary	particles,
	e concept of Nature and Universe of today.		
02DPD1	Detectors and Principles of Detection 1	ZK	2
	es introduce the main forms of interaction of some particles with matter. The goal is that the student gets an overview of what t	ype of processes ar	e possible and
	hey may be dominant. Some applications to Medicine and to study the fundamental structure of matter are presented.		
02DPD2	Detectors and Principles of Detection 2	ZK	4
Abstract: The lectur	es introduce the main ideas needed to understand how detector systems work. It will be focused on gaseous detecting principl	es, scintilating princ	iples and
semiconductor dete	cting principles. Basic information about various detector constructions is provided.		
02EXF	Experimental Physics	ZK	2
The goal of this sub	ject is to introduce the students the principles of physics measurements, their techniques, methods and instruments that are us	ed for such measur	ements, and t
analysis of measure	ed data.		
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	· · · · · ·	ail: the derivati
of a complex function	on and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve,	Cauchy's integral the	eorem, Morera
-	nolomorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauch		
heorem.			
02FYS1	Physical Seminar 1	Z	2
	ted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical problems.		
	blems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory ed	-	
04AKS		Z	1
-	English Conversation English communication skills acquired throughout their previous studies. It aims to improve all aspects of oral comm		•
	elop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral comm various communication situations and will master their communication strategy. They will also practise their listening skills in or		
-	student will be trained to express their ideas clearly and according to current English usage, and become a more confident spe		and participat
		1 1	
2LAS	Laser Systems	Z,ZK	3
	anosecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable laser		-
	Semiconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. U	Itraviolet lasers. X-ra	ay lasers. Higl
ower continuous la	asers. Infrared high power lasers. Submilimeter lasers. Lasers with high degree of coherence. Free electron lasers.		
DOMAM1	Essentials of High School Course 1	Z	1
Students are introd	uced to mathematical concepts and methods used in the introductory physics course.		
00MAM2	Essentials of High School Math Course 2	Z	1
Review of basics of	high school mathematics.	1 1	
12MOF	Molecular Physics	ZK	2
-	sics of molecules and molecular matter, and on structure-to-physical properties relationship. Methods of molecular structure de	1 1	2
02NSAD1	Simulations and Data Analysis Tools 1		2
	I SIMUJAUOOS ADO DAJA ADAIVSIS TOOIS T	7 1	
		Z	2
Data analysis and s	imulations of high energy elementary particle collisions. ROOT and Pythia programs.	· ·	
Data analysis and s	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2	Z	2
Data analysis and s 02NSAD2 Individual work will	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2 include implementation and testing of a program for generating of particle collision. Results are reviewed.	· ·	
Data analysis and s D2NSAD2 ndividual work will	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2	· ·	
Data analysis and s D2NSAD2 Individual work will 18NES2	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2 include implementation and testing of a program for generating of particle collision. Results are reviewed.	Z KZ	2
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Data analysis and so D2NSAD2 Individual work will I8NES2 The aim of the cour asks. I5CH1 The most important solved in exercises. I5CH2 The subject is the of he validity of these in exercises. I8PRC1 This course covers I8PRC2 This course covers I8PRC2 This course covers I8PRC1 This course covers I8PRC2 This course covers I8PRC2 This course covers I8PRC3 This course covers I8PRC4 This course covers I8PRC3 This course covers I8PRC4 This co	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2 include implementation and testing of a program for generating of particle collision. Results are reviewed. Neural Networks 2 se "Neural Networks 2" is to acquaint students with basic models of deep neural networks and teach them how to apply these m General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practice principles is not restricted only to chemical processes is documented. The significance and practical use of explained principle Programming in C++ 1 mainly the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Templa Programming in Python 1 cs seminar on Solid State Physics and momentur transport, infinite chain, chain of finite length, boundary conditions; wave packets, group and phase velocity, disp and momentur transport, infinite chain, chain of finite length, boundary conditions; wave packets, group and phase velocity, disp	KZ odels and methods t Z tical use are illustrat Z,ZK Jsing various examples s are illustrated by examples Z Z,ZK Jsing various examples s are illustrated by examples Z Z Ate Library. Z ate Library. Z ate Library. Z ate of diffractive phenenatomic scattering factors, data processing at the second structure shon, pulses and the second the second structure shon, pulses and the second structure shon, density of states, nexternal electric fields at the second structure	2 3 o solve practi 3 ted by examp 3 les, the fact the examples solva 4 4 4 2 nal programm ind visualizati 2 omena relate etor, structural tern, atomizat al modes, neir propagati thermal ener id, Haynes an
Data analysis and so D2NSAD2 Individual work will I8NES2 The aim of the cour asks. I5CH1 The most important solved in exercises. I5CH2 The subject is the of he validity of these in exercises. I8PRC1 This course covers I8PRC2 This course covers I8PRC2 This course covers I8PPY1 This course covers I8PPY1 This course introduc baradigms. The follo I1SFIPL I.Introduction of the o following themes actor, extinction, pri- and thermal oscillat bolarization, energy pocalized modes, ar neat capacity 10."d Shockley experime seminar work. D2STR Students extend the	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2 include implementation and testing of a program for generating of particle collision. Results are reviewed. Neural Networks 2 se "Neural Networks 2 is to acquaint students with basic models of deep neural networks and teach them how to apply these means the service of the comparison of the course of	KZ odels and methods t Z tical use are illustrat Z,ZK Jsing various examp s are illustrated by e Z Z Z Z Z Z Z Z Z ate Library. Z ata swell as functior s), data processing a KZ s of diffractive phen atomic scattering factor ber on diffraction patter inding waves, normal ersion, pulses and th in, density of states, in external electric file elaboration and president and presi	2 3 o solve pract 3 ted by examp 3 les, the fact t examples solv 4 4 4 2 nal programm ind visualizati 2 omena relate tor, structura tern, atomizat al modes, neir propagati thermal ener id, Haynes a assentation of 2
Data analysis and so D2NSAD2 ndividual work will 18NES2 The aim of the cour asks. 15CH1 The most important solved in exercises. 15CH2 The subject is the of he validity of these n exercises. 18PRC1 This course covers 18PRC2 This course covers 18PRC2 This course covers 18PRC2 This course covers 18PRC1 This course covers 18PRC1 This course covers 18PRC1 This course covers 18PRC1 This course introduc baradigms. The follo 11SFIPL 1. Introduction of the o following themes actor, extinction, pri- and thermal oscillat boolarization, energy ocalized modes, ar neat capacity 10."d Shockley experime seminar work. D2STR	imulations of high energy elementary particle collisions. ROOT and Pythia programs. Simulations and Data Analysis Tools 2 include implementation and testing of a program for generating of particle collision. Results are reviewed. Neural Networks 2 se "Neural Networks 2" is to acquaint students with basic models of deep neural networks and teach them how to apply these m General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practice principles is not restricted only to chemical processes is documented. The significance and practical use of explained principle Programming in C++ 1 mainly the C programming language and non-object oriented features of the C++ language. Programming in C++ 2 the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Templa Programming in Python 1 cs seminar on Solid State Physics and momentur transport, infinite chain, chain of finite length, boundary conditions; wave packets, group and phase velocity, disp and momentur transport, infinite chain, chain of finite length, boundary conditions; wave packets, group and phase velocity, disp	KZ odels and methods t Z tical use are illustrat Z,ZK Jsing various examples s are illustrated by examples Z are illustrated by examples Z are illustrated by examples Z are Library. Z ate Library. Z ata swell as functions ata processing and the process and the proces and the process and the process and the pro	2 3 o solve practi 3 ted by examp 3 les, the fact t examples solv 4 4 4 2 nal programm ind visualizati 2 omena relate etor, structura tern, atomizat al modes, neir propagati thermal ener- id, Haynes a esentation of

TV-3	Physical education	Z	1
TV-4	Physical education	Z	1
14TED	Creating Electronic Documents	Z	2
Basic skills for creating	and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, present	ations and entire	documents in an
office suite.			
12UFN	Introduction to Photonics and Nanostructures	KZ	3
	ires and nanotechnologies; quantum technologies; quantum nanostructures; photonic structures; nanophotonics and nanopl	asmonics; optical	waveguides and
02UFEC	ics; computer simulations; technological realization; student presentations	Z	2
	Introduction to Elementary Particle Physics easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject	_	2
11UFPLN	Introduction to Solid State Physics	ZK	2
-	ure is to introduce the undergraduate students to the study of the solid state physics.		_
11UFP	Introduction to Solid State Physics	ZK	3
	fundamentals of diffraction stress analysis with a strong emphasis on the illustrations of the capability of X-ray diffraction to		
17UING	Introduction to Engineering	KZ	3
	roduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and be assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be included.	enavior, basics of i	manufacturing
02UKT	Introduction to Quantum Theory	Z	2
	to introduce the basic principles of quantum theory and its interpretation on simple examples.	_	-
12UMF	Introduction to Modern Physics	Z	3
The course is intended t	o be a concise introduction to modern / nonclassical physics for students who have already had basic classical physics cours	e. A part of the co	urse is delivered
in a computational labor			
12UNXAP	Introduction to UNIX		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		
	hell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard		
X-windows. Computer n	etworks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a c	computer. Network	services:
-	scp, etc. Network applications		
12UVP	Introduction to Scientific Computing	Z	2
-	oduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with ig, data analysis, data visualisation and algorithm development.	I Some Dasic tools	s ion scientific
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		sorption; gas
	natter; evaporation, condensation; Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and their		
	ing vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Adso		
and seals.Practical exer	pumpsVacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. Ma cises	ateriais and vacuu	im components
12PYTH	Scientific Programming in Python	7	2
	s to learn the fundamentals of the modern Python programming language with a focus on scientific computing. Emphasis is p		
1.	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 of		-
	se focuses on specific features of Python for scientific programming. Presented are the main numerical libraries NumPy, SciF generate efficient code, how to combine Python with other languages, what tools are available.	y and the Matpio	tilb graphics
12VTV	Scientific and Technical Computing	Z	2
	r with methods of solving of computational problems in the scientific and technical practice, and with methods of their progra		
mainly to programming	in the Fortran language.		
12ZPLT	Basic Laser Technique Laboratory	KZ	6
	AG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmo	-	lischarges, laser
12ZEL1	d: YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto- Basic Electronics 1	Z,ZK	3
''	mary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Cir	· · ·	
	and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effect	-	
12ZEL2	Basic Electronics 2	Z,ZK	3
	vith the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic	-	
12ZFS	Fundamentals of Photonic Structures	Z,ZK	2
	asics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures		
	pommunications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic stru		
	faces, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations on	selected relevant	topics and
excursions to selected p			
11ZFP	Basic to Solid State Physics	ZK	3 aturaan atama in
	ntal properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bon rystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and the second	-	
	c potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons		,
energy bands explained	. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to	-	
	menological basis of physical properties of crystalline solids		
11ZFPL	Basic to Solid State Physics	KZ	2
	ntal properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bon rystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and the second	-	
	c potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons		,
energy bands explained	. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to	-	
interpret a broad phenor	menological basis of physical properties of crystalline solids		

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

Credits in the group: 0

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAM1	English for Intermediate Students M1 Jana 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	2S	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 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP2	French for Advanced Students P2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFP3	French for Advanded Students P3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFZ1	French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ3	French for Beginners Z3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ4	French for Beginners Z4 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V

	Cormon for Advanced Students P2					1
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 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	v
04XSP1	Spanish for Advanced Students P1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSP2	Spanish for Advanced Students P2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSP3	Spanish for Advanced Students P3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	v
04XSZ1	Spanish for Beginners Z1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ2	Spanish for Beginners Students Z2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	v
04XSZ4	Spanish for Beginners Z4 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ5	Spanish for Beginners Z5 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
Characteristics of the	e courses of this group of Study Plan: Code=BSPJAZYKYZA	P Name=BS P	iazvky za	n		
	nglish for Intermediate Students M1		<u>,,.,</u>	- P	Z	2
	students who have successfully completed the full secondary school English langua					
	s (CEFR). It provides an introduction into English for Specific and Academic Purpos				-	
	n communication situations. Thus it covers topics related to the student's life and ne grammar issues used in EAP.	eas as well as topics	s of subtech	nical interest	. Attention is	aiso paid to
	nglish for Intermediate Students M2				Z	2
-	e student to have completed the AM1 course. It develops their skills for work with su	ubtechnical texts, foc	using also n	nore on spec	- 1	_
	SP and EAP (e.g., definition, existence and classification of phenomena, object desc		-		-	
revision is included.						
	nglish for Intermediate Students M3				Z	2
	ills that enable students to cope with features typical of professional style. Increasing				-	-
	hal texts. Great emphasis is placed on distinguishing different levels of formal and in					
equivalents. The course also student's field.	o includes studying abstracts and rules for writing them as well as basic rules for pro	eparing and giving a	snort prese	ntation on a	cnosen topic	related to the

04XAP1 English for Advanced Students P1

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

Ζ

2

04XAP2	English for Advanced Students P2	Z	2
The AP2 course is base	o on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen	branches of scier	nce. According to
the students' needs it of	oncentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetc	orical functions (e.	g., various types
of descriptions, and, if p	possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguist	ically more demar	nding materials.
The course extends the	student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal	writing including t	he sentence and
paragraph structure, lin	king, cohesion and coherence in texts.		

04XAP3	English for Advanced Students P3	Z	2
The AP3 course is base	ed on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text.	. It includes training	oral and written
communication skills ar	nd functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, wr	iting an abstract) a	ind, if possible,
	t on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal la	nguage both in ora	al and written
communication.			
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
s a	for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic a	0	
	and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communica covers roughly lessons 1-3 of eština Express (Czech Express) by L. Holá and P. Bo ilová.	ation in the most co	ommon everyday
04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
	munication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and		_
	pics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.	oonjuguton oyoto	
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
	elops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses		
	tion and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to proc		-
frequent types of dialog	ue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers rou	ughly lessons 5-7 ir	n eština expres
1.			
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2
	n correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending t	he student's vocat	oulary for various
social situations.			
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
	e topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and re	ading skills and tra	ains the student
-	ion abbreviations, abbreviated words, and mathematical terms and formulas.	Z	2
04XCESM3	Czech for Foreigners - Intermediate 3 morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is espe		
	oping the student's writing skills.	cially locused off s	stylistics and
04XCESP1	Czech for Foreign Students - Advanced 1	Z	2
	course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common E		
	evision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of		
	e of engineering and professional communication, both in spoken and written form. The topics include University Studies and		-
includes communication	n with teachers and faculty administrators.		
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extends the	e student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical	and specialist texts	s placing greater
emphasis on individual			
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
	e student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentat	ion, and, finally, pro	esentation of the
	ng skills necessary for professional communication are trained.		-
04XFM1	French for Intermediate Students M1	Z	2
	M The objective of this three-semester course is to improve and further develop communication in the French language in b icate in social interaction and in academic, scientific and professional environment. They will be able to use the language to t		
	e problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, s	-	
	s study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, pe		
	Iture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, worl		
04XFM2	French for Intermediate Students M2	Z	2
	¹ M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science	e texts, features typ	bical for technical
and scientific language	(passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French sc	ience and technolo	ogy, French
scientists, artists and a	rchitects. Description of an object, device, shapes, dimensions, material.		
04XFM3	French for Intermediate Students M3	Z	2
	on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures	-	
	mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-		
	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative of dge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and	-	n French articles
04XFP1	French for Advanced Students P1	Z	2
	prench for Auvanced Students PT he objective of this three-semester course is to improve and further develop communication in the French language in both w	1	
	e in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit ger		
	The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are i		
passé composé-imparfa	ait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transaction	al letters, CV, pers	onal statement,
request, answer to an a	dvert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Top	pics of specialization	on: mathematics,
internet, physics, chem	istry. 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	on given topics. Fe	atures typical of
	communication are stressed (passive voice, nominalization, word formation).		-
04XFP3	French for Advanded Students P3	Z	2
	on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in		
	rter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cc rk compiled from 3 French sources. Preparation of several set topics for oral examination.	wers a technical /a	ipplied science
04XFZ1	French for Beginners Z1	Z	2
	prencipion beginners 2 in the objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in		
-	ench for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be ab	-	-
	knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravd		-
(Francouzština pro za	áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4 : introductions	s, personal informa	ation, asking and
giving the directions, si	mple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronuncia	ation and grammar	

	Franch for Design and 70	7	
04XFZ2	French for Beginners Z2	Z	2
	with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of		
French for Beginners .	Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreem	ent - disagreemer	nt, apology,
thanking, travelling, ma	p of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral comm	nunication. Specific	c topics covered:
How does the machine	work? A few expressions concerning the study. Name of University and Faculty.		
04XFZ3	French for Beginners Z3	Z	2
	FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - F	Pravdová: French	for Beginners.
	tuations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for ir		-
-	Reading covers short adapted texts of general interest first, and later popular science texts.		
04XFZ4	French for Beginners Z4	Z	2
-		I – I	_
	n FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The or xtbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the leveloped from the levelope		
			۰ v
	ourse covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, sho	pping, weather, ur	niversity in our
	how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.		
04XFZ5	French for Beginners Z5	Z	2
All four skills acquired i	n FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. The	ey present it orally	in the class. The
general contents is cov	ered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.	Topics: on physics	s from lecture
notes, success of Fren	ch science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cl	auses, typical con	ijunctions,
subjunctive clauses, ge	rund, passive.		
04XNM2	German for Intermediate Students M2	Z	2
	ther more complex grammatical structures and their application in communication based on technical texts, such as the relatio	n between techno	logy and society.
	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
-	rmation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system		
•	or professional discourse (participles, relative clauses).		anor grannatioal
		7	
04XNM1	German for Intermediate Students M1	Z	2
	Irse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena an		
	es (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repul		
environmental issues to	ogether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicis	ts, and the fundan	nentals of IT
terminology. It develops	communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.		
04XNM3	German for Intermediate Students M3	Z	2
The course introduces	ther more complex grammatical structures and their application in communication based on technical texts, such as the relatio	n between techno	logy and society,
the world at the beginn	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and	d car technology e	tc. Students
-	mation and reading aloud, and appropriate language for various purposes in oral and written communication. The course syster		
	or professional discourse (participles, relative clauses).		Ũ
04XNP1	German for Advanced Students P1	Z	2
	od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be le	I – I	
I This course requires go			
course. The course is t			
	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for	detail). It revises	and develops
more difficult grammar		detail). It revises	and develops
more difficult grammar s i.e., telephoning.	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on	detail). It revises practical everyday	and develops communication,
more difficult grammar s i.e., telephoning. 04XNP2	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2	detail). It revises practical everyday	and develops communication, 2
more difficult grammar s i.e., telephoning. 04XNP2	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on	detail). It revises practical everyday	and develops communication, 2
more difficult grammars i.e., telephoning. 04XNP2 The course develops th	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2	r detail). It revises practical everyday Z ding their general a	and develops communication, 2 and subtechnical
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extended	r detail). It revises practical everyday Z ding their general a	and develops communication, 2 and subtechnical
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and	r detail). It revises practical everyday Z ding their general a	and develops communication, 2 and subtechnical
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (0 04XNP3	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3	r detail). It revises practical everyday Z ding their general a d practising formal Z	and develops communication, 2 and subtechnical communication, 2
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (C 04XNP3 The course consists of	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).	r detail). It revises practical everyday Z ding their general a d practising formal Z ariety of less comr	and develops communication, 2 and subtechnical communication, 2 mon situations
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (C 04XNP3 The course consists of (traffic problems and ca	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a var accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the v	r detail). It revises practical everyday Z ding their general a d practising formal Z ariety of less comr rocabulary range in	and develops communication, 2 and subtechnical communication, 2 mon situations n fields such as
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (C 04XNP3 The course consists of (traffic problems and ca nuclear power enginee	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a var accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the v ring, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are use	detail). It revises practical everyday Z ding their general a d practising formal Z ariety of less comrocabulary range in d. By means of a	and develops communication, 2 and subtechnical communication, 2 mon situations n fields such as presentation,
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (C 04XNP3 The course consists of (traffic problems and ca nuclear power enginee students are trained to	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a var accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the v ring, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are use process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The	detail). It revises practical everyday Z ding their general a d practising formal Z ariety of less comrocabulary range in d. By means of a	and develops communication, 2 and subtechnical communication, 2 mon situations n fields such as presentation,
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (C 04XNP3 The course consists of (traffic problems and ca nuclear power enginee students are trained to practice to and from G	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a va raccidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the v ring, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are use process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. Therman.	detail). It revises practical everyday Z ding their general a d practising formal Z ariety of less commocabulary range in d. By means of a phe course also incommocabulary in the course also incommocabul	and develops communication, 2 and subtechnical communication, 2 mon situations n fields such as presentation, ludes translation
more difficult grammars i.e., telephoning. 04XNP2 The course develops th vocabulary range. It intr both written and oral (C 04XNP3 The course consists of (traffic problems and ca nuclear power enginee students are trained to practice to and from Ge 04XRM1	hen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on German for Advanced Students P2 e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a va ar accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the v ring, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are use process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. Therman. Russian for Intermediate Students M1	detail). It revises practical everyday Z ding their general a d practising formal Z ariety of less commocabulary range in d. By means of a phe course also inc Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	and develops communication, 2 and subtechnical communication, 2 mon situations n fields such as presentation, ludes translation 2
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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 Rus the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speal	-	-
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 s		
able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.	also develop thei	r vocabulary and
04XRZ3 Russian for Beginners Z3	Z	2
The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for trai	-	1
and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be	e able to respond	l so as to be
understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		-
04XRZ4 Russian for Beginners Z4	Z	2
The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular ve		-
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	Z	2
The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understa information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. C		-
everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication		
passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite require		
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-semi-		
vocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, nega		
subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts of 04XSM2 Spanish for Intermediate Students M3	T listening to then	n. 2
04XSM2 Spanish for Intermediate Students M3 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.		
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 acad	lemic style. They v	vill be competent
enough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write s	short articles and	summaries. The
final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination. 04XSP1 Spanish for Advanced Students P1	7	2
04XSP1 Spanish for Advanced Students P1 Course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicat	. –	-
of CEFR.		quioitoo. 10701 D2
04XSP2 Spanish for Advanced Students P2	Z	2
Course SP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and 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 based on what students will need in their career.	locused on writter	rcommunication
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 fundar		tructures and will
be able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish a	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 I		
them to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and o Realia of Spanish-speaking countries are also included.	thers such as the	Czech Republic.
04XSZ3 Spanish for Beginners Z3	Z	2
The course is based on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of	1	1
mainly of Spain. It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperativ	e). It includes wri	ten and oral
communication on a given general topic, for which the student is trained by reading texts or listening to them.		
04XSZ4 Spanish for Beginners Z4	Z	2
The course is based on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Span Spain. It pays attention to further grammar topics (perifrasis verbales, future imperfecto, direct object and indirect object pronouns, negative form of		-
to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.	the imperative, at	ia subjunctive),
04XSZ5 Spanish for Beginners Z5	Z	2
The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanis	1	1
part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination.		

List of courses of this pass:

Code	Name of the course	Completion	Credits
00MAM1	Essentials of High School Course 1	Z	1
	Students are introduced to mathematical concepts and methods used in the introductory physics course.		'

00MAM2	Essentials of High School Math Course 2	Z	1
OODT	Review of basics of high school mathematics.	7	
00PT 00RET	Preparatory Week Rhetoric	Z Z	2
	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		
01ANB3	Calculus B 3	Z,ZK	8
1. Functional sec	uences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional	series, power serie	es, Series
	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 coertical equations). A Matria encoder matria parameters and exterior paints beyond in the second exterior paints beyond in the second exterior paints beyond in the second exterior paints beyond exterior paints bey		-
	tial equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and s of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourie		
	onvergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total of		
	Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations	5.	
01ANB4	Calculus B 4	Z,ZK	6
	o et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] F	-	
	kartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstr unkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgu		
integrain po et i	derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.		spojitost a
01FKO	Functions of Complex Variable	Z,ZK	3
	om outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable are ex	· ·	-
of a complex function	on and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Cauch	ny's integral theore	m, Morera's
theorem, roots of a	holomorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy esti	mates, Laurent se	ries, residue
	theorem.	-	
01LAL	Linear Algebra 1 . Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of li		Erobopius
1. vector space. 2	theorem.	inear mappings. 7.	Frobenius
01LAL2	Linear Algebra 2	Z,ZK	4
	se matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian an	· ·	
product and orthog	onality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse matri	ices. 2. Methods of	f calculation
of determinants.	3. Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonalit	y. Calculation of o	rthogonal
041 01 7	complements. 6. Geometry exercises and examples. 7. Adjoint operators.	71/	
01LALZ	Linear Algebra 1, exam	ZK Z	2
01MAN	Calculus 1 Basic calculus (real analysis, functions of one real variable, differential calculus).	Z	4
01MAN2	Calculus 2	Z,ZK	8
-	differential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence, operations on series, absolute ar	· ·	-
Real and complex p	power series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integr	rals: primitives, def	inite integral
	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral		
01MANZ	Calculus 1, exam	ZK	4
01PRST	Probability and Statistics	Z,ZK	4
	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and one one as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the	-	- 1
	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testin		and provou.
01RMAF	Equations of Mathematical Physics	Z,ZK	7
	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).		
02BPQT1	Bachelor Thesis 1	Z	5
Bachelors thesis or	In the selected topic under the supervision of a selected supervisor, based on the assignment approved by the guarantor, department h and regular checking of the project under preparation by the supervisor is performed by means of personal consultations.	ead and the dean.	Supervision
02BPQT2	Bachelor Thesis 2	Z	10
	the selected topic under the supervision of a selected supervisor, based on the assignment approved by the guarantor, department h		
	and regular checking of the project under preparation by the supervisor is performed by means of personal consultations.		
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	-	
Helenistic period,	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, H	Huygens. The birth	of physics
02DEF2	as experimental science. Newton and his work.	Z	2
	History of Physics 2 f classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	_	
-	vanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann.		
	hysics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear er		
	standard model. The concept of Nature and Universe of today.		
02DPD1	Detectors and Principles of Detection 1	ZK	2
Abstract: The lectu	ires introduce the main forms of interaction of some particles with matter. The goal is that the student gets an overview of what type of in which situations they may be dominant. Some applications to Medicine and to study the fundamental structure of matter are pre-		ossible and
02DPD2	Detectors and Principles of Detection 2	ZK	4
	ctures introduce the main ideas needed to understand how detector systems work. It will be focused on gaseous detecting principles	1	1 1
	semiconductor detecting principles. Basic information about various detector constructions is provided.	51 10	
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	-	-
theory. I	Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Electromagnetic waves, I	Maxwell equations	

02EXF	Experimental Physics	ZK	2
The goal of this sul	bject is to introduce the students the principles of physics measurements, their techniques, methods and instruments that are used for	or such measureme	nts, and the
	analysis of measured data.		
02FYS1	Physical Seminar 1	Z	2
The seminar is o	devoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic	s presented in the	course of
Mecha	anics. The problems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical labor	atory equipments.	
02KM1	Quantum Mechanics 1	Z,ZK	6
Abstract: The lectu	re describes the birth of quantum mechanics and description of one particle and more particles by elements of the Hilbert space as we	ell as its time evolut	ion. Besides
	that it includes description of observable quantities by operators in the Hilbert space and calculation of their spectra.		
02KM2	Quantum Mechanics 2	Z,ZK	6
Abstract: The lea	ture expands the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and pat	h integral. It summ	arizes the
terminology and m	ethods used in various applications of quantum mechanics and prepares the students for an effective scientific research and further stu	udy, in particular, of	the modern
	formulations of quantum field theory.		
02KPRA2	Quantum Laboratory 2	KZ	4
Physical measuren	nents designed to master the operation of devices used in physics and technology dealing with experiments at the quantum level. Exp	periments are chos	en such that
	the student will become accostumed with demanding parts of experimental physics and demonstrate quantum effects.	1	1
02MECH	Mechanics	Z	4
	sysics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle, so		
one-dimensional r	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
	The content of the subject is the examination according to the plan of studies.	1	
02NSAD1	Simulations and Data Analysis Tools 1	Z	2
	Data analysis and simulations of high energy elementary particle collisions. ROOT and Pythia programs.		
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	ed.	
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 E		
-	ts interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with th		
of the measureme	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	ion of results. At the	e same time
	practically extend the knowledge gained in lectures on physics.		-
02PRA2	Experimental Laboratory 2	KZ	6
	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E		
-	ts interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with the		
of the measureme	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluati practically extendthe knowledge gained in lectures on physics.	ion of results. At the	e same ume
02STR		ZK	2
02316	Special Theory of Relativity Students extend their knowledge of classical, non-quantum mechanics of the special theory of relativity fundamentals.		2
02TEF1	Theoretical Physics 1	Z,ZK	4
	troduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms		-
	dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementar		
	on of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles		
, ,	the first part of the course of classical theoretical physics (02TEF1, 02TEF2).		· · · · / · · · · ·
02TEF2	Theoretical Physics 2	Z,ZK	4
	isformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics an		ory in the
	ime. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electror		-
	approximation.		
02TER	Heat and Molecular Physics	Z,ZK	4
Thermal expansion	n of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynam		nd real gas,
entropy; non-chem	ical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity dis	tribution,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 Chatel		ical entropy.
Basics of many bo	dy descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonica	l ensemble, Fermi	gas, models
	of crystals and the black body radiation). The Boltzmann equation is usedto discusses simple transport phenomena.		
02UFEC	Introduction to Elementary Particle Physics	Z	2
The cour	se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the s	ubject are presente	ed.
02UKT	Introduction to Quantum Theory	Z	2
	The aim of the lecture is to introduce the basic principles of quantum theory and its interpretation on simple examples.	•	
02VOAF	Waves, Optics and Atomic Physics	Z,ZK	6
	a in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarize		
coherence. Geo	metrical optics. Introduction to quantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Bri	oglie waves,the Sc	hrodinger
	equation, stationary states and spectra of finite systems.		
02ZM1	Foundations of Physical Measurements 1	ZK	2
	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it	-	
other branches. T	he goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired dat	a on a PC. Studen	ts learn the
	basic habits of work in a physics lab.		-
02ZM2	Foundations of Physical Measurements 2	KZ	4
	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it (
other branches. T	he goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired dat	a on a PC. Studen	is learn the
	basic habits of work in a physics lab.		

04AKS	English Conversation	Z	1
	evelop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication		vill develop
	or various communication situations and will master their communication strategy. They will also practise their listening skills in order t		
in c	liscussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more cor	fident speaker.	
04XAM1	English for Intermediate Students M1	Z	2
The course is desi	gned for students who have successfully completed the full secondary school English language course at least at the A2 level of the C	ommon European	Framework
	anguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of		
professional oral	and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical int	erest. Attention is a	also paid to
	extending the knowledge of grammar issues used in EAP.		
04XAM2	English for Intermediate Students M2	Z	2
	expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more or		
and lexical items ty	pical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided revision is included.	writing. If necessal	ry, grammar
04XAM3		Z	2
	English for Intermediate Students M3 ps the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnic	I I	
	f professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication	•	
-	purse also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation o		
	student's field.		
04XAMZK	English for Intermediate Students Examination	ZK	4
	ent is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts	I I	
	30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three I		,
04XAP1	English for Advanced Students P1	Z	2
	igned for students who have successfully completed the full secondary school English language course (at least the B1 level of the C	I I	
	Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamen		
	le typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, g	-	
covers professiona	I oral and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writing (w	riting a CV, letter of	application,
	polite request). If necessary, revision of selected grammar topics is included.		
04XAP2	English for Advanced Students P2	Z	2
The AP2 course is	based on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen bra	nches of science. A	According to
the students' need	Is it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorica	I functions (e.g., va	arious types
of descriptions, ar	nd, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguistical	ly more demanding	g materials.
The course extend	s the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writ	ing including the se	entence and
	paragraph structure, linking, cohesion and coherence in texts.		
04XAP3	English for Advanced Students P3	Z	2
The AP3 course is	based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It in	cludes training oral	and written
	ills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing		
also preparing a	project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal lang	uage both in oral a	nd written
		71/	
04XAPZK	English for Advanced Students Examination	ZK	4
	t is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to a		-
	courses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from		-
04XCESM1	Czech for Foreigners - Intermediate 1		2
	sed on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the s social situations.	ludent s vocabular	y ior various
		Z	2
04XCESM2	Czech for Foreigners - Intermediate 2 pps the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and readir		2
	in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.	iy skills and trains	
04YCESM2		Z	2
04XCESM3	Czech for Foreigners - Intermediate 3 revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especia		
	lexises morphological topics covered earlier and extends the student's moviedge of more difficult language phenomena. It is especial lexicology and on developing the student's writing skills.	ally locused off styl	istics and
04XCESMZK	· · · · · · · · · · · · · · · · · · ·	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		
	be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.	.,_,2 0001000 un	
04XCESP1	Czech for Foreign Students - Advanced 1	Z	2
	the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common Europ	I I	
	/ on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of sci		
	nal style of engineering and professional communication, both in spoken and written form. The topics include University Studies and S		-
	includes communication with teachers and faculty administrators.		
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
	Is the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and	specialist texts place	cing greater
	emphasis on individual work.		
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
	ps the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation,	and, finally, present	tation 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	I I	d 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
	gned for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and g	rammar features) a	
acquire basic lang	uage and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication	in the most commo	on everyday
	situations. The course covers roughly lessons 1-3 of eština Express (Czech Express) by L. Holá and P. Bo ilová.		

		1	1
04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
The language and	communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and cou	, njugation system	and practise
0 0	basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.	, , ,	·
04100000		-	0
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
The course furthe	er develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on	building up basic	vocabulary,
fixing correct pronu	unciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce	simple texts and	they practise
frequent types of d	ialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly	lessons 5-7 in	eština expres
	One of the Exercise on Device strengther	71/	4
04XCESZZK		ZK	4
The course conte	ent is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04X	CESZ1,2,3 cours	ses and can
	only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.		
04XFM1	French for Intermediate Students M1	Z	2
	ate FM The objective of this three-semester course is to improve and further develop communication in the French language in both v	-	1
	mmunicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tra	-	
information and to	solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, syste	emizes and expar	nds language
skills gained in prev	vious study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, person	nal statement, rec	quest, answer
to an advert,	French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, we	ork based on thes	e texts.
04XFM2	French for Intermediate Students M2	7	2
	I contraction of the second	· · · · ·	1
	on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science tex		
and scientific lar	nguage (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scie	nce and technolo	ogy, French
	scientists, artists and architects. Description of an object, device, shapes, dimensions, material.		
04XFM3	French for Intermediate Students M3	Z	2
	I contraction of the second	1	1
	sed on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (sub		
	res, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cla		
field of students' fu	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 Fi	rench articles
and on	e's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi	ion and coherenc	e.
04XFMZK	French for Intermediate Students Examination	ZK	4
-		1	
The content is the	e examination as given by the study programme. The whole French programme is ended with an examination covering the contents o		examination
	consists of a written and oral part and is organized according to Examination Instructions, a document available on the well	b.	
04XFP1	French for Advanced Students P1	Z	2
FP advanced cour	'se The objective of this three-semester course is to improve and further develop communication in the French language in both writte	en and oral form.	Students will
	nicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general		
-	FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repe	-	-
	nparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional le	-	
request, answer to	an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics	of specialization.	mathematics
		or opeolanzation.	mathematics,
	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation	-	mathematics,
04XFP2	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation	n.	
04XFP2 With the link to P1	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2	n. Z	2
	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g	n. Z	2
With the link to P1	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation).	n. Z iven topics. Featu	2 Ires typical of
	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g	n. Z	2
With the link to P1 04XFP3	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation).	n. Z iven topics. Featu	2 Ires typical of
With the link to P1 04XFP3 The course is focus	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in eng	n. Z iven topics. Featu Z gineering environi	2 ures typical of 2 ment. Special
With the link to P1 04XFP3 The course is focus	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engl of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover	n. Z iven topics. Featu Z gineering environi	2 ures typical of 2 ment. Special
With the link to P1 04XFP3 The course is focus skill - translation o	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engl of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.	n. Z iven topics. Featu Z gineering environi s a technical /app	2 ures typical of 2 ment. Special blied science
With the link to P1 04XFP3 The course is focus skill - translation o 04XFPZK	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engl of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. French for Advanced Students Examination	n. Z iven topics. Featu gineering environi s a technical /app ZK	2 ures typical of 2 ment. Special blied science
With the link to P1 04XFP3 The course is focus skill - translation o 04XFPZK	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engl of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.	n. Z iven topics. Featu gineering environi s a technical /app ZK	2 ures typical of 2 ment. Special blied science
With the link to P1 04XFP3 The course is focus skill - translation o 04XFPZK	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engl of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. French for Advanced Students Examination	n. Ziven topics. Featu gineering environi s a technical /app ZK and is organized a	2 ures typical of 2 ment. Special blied science
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With the link to P1 04XFP3 The course is focus skill - translation of 04XFPZK The whole French 04XFZ1 French for beginne The course includ level, actively to (Francouzština pro giving the of 04XFZ2 The course is linkit French for Begin thanking, travelling 04XFZ3 The course builts Topics, functions 04XFZ4 The course builds lessons 19 - 23 of ti Students of FJFI. 04XFZ5 All four skills acquit general contents	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication or g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in end of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination French for Advanced Students Examination French for Advanced Students Examination French for Advanced Students Examination French for Beginners Z1 res The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in soc les French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to grade to the statution sof communication and functions from the textbook Espaces I, lessons 1-4 : introductions, pe directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronu gray with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the ners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreeme may of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communic to and situations are complemented from other materials. Stress is put on oral communication and reading skills are propular science texts. French for	n. Z iven topics. Feature gineering environ s a technical /app ZK and is organized a ading. Z ializing and in pro- o communicate al dová, French for be brsonal information nciation and gran Z textbook: Pravda ent - disagreement cation. Specific to Z avdová: French for ormation and loud Z textbook: Pravda ent - disagreement cation. Specific to Z avdová: French for ormation and loud Z textbook: Pravda ent - disagreement cation. Specific to Z avdová: French for ormation and loud Z texts is roughly of e notes French for ing, weather, univert. Z resent it orally in to pics: on physics for	2 ures typical of 2 ment. Special olied science 4 according to 2 ofessional life. t elementary beginners n, asking and nmar. 2 - Pravdová : act, apology, pics covered: 2 r Beginners. d as part of 2 covered with r Engineering versity in our 2 the class. The from lecture
With the link to P1 04XFP3 The course is focus skill - translation of 04XFPZK The whole French 04XFZ1 French for beginne The course includ level, actively to (Francouzština pro giving the of 04XFZ2 The course is linkit French for Begin thanking, travelling 04XFZ3 The course builts Topics, functions 04XFZ4 The course builds lessons 19 - 23 of ti Students of FJFI. 04XFZ5 All four skills acquit general contents	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation French for Advanced Students P2 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 sed on systemization and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. French for Advanced Students Examination rorgam is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part a Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination or several set topics for oral examination groups for the solution is communication and reading of popular science and scientific texts. F21 The objective is to be able to using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbock Pravda - Pravc as at key). It is extended with situations of communication and functions from the textbock Espaces I, lessons 1 - 4 : introductions, pe directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronu may of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation, is practiced. Stress on oral communic mode with situations of communication skills are expanded. The scope is given by lessons 8 - 13 of the ners . Additional topics and skills are filled in from the textbock Espaces I, lessons 14 - 18 of the textbock: Pravda - Prav and situations are complemented from other materials. Stress is put on oral communication and reading skills are practiced. The cortent	n. Z iven topics. Feature gineering environ s a technical /app ZK and is organized a ading. Z ializing and in pro- o communicate al dová, French for b brsonal information nciation and gran Z textbook: Pravda ent - disagreement cation. Specific to Z avdová: French for ormation and loud Z textbook: Pravda ent - disagreement cation. Specific to Z avdová: French for ormation and loud Z textbook: Pravda ent - disagreement cation. Specific to Z avdová: French for ormation and loud Z texts is roughly of e notes French for ing, weather, univert. Z resent it orally in to pics: on physics for	2 ures typical of 2 ment. Special olied science 4 according to 2 ofessional life. t elementary beginners n, asking and nmar. 2 - Pravdová : act, apology, pics covered: 2 r Beginners. d as part of 2 covered with r Engineering versity in our 2 the class. The from lecture

04XFZZK	French for Beginners Examination	ZK	3			
	examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination	I I	-			
	Instruction for examination. Its content covers the levels FZ1 - FZ5.		dooumont			
		Z	2			
The objective of the course is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and structures (e.g. the passive) and						
	n processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repu	•				
environmental is	sues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists		itals of 11			
	terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and unders	tandability.				
04XNM2	German for Intermediate Students M2	Z	2			
The course introdu	ces other more complex grammatical structures and their application in communication based on technical texts, such as the relation be	tween technology a	and society,			
the world at the l	beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and d	car technology etc.	Students			
practise reading for	r information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati	cally revises other g	rammatical			
	phenomena important for professional discourse (participles, relative clauses).					
04XNM3	German for Intermediate Students M3	Z	2			
	ces other more complex grammatical structures and their application in communication based on technical texts, such as the relation be	ہ tween technoloay ;	and society.			
	beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and					
	information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati					
practice reading for	phenomena important for professional discourse (participles, relative clauses).	sany reflece carel g	, anna a cai			
04XNMZK	German for Intermediate Students Examination	ZK	4			
	t is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination of					
and oral, which co	wer the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessme	ent. More detailed in	nformation			
	is to be obtained from the teacher.	·				
04XNP1	German for Advanced Students P1	Z	2			
This course requi	res good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be level	led off at the begin	ning of the			
course. The cours	se is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for de	etail). It revises and	l develops			
more difficult gramr	nar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on prac	ctical everyday com	munication,			
	i.e., telephoning.					
04XNP2	German for Advanced Students P2	Z	2			
	bs the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending					
-	t introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and pra	-				
	oth written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indi	-	namoaton,			
04XNP3	German for Advanced Students P3	Z	2			
	sts of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varie	-				
	nd car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the voca					
	gineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used.					
students are traine	d to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The c	ourse also includes	s translation			
	practice to and from German.					
04XNPZK	German for Advanced Students Examination	ZK	4			
The course conter	t is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination o	onsisting of two par	rts - written			
and oral, which o	cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded	assessment. More	e detailed			
	information is to be obtained from the teacher.					
04XRM1	Russian for Intermediate Students M1	7	2			
	gned for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (both printed and h	- 1			
-	or communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking					
they can use ba	sic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement I		uise. The			
	contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetab					
04XRM2	Russian for Intermediate Students M2	Z	2			
-	The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the	e timetable.				
04XRM3	Russian for Intermediate Students M3	Z	2			
The course develop	bs the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, howe	ver, for half of the t	ime allotted			
	in the timetable.					
04XRMZK	Russian for Intermediate Students Examination	ZK	4			
	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled	I I	-			
	lents are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instr					
		· · · · · · · · · · · · · · · · · · ·				
04XRP1	Russian for Advanced Students P1	Z	2			
I ne entrance req	juirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, prac	ticing more difficult	grammar			
	structures, understanding the fundamentals of technical language and training writing skills.	r				
04XRP2	Russian for Advanced Students P2	Z	2			
The course is bas	sed on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, ve	rb aspects, specific	c syntactic			
	structures). Stress is put on independent oral and written communication.					
04XRP3	Russian for Advanced Students P3	Z	2			
	ed on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing	J, translation). The	RP1 - RP3			
	od previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The	- ·				
	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and wi	-				
	echnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accurate	, ,				
	technical topics.					
04XRPZK	Russian for Advanced Students Examination	ZK	4			
	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled					
	lents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instr					
- KF 5. 3100	איז	uotiona by the teac	noi.			

04XRZ1	Russian for Beginners Z1	Z	2
	ents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian	1. Thus it begins wit	h mastering
	bet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking	-	-
	a short text with marked stress, understand its contents and summarize it.		
04XRZ2	Russian for Beginners Z2	Z	2
	ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subte	echnical texts. Stud	lents will be
able to communica	te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also	o develop their voc	abulary and
	master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in	writing.	
04XRZ3	Russian for Beginners Z3	Z	2
The course is base	d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training	various forms of re	eading skills
and listening) an	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be	able to respond so	o as to be
	understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4	Russian for Beginners Z4	Z	2
The course is base	d on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a c	ertain percentage	of unfamiliar
words, oral comm	nunication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs	s, differences in ver	b patterns
from Czech, mo	dality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), a	and practice oral ar	nd written
communication c	n more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g.	., Siberia), learn ho	ow to fill in
	forms, look up the information from the timetable, learn about Russian holidays and typical meals.		
04XRZ5	Russian for Beginners Z5	Z	2
The course expects	the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding	ig, extracting and s	ummarizing
information from a	specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Comr	nunication skills ar	e trained on
everyday topics. S	Studying grammar is based on professional and technical texts and only includes items typically used in professional communication ((verbal adjectives,	participles,
passiv	ve voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, po	olite request, etc.)	
04XRZZK	Russian for Beginners Examination	ZK	3
	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled		
- RZ5. Stud	ents are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instr	uctions by the tead	cher.
04XSM1	Spanish for Intermediate Students M1	Z	2
The course is des	signed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semest	ter course develop	s standard
vocabulary and p	ays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negativ	e form of the impe	rative, and
subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading tex	kts or listening to th	iem.
04XSM2	Spanish for Intermediate Students M3	Z	2
The course develo	ps the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for sp	ecific purposes in	order to be
	able to work with specialized texts on the Internet.		
04XSM3	Spanish for Intermediate Students M3	Z	2
The course books a	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academi	່ ic style. They will be	e competent
enough to use the	Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write sho	rt articles and sum	maries. The
	final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral ex	amination.	
04XSMZK	Spanish for Intermediate Students Examination	ZK	4
The course content	is the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the written parts	art, students will ha	ve obtained
	non-graded assessment for course SM3.Oral examination follows the written part.		
04XSP1	Spanish for Advanced Students P1	Z	2
Course concentrate	es on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication.	Course prerequisit	tes: level B2
	of CEFR.		
04XSP2	Spanish for Advanced Students P2	Z	2
Course SP2 is the	second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and synta	x and focuses on ir	ndependent
	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 focu	used on written con	nmunication
	based on what students will need in their career.		
04XSPZK	Spanish for Advanced Students Examination	ZK	4
The course conten	is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for a	admission to oral pa	art is having
	passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the	e student.	
04XSZ1	Spanish for Beginners Z1	Z	2
Course SZ1 is the	first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundament	tal grammar structu	ires and will
be able to	communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Span	ish and will develo	p it.
04XSZ2	Spanish for Beginners Students Z2	Z	2
Course SZ2 is base	ed on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis	will be chosen so a	as to enable
them to understand	d short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and other	s such as the Czec	ch Republic.
	Realia of Spanish-speaking countries are also included.		
04XSZ3	Spanish for Beginners Z3	Z	2
The course is base	d on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the	e Spanish-speakin	g countries,
mainly of Spain.	It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative). It includes writter	n and oral
	communication on a given general topic, for which the student is trained by reading texts or listening to them.		
04XSZ4	Spanish for Beginners Z4	Z	2
The course is bas	ed on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish	speaking countries	s, mainly of
Spain. It pays atte	ntion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	imperative, and su	ubjunctive),
	to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listeni	ng to them.	
04XSZ5	Spanish for Beginners Z5	Z	2
	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for	r specific purposes	s. In its final
	part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examina	ition.	

04XSZZK	Spanish for Beginners Examination	ZK	3
	ent is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral ex	ہ amination only if h	e/she has
	passed the written examination test.		
11KPRA1	Quantum Laboratory 1	KZ	4
In the first part of	the semester, the students will gain basic practical skills in laser physics and usually used measurement methods and techniques. In	the second part th	e students
will focu	s on tasks in preparation of low-dimensional systems, physics of low temperatures and basic structure and spectroscopic methods of	solid state physics	5.
11SFIPL	Seminar on Solid State Physics	KZ	2
1.Introduction of t	he Seminar and ?SSS? software features. 2. Module "bravais" - crystal structure and X-ray diffraction in 2D ? theory 3. Simulations of o	diffractive phenome	ena related
-	es: crystal lattice versus crystal structure, primitive cell, elementary cell, lattice plane, reciprocal grid, Laue and Bragg condition, atom	-	
	ractical structural analysis 4. Module "laue" - Diffraction on perfect and imperfect crystals 5. Simulations: influence of structural disorder on	-	
	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stanc		
	y and momentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets, group and phase velocity, dispersion		
	nharmonicity 8."debye" module - lattice dynamics and thermal capacity ? theory 9.Simulations: Brillouine zone, dispersion relation, der drude" module - dynamics of classical electron gas in 2D ? theory 11.Simulations: diffuse electron movement, electron drift in an exte	-	
	entitie include i dynamics of classical election gas in 2D if theory in community in community and the electron movement, electron of the man execution movement, electron movement, electron and in an execution and the electron movement, electron movement, electron and the electron movement, electron and the ele		-
chookiey experime	seminar work.		
11UFP	Introduction to Solid State Physics	ZK	3
-	tains the fundamentals of diffraction stress analysis with a strong emphasis on the illustrations of the capability of X-ray diffraction to s	I I	
11UFPLN	Introduction to Solid State Physics	ZK	2
THOIT EN	The purpose of this lecture is to introduce the undergraduate students to the study of the solid state physics.		2
11ZFP	Basic to Solid State Physics	ZK	3
Description of func	amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding	j interaction betwe	en atoms in
	es of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic		-
	periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons in	-	
energy bands ex	kplained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s	systematically intro	duce and
44750	interpret a broad phenomenological basis of physical properties of crystalline solids	1/7	
11ZFPL	Basic to Solid State Physics	KZ	2
	lamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding	5	
	es of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons ir		-
	periodic potential of the crystal natice is introduced and its relation to the following model describing the energence state of electrons in replained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s	-	
onorgy bando o	interpret a broad phenomenological basis of physical properties of crystalline solids	yotomation y march	
12KOE	Fundamentals of Classical Optics and Electrodynamics	ZK	4
-	sed on the basics of classical optics and electrodynamics, which is important especially in relation to quantum optical theory. The lectu	I I	tromagnetic
	optics, material aspects of optical phenomena, introduction to geometrical optics, and fundamentals of nonlinear optics, including dis		-
nonlinear respons	e in optical media, including anisotropic ones. Attention is also given to beam optics. Further, it focuses on the implications of statistic	al properties of ligh	nt, explains
the basics of diffra	action theory and holography. It explains the relation between wave optics and ray optics, describes light propagation in term of rays, a	and outlines the fur	damentals
of instrumental o	ptics. It also includes the basics of guided waves and resonators - the theory of guided waves in waveguides and optical fibers, waveg	juide modes and w	vaveguide
401.4.0	dispersion, reciprocity theorem and optical resonator theory.	771	0
12LAS	Laser Systems	Z,ZK	3
	e nanosecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers. O . Semiconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultravi		
	power continuous lasers. Infrared high power lasers. Submilimeter lasers. Lasers with high degree of coherence. Free electron la		isers. riigir
12MOF	Molecular Physics	ZK	2
-	deas on physics of molecules and molecular matter, and on structure-to-physical properties relationship. Methods of molecular struct		2
12NME1	Numerical Methods 1	Z,ZK	4
	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Met		
	icists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computation		-
	used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.		
12PYTH	Scientific Programming in Python	Z	2
	Irse is to learn the fundamentals of the modern Python programming language with a focus on scientific computing. Emphasis is place	ed on effective solu	
problems. The c	ourse 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
involved in ongoi	ng research. In the introductory part of the course, students learn the basic features of Python? from basic types to object oriented or	functional program	ming. The
greater part of th	ne course focuses on specific features of Python for scientific programming. Presented are the main numerical libraries NumPy, SciPy	and the Matplotlib	graphics
	library. We show how to generate efficient code, how to combine Python with other languages, what tools are available.		
12UFN	Introduction to Photonics and Nanostructures	KZ	3
Overview of nanos	tructures and nanotechnologies; quantum technologies; quantum nanostructures; photonic structures; nanophotonics and nanoplasm	onics; optical wave	eguides and
	fibers; integrated photonics; computer simulations; technological realization; student presentations		
12ULAT	Introduction to Laser Technique	KZ	2
Overview of electi	romagnetic radiation sources; laser principle; classification of lasers; characterization and rough application of various types of lasers;	laser safety preca	utions. The
	laser amplifier, Q-switching, mode-locking.	7	0
12UMF	Introduction to Modern Physics	Z	3
The course is inter	nded to be a concise introduction to modern / nonclassical physics for students who have already had basic classical physics course. A	part of the course	is delivered
	in a computational laboratory. Introduction to UNIX	Z	2
12UNXAP	INTRODUCTION TO UNIX operating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfac	I I	2
	ting systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working with		
Command interpreter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard tools. Graphical user interface			
X-windows. Computer networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configuration of a computer. Network services:			
	hardware sharing, mail, scp, etc. Network applications		

12UVP	Introduction to Scientific Computing	Z	2
	Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with sc	ome basic tools fo	ort scientific
	and technicval computing, data analysis, data visualisation and algorithm development.		
12VKT	Vacuum Technology	KZ	4
Rarefied gasses: ba	asic concepts and relations; diffusion, flow of rarefied gases. Flow and current of gas, conductivity. Interaction of gas with solid surface	ce; sorption, desc	prption; gas
	id matter; evaporation, condensation; Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and their pro		
pumps: Diaphragm,	, Sliding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Adsorpt	tion pumps, Subli	mation and
NEG pumps, Ion get	tter pumpsVacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. Materi	ials and vacuum	components
	and seals.Practical exercises.		
12VTV	Scientific and Technical Computing	Z	2
The students get fa	amiliar with methods of solving of computational problems in the scientific and technical practice, and with methods of their programm	ming. The course	is oriented
	mainly to programming in the Fortran language.		
12ZEL1	Basic Electronics 1	Z,ZK	3
The subject provide	es primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circui	it analysis methor	ds for linear
circuits include	symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe	ects inside linear	circuits.
12ZEL2	Basic Electronics 2	Z,ZK	3
The subject follows	s up with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic the	emes of logical ci	rcuits field.
12ZFS	Fundamentals of Photonic Structures	Z,ZK	2
-	e basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their pre		1
	ecture discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures		
applications in opti	ical communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic struct	tures and photon	ic crystals,
metamaterials, me	etasurfaces, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations on s	selected relevant	topics and
	excursions to selected photonic laboratories.		
12ZPLT	Basic Laser Technique Laboratory	KZ	6
Lasers, solid state No	d:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmonic,	He-Ne glow disc	harges, laser
	pumped Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acou	-	-
14TED	Creating Electronic Documents	Z	2
1	ng and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentatior	_	1
	office suite.		
15CH1	General Chemistry 1	Z	3
	concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical u	_	-
	solved in exercises.		-,
15CH2	General Chemistry 2	Z,ZK	3
	ntinuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using v		-
-	principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are i	-	
	in exercises.		
17UING	Introduction to Engineering	ΚZ	3
	es introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and beha		-
	nd production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will b		analaotaning
18NES2	Neural Networks 2	KZ	3
	e "Neural Networks 2" is to acquaint students with basic models of deep neural networks and teach them how to apply these models a		-
	tasks.		one practical
18PPY1		Z	2
	Programming in Python 1 es students to advanced features of the Python language and common scientific packages. The course covers both object-oriented as v		
	ving part of the course describes the use of Python in the fields of scientific and technical computing (NumPy and SciPy packages), data		
			1
18PRC1	Programming in C++ 1	Z	4
400000	This course covers mainly the C programming language and non-object oriented features of the C++ language.		
18PRC2	Programming in C++ 2	KZ	4
	urse covers the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard		
18ZPRO	Basics of Programming	Z	4
This course is inte	ended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	nming and with th	e Python
	programming language.		1
	Physical Education	Z	1
TV-1		7	1
TV-1 TV-2	Physical Education	Z	
TV-2	•		
	Physical Education Physical education Physical education	Z Z Z	1

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