Study plan

Name of study plan: Fyzikální inženýrství - Fyzikální inženýrství materiál

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Physical Engineering
Type of study: Bachelor full-time
Required credits: 6
Elective courses credits: 174
Sum of credits in the plan: 180
Note on the plan:

Name of the block: Povinné p edm ty specializace Minimal number of credits of the block: 0 The role of the block: PS

Code of the group: BSPFIFIM1 Name of the group: BS P_FIB FIM 1st year Requirement credits in the group: Requirement courses in the group: In this group you have to complete at least 14 courses Credits in the group: 0 Note on the group: Podmínkou skládání zkoušky 01MANZ je získání zápočtu z 01MAN.

Podmínkou skládání zkoušky 01MANZ je získání zápočtu z 01MAN. Podmínkou skládání zkoušky 01LALZ je získání zápočtu z 01LAL.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
02DEF1	History of Physics 1 Igor Jex, Miroslav Myška Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	Z	PS
02ELMA	Electricity and Magnetism Iskender Yalcinkaya, Goce Chadzitaskos, Josef Schmidt, Jan Vysoký Jan Vysoký Goce Chadzitaskos (Gar.)	Z,ZK	6	4+2	L	PS
01LAL	Linear Algebra 1 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	z	2	2P+2C		PS
01LALZ	Linear Algebra 1, exam Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	0P+0C		PS
01LAL2	Linear Algebra 2 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		PS
01MAN	Calculus 1 Miroslav Kolá, Pavel Strachota, Edita Pelantová Pavel Strachota Edita Pelantová (Gar.)	Z	4	4+4		PS
01MANZ	Calculus 1, exam Miroslav Kolá, Pavel Strachota, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	ZK	4	0P+0C		PS
01MAN2	Calculus 2 Severin Pošta, Miroslav Kolá, Edita Pelantová Miroslav Kolá Severin Pošta (Gar.)	Z,ZK	8	4P+4C		PS
02MECH	Mechanics Iskender Yalcinkaya, David B e Michal Jex David B e (Gar.)	Z	4	4+2	Z	PS
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, David B e , Filip Petrásek, Stanislav Skoupý, Antonín Hoskovec, Petr Novotný Antonín Hoskovec David B e (Gar.)	ZK	2	-	Z	PS
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	PS
02TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	PS
17UING	Introduction to Engineering Jan Frýbort, Petr Haušild, Radek Mušálek Jan Frýbort (Gar.)	KZ	3	2P+1C	Z	PS

18ZPRO	Basics of Programming Maksym Dreval, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	PS
Characteristics	of the courses of this group of Study Plan: Code=BSPFIFIM1 Name=	BS P FIB F	-IM 1st ve	ar		
02DEF1	History of Physics 1				Z	2
Helenistic period, Ar	e in the system of sciences. The relationship of man and nature. Natural sciences in ancient Or chimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano E ence. Newton and his work.		,		,	
02ELMA	Electricity and Magnetism				Z,ZK	6
-	lomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectric nic forces,magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. E				-	of the relativity
01LAL	Linear Algebra 1				Z	2
-	inear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces.	5 Linear mann	inas 6 Matric	es of linear		1
theorem.		o. Emour mapp	ingo: o. maine		mappinge	
01LALZ	Linear Algebra 1, exam				ZK	2
01LAL2	Linear Algebra 2				Z,ZK	4
Outline: 1. Inverse m	atrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector	, diagonalizatio	n). 4. Hermitia	an and quad	dratic form	s. 5. Scalar
product and orthogo	nality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Me	ethods for calcu	lation of inver	se matrices	s. 2. Metho	ds of calculation
of determinants. 3. C	Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form.	5. Scalar produ	ct and orthog	onality. Cal	culation of	orthogonal
complements. 6. Ge	ometry – exercises and examples. 7. Adjoint operators.					
01MAN	Calculus 1				Z	4
Basic calculus (real	analysis, functions of one real variable, differential calculus).					
01MANZ	Calculus 1, exam				ZK	4
01MAN2	Calculus 2			2	Z,ZK	8
1. Continuation of dif	fferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergen	ce, operations o	on series, abs	olute and c	onditional	convergence 3.
Real and complex po	ower series, the Cauchy-Hadamard theorem, expansion of function into power series, summatic	on of infinite ser	ies. 4. Theory	of integrals	: primitives	, definite integra
(Riemann definition)	, techniques of integration and application of integrals, Generalized Riemann integral					
02MECH	Mechanics				Ζ	4
ntroduction to physic	s, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition	on. Particle dyna	amics, one-dii	mensional e	equations of	of motion, motior
in central force field,	forces innoninertial reference frames. Mechanics of system of free particles, two-body problem	n, collisions. Me	chanics ofrigi	d body, rota	ation. Fund	amentals of
continuum mechanic	s, elasticity, hydrodynamics. Sound.					
02MECHZ	Mechanics - Examination				ZK	2
The content of the s	ubject is the examination according to the plan of studies.			•		
00PT	Preparatory Week				Z	2
02TER	Heat and Molecular Physics				Z,ZK	4
Thermal expansion	of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and per	netration; 1st ar	nd 2nd thermo	odynamic pi	rinciple, ide	al and real gas,
entropy; non-chemic	al systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials;	kinetic theory:	Maxwell's velo	ocity distrib	ution,equip	artition theorem
17UING	Introduction to Engineering				KZ	3
	s introduction to engineering skills. Students should gain general engineering skills at basic leve lity assurance, environmental impacts,). In addition, the introduction to scientific work and teo				basics of	manufacturing
18ZPRO	Basics of Programming				Z	4
				Ι.	<u> </u>	4

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

Code of the group: BSPFIFIM2

Name of the group: BS P_FIB FIM 2nd year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 9 courses Credits in the group: 0

Note on the group:

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

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
14DYLS	Dynamics of Linear Systems Ji í Kunz Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	2	1P+1C	6	PS
14ELM	Electron Microscopy Miroslav Karlík Miroslav Karlík (Gar.)	KZ	2	2P+0C		PS
01ANB3	Calculus B 3 Miroslav Kolá , Milan Krbálek Miroslav Kolá Milan Krbálek (Gar.)	Z,ZK	8	4P+4C		PS
01ANB4	Calculus B 4 Ji í Mikyška, Miroslav Kolá , Milan Krbálek Milan Krbálek Milan Krbálek (Gar.)	Z,ZK	6	2P+4C		PS
12NME1	Numerical Methods 1 Pavel Váchal Pavel Váchal (Gar.)	Z,ZK	4	2+2	L	PS
14TEM	Engineering Mechanics Ji í Kunz Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	6	4	5	PS

02TEF1	Theoretical Physics 1 Petr Novotný Petr Novotný Igor Jex (Gar.)	Z,ZK	4	2+2	Z	PS
02TSFA	Thermodynamics and Statistical Physics Igor Jex, Jaroslav Novotný Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	PS
02VOAF	Waves, Optics and Atomic Physics Josef Schmidt, Petr Novotný Jan Vysoký Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	PS
Characteristics of the	courses of this group of Study Plan: Code=BSPFIFIM2 Name	=BS P_FIB FI	M 2nd ye	ear		
	namics of Linear Systems				,ZK	2
-	mechanical systems by means of simple computational system of discrete elements. I equations of motion - their determination and solution. Analysis of motion stability.	Free and/or forced	d vibration o	f mechanica	I systems with	n one or two
	ectron Microscopy				KZ	2
	udents are introduced to the microscopic methods used for the characterization of mat	erials, thin layers	or nanoparti			
	ectron microscopy and to various types of microscopes. An important part of the course					
	nd tools used in microscopy and to the description of particular parts of the microscope					action, types
	nd imaging techniques are also covered. A particular attention is given to analytical me	ethods and imagin	ng technique			
	Iculus B 3				,ZK	8
· ·	series - convergence range, criteria of uniform convergence, continuity, limit, different	•				
	. 2. Ordinary differential equations - equations of first order (method of integration fact and equations of higher order (fundamental system, reduction of order, variation of par	-				-
	on). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterio	•				•
, ,	e, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier set	1 /	, ,		•	, ,
	e. 5. Differential calculus of functions of several variables - limit, continuity, partial and d	•				
Taylor series, elementary ter	ms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several e	equations.				
01ANB4 Ca	Iculus B 4			Z	',ZK	6
	více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorov					
	pustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6]				• •	
	prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta,	v ta o substituci.	Leviho a Lel	besgueova	v ta. Limita, s	pojitost a
	ametru. [8] Integrály po k ivkách a plochách. Integrální v ty. merical Methods 1				.ZK	4
	c principles of numerical mathematics important for numerical solving of problems imp	ortant for physics	and technol	1	· I	•
	nary differential equations, random numbers) are included in addition to the basic num					
	ning language as a demonstration tool. The seminars are held in computer laboratory.		0	•		
14TEM En	gineering Mechanics			Z	,ZK	6
Abstract: The course represe	ents a link-up between the theoretical mechanics of rigid bodies and engineering disci	plines dealing with	n stress and	strain analy	sis of real str	ucture parts
	mechanics, etc.). Principles of statics, kinematics, and dynamics and their application.					
	eoretical Physics 1			1	,ZK	4
	to analytical mechanics. The students acquire knowledge of the basic concepts of the					
	Jewton's, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these tem of constrained mass points, and of a rigid body. Advanced parts of the course cov			-	•	
	classical theoretical physics (02TEF1, 02TEF2).		rintegrai prii	icipies of m	echanics. The	Subject is
· · ·	ermodynamics and Statistical Physics			7	,ZK	4
	cs and statistical physics. Thermodynamic potential, the Joule Thomson effect, condition	ns of equilibrium, t	he Braun-Le			-
Basics of many body descrip	tionfrom a statistical point of view (classical and quasiclassical regime within the fram	e of a canonical a	and grand-ca	anonical ens	emble, Fermi	gas, models
of crystals and the black bod	y radiation). The Boltzmann equation is usedto discusses simple transport phenomen	a.				
02VOAF Wa	ives, Optics and Atomic Physics			Z	,ZK	6
	nics and electromagnetism: modes, standing and travelling waves, wave packets indis					
	cs. Introduction toquantum physics: black body radiation, quantum of energy, photoeffe	ect, the Compton	effect, the d	e Broglie wa	aves, the Schro	odinger
equation, stationary states a	nd spectra of finite systems.					
Code of the group	b: BSPFIFIM3					
Name of the grou	p: BS P_FIB FIM 3rd year					
Requirement cred	,					
•	0	oto ot looo	10 00	uraaa		
	rses in the group: In this group you have to comple	ele al leas		urses		
Credits in the gro	up: 0					
Note on the group	D: Zkoušku z předmětu 01RMAF lze sklá	dat až po slo	ožení vše	ech zkou	šek z Ma	tematické
0,	analýzy a Lineární algebry.					
	Name of the course / Name of the group of courses					
Code	(in case of groups of courses the list of codes of their	Completion	Credits	Scope	Semester	Role
	members)	•		•		
	Tutors, authors and guarantors (gar.) Bachelor Thesis 1	_	_			
14BPFI1	Ji í Kunz, Ladislav Kalvoda Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	5	5C		PS
14BPFI2	Bachelor Thesis 2 Ji í Kunz, Ladislav Kalvoda Ladislav Kalvoda Ji í Kunz (Gar.)	Z	10	10C		PS
14EM1	Elasticity 1 Aleš Materna, Vladislav Oliva Vladislav Oliva Vladislav Oliva (Gar.)	Z,ZK	5	2P+2C		PS
14FKO	Metal Physics Miroslav Karlík, Jaroslav ech Miroslav Karlík Miroslav Karlík (Gar.)	Z,ZK	6	4P+2C		PS
02KF	Quantum Physics	Z,ZK	3	2P+1C	Z	PS
	Filip Petrásek Libor Šnobl (Gar.)				_	

01NME2	Numerical Methods 2 Michal Beneš Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	PS
14РМКОР	Practicum of finite elements methods Aleš Materna Aleš Materna Aleš Materna (Gar.)	ZK	3	0P+2C		PS
01PRST	Probability and Statistics Tomáš Hobza Tomáš Hobza Tomáš Hobza (Gar.)	Z,ZK	4	3+1	Z	PS
01RMAF	Equations of Mathematical Physics Václav Klika Václav Klika (Gar.)	Z,ZK	7	4P+2C		PS
11BSEM	Bachelor Seminar Ladislav Kalvoda, Radka Mika Havlíková Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	1	0P+2C	L	PS
11ZFPL	Basic to Solid State Physics Ladislav Kalvoda, Eva Mihóková Eva Mihóková Ladislav Kalvoda (Gar.)	KZ	2	26P+0C	Z	PS
14ZZKOS	Testing and processing of metals and alloys Radek Mušálek, Hynek Lauschmann Hynek Lauschmann Hynek Lauschmann (Gar.)	Z,ZK	4	2P+2C		PS
Characteristics of the	courses of this group of Study Plan: Code=BSPFIFIM3 Name=	BS P_FIB FI	M 3rd ye	ar		
	chelor Thesis 1				Z	5
	is/her supervisor has been working on the given particular topic for one year.				7	40
	chelor Thesis 2 iis/her supervisor has been working on the given particular topic for one year.				Z	10
-	asticity 1			7	,ZK	5
	ents an introduction for several another lectures on continuum mechanics and the strer	oth of materials.	The first pa		·	-
· ·	ticity. The second one represents a logical descent from the continuum mechanics to the	•	•			
bending, shearing and torsic	on in the cross section of bars and beams.		-			
14FKO Me	etal Physics			Z	,ZK	6
Abstract: The physical backg	round of processes encountered in production and thermo-mechanical treatment of me	etallic materials is	described,	including so	lidification, c	rystal defects,
	ory of dislocations, diffusion, hardening and softening of metals and alloys.					
	antum Physics				,ZK	3
	tion, postulates of quantum mechanics, Born s statistical interpretation, expectation va	alues, Schrödinge	er equation,	Heisenberg	uncertainty	principle,
	nentum, solution of simple systems, hydrogen atom.				KZ	0
	Imerical Methods 2 nerical solution of boundary-value problems and intial-boundary-value problems for ordir	harv and partial di	fferential ec	1	1	2 ods.converting
	initial-value problems and finite-difference methods for elliptic, parabolic and first-orde					Jus conventing
	acticum of finite elements methods	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			ZK	3
-	ment code for solving practical problems in mechanics.			I		Ū
01PRST Pro	obability and Statistics			Z	.ZK	4
	pility theory and mathematical statistics. The probability theory is build gradually beginr	ning with the class	sical definiti	on and conti	nuing till the	Kolmogorov
	ndom variable, distribution function of random variable and characteristics of random va				ns are stated	and proved.
	ne basic methods of mathematical statistics such as estimation of distribution parameter	ers and hypothesi	s testing ar			
	uations of Mathematical Physics				,ZK	7
	solving integral equations, theory of generalized functions, classification of partial diffe	erential equations,	theory of it	ntegral trans	formations, a	and solution of
	(boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).				Z	1
	chelor Seminar r, students familiarize themselves with the general principles of publishing and presenti	na scientific work	and the for	 mal requirem	1	-
	econd part is designed as a practical training for the defence of the bachelor's degree p	-		-		-
the research results achieve	d during the work on their projects. Each presentation is followed by a discussion on so	cientific matters a	s well as or	the possibil	ities of impro	oving the
student's performance.						
	sic to Solid State Physics				KZ	2
	properties of solids following the regular long distance ordering of atoms in a crystal lat			-		
	als and their properties are defined. The model of crystalline lattice dynamics in harmonic tential of the crystal lattice is introduced and its relation to the following model describir					-
	e special consequences of band approach to the physical properties of solids are elucid				-	
	ological basis of physical properties of crystalline solids	-		,		
14ZZKOS Te	sting and processing of metals and alloys			Z	,ZK	4
Tension tests, hardness, imp	pact toughness, technological testing, fatigue testing, creep testing. Light microscopy, pl	reparation of spec	cimens for r	nacro- and n	nicro-observa	ation. Casting,
forming, welding, soldering, and CAD.	brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, tita	anium alloys, spe	cial alloys o	f non-ferrous	metals. Tecl	nnical drawing
Name of the bloc	k: Compulsory elective courses					

Minimal number of credits of the block: 6 The role of the block: PV

Code of the group: BSPFIFIMPV2 Name of the group: BS P_FIB FIM Required optional courses 2nd year Requirement credits in the group: In this group you have to gain at least 6 credits Requirement courses in the group: Credits in the group: 6 Note on the group: Studenti si povinně zapisují předměty alespoň za 6 kreditů.

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
14CHMA	Materials Characterization Petr Haušild, Karel Tesa Karel Tesa Petr Haušild (Gar.)	KZ	4	2P+1C		PV
02PRA1	Experimental Laboratory 1 Libor Škoda, Katarína K ížková Gajdošová, Barbara Antonina Tizeciak, Jaroslav Biel ík Jaroslav Biel ík Jaroslav Biel ík (Gar.)	КZ	6	0+4	Z	PV
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ik Jaroslav Biel ik (Gar.)	KZ	6	0+4	L	PV
14PMA	Practicum in Materials Miroslav Karlík, Karel Tesa Miroslav Karlík Miroslav Karlík (Gar.)	KZ	3	0P+2L		PV

Characteristics of the courses of this group of Study Plan: Code=BSPFIFIMPV2 Name=BS P_FIB FIM Required optional courses 2nd year

14CHMA	Materials Characterization	KZ	4			
Abstract: The subject is	composed of lectures, exercises and discussion regarding the basic methods of characterization. The aim of the subject is to	o introduce studer	its to the most			
common methods of ma	aterials characterization, their outputs and the interpretation of the obtained data. An emphasis is placed on the individual wo	ork of the students	with current			
scientific articles in the	field of materials characterization. A part of the subject is an excursion to the laboratories of the department and its collabora	ating institutions. A	fter passing this			
subject, the student sho	puld be able to choose the adequate characterization method for a particular material and evaluate the obtained results.					
02PRA1	Experimental Laboratory 1	KZ	6			
Lecture is intended esp	ecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclea	r Engineering). Bu	it it can be also			
attended by students inte	erested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work wit	h theliterature), the	implementation			
of the measurement (ac	equire of different experimental procedures and routines), willteach writing the records of measurement, processing and evalu	uation of results. A	t the same time			
practically extendthe kn	owledge gained in lectures on physics.					
02PRA2	Experimental Laboratory 2	KZ	6			
Lecture is intended esp	ecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclea	r Engineering). Bu	t it can be also			
attended by students inte	erested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work wit	h theliterature), the	e implementation			
of the measurement (ac	equire of different experimental procedures and routines), willteach writing the records of measurement, processing and evalu	uation of results. A	t the same time			
practically extendthe kn	owledge gained in lectures on physics.					
14PMA	Practicum in Materials	KZ	3			
Abstract: The aim of this	subject is to introduce students to the basics of scientific work in the form of measurements, data analysis and writing of rej	ports. Simple case	studies of			
materials science are designed to show students the right way of presenting the outputs of their work. The subject is focused on correct data analysis and logical structure of the reports.						
After completing the sul	pject, the student should be able to individually design, execute and evaluate experiments.					

Code of the group: BSSPOLVEDY Name of the group: BS - Social Sciences Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 0

Note on the group:

Only one of these courses is obligatory.

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	
00EKOT	Economy in Technology Jana Ková ová	Z	1	2+0		PV	
00ETV	Ethics of Science and Technology Jakub Hají ek Jana Ková ová	Z	1	0+2	L	PV	
00RET	Rhetoric Jana Ková ová Jana Ková ová	Z	1	0+2		PV	
00UPRA	Introduction to Law Martin ech Jana Ková ová	Z	1	0+2		PV	
00UPSY	Introduction to Psychology Jakub Hají ek Jana Ková ová	Z	1	0+2		PV	

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

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

Code of the group: BSPJAZYKYZK Name of the group: BS P languages Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 2 courses Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAMZK	English for Intermediate Students Examination Michal Beneš	ZK	4		Z	PV
04XAPZK	English for Advanced Students Examination Michal Beneš	ZK	4		Z	PV
04XCESZZK	Czech for Foreigners – Beginners - Examination Jana Ková ová, Slav na Brownová	ZK	4		Z	PV
04XCESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Michal Beneš Jana Ková ová (Gar.)	ZK	4		Z	PV
04XFMZK	French for Intermediate Students Examination Michal Beneš	ZK	4		Z	PV
04XFPZK	French for Advanced Students Examination Michal Beneš	ZK	4		Z	PV
04XFZZK	French for Beginners Examination	ZK	3		L	PV
04XNMZK	German for Intermediate Students Examination Michal Beneš	ZK	4		Z	PV
04XNPZK	German for Advanced Students Examination Michal Beneš	ZK	4		Z	PV
04XRMZK	Russian for Intermediate Students Examination Michal Beneš	ZK	4		Z	PV
04XRPZK	Russian for Advanced Students Examination Michal Beneš	ZK	4		Z	PV
04XRZZK	Russian for Beginners Examination	ZK	3		L	PV
04XSMZK	Spanish for Intermediate Students Examination Michal Beneš	ZK	4		Z	PV
04XSPZK	Spanish for Advanced Students Examination Michal Beneš	ZK	4		Z	PV
04XSZZK	Spanish for Beginners Examination	ZK	3		L	PV

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

04XAMZK	English for Intermediate Students Examination	ZK	4			
The course content is the	, examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two part	s - written (100 n	nin) and oral			
(20-30 min). The studer	t is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English cour	ses.				
04XAPZK	English for Advanced Students Examination	ZK	4			
The course content is the	e examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability	to apply their kno	wledge obtained			
in the three AP courses	. The examination consists of 2 parts - written (110 min) and oral (30 min) and includes also oral presentation of a topic from	the student's fiel	d of study.			
04XCESZZK	Czech for Foreigners – Beginners - Examination	ZK	4			
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	XCESZ1,2,3 cou	irses and can			
only be taken after succ	essful completion of all three courses. Detailed information is to be obtained from the teacher.					
04XCESMZK	Czech for Intermediate Students Examination	ZK	4			
The course content is the	e examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the C	SM1,2,3 course	s and can only			
be taken after successf	ul completion of the 3 courses. Detailed information is to be obtained from the teacher.					
04XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4			
The course content is the	e examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the C	SP1,2,3 courses	s and can only			
be taken after successf	ul 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 exan	nination as given by the study programme. The whole French programme is ended with an examination covering the contents	of FM1-FM3. The	e examination			
consists of a written and	d 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 prog	am is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral par	t and is organize	d according to			
Examination Instruction	s, 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 exan	nination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The exam	nination is ruled b	by the document			
Instruction for examinat	ion. Its content covers the levels FZ1 - FZ5.					
04XNMZK	German for Intermediate Students Examination	ZK	4			
The course content is the	e examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination	on consisting of tw	wo parts - written			
and oral, which cover th	e courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assess	ment. More detai	iled information			
is to be obtained from t	he teacher.					
04XNPZK	German for Advanced Students Examination	ZK	4			
The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written						
and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed						
information is to be obta	ained 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 know		acquired in RM1		
- RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher.				
		JI.		
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 know	vledge and skills a	acquired in RP1		
- RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructi	ions 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 know	vledge and skills a	acquired in RZ1		
- RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instruction	ons 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 written	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 of	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: BSPFIFIMV Name of the group: BS P_FIB FIM 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 Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) Applications of Group Theory in Solid State Physics 11APLG ΖK 2 2 Ζ v Zden k Pot ek Zden k Pot ek Zden k Pot ek (Gar.) History of Physics 2 02DEF2 Ζ 2 2+0 L V Igor Jex Miroslav Myška Igor Jex (Gar.) **Instrumentation and Measurement** 11ELEA Z,ZK 2 2 L V Pavel Jiroušek Pavel Jiroušek (Gar.) **Experimental Physics** 02EXF ΖK 2 2P+0C Ζ v Katarína K ížková Gajdošová, Barbara Antonina Trzeciak, Jaroslav Adam, Jaroslava Óbertová Jaroslava Óbertová Katarína K ížková Gajdošová (Gar.) **English Conversation** 04AKS Ζ 1 0+2L v Jana Ková ová Jana Ková ová (Gar.) **Essentials of High School Course 1** 00MAM1 Ζ 1 0+1 V David B e **Essentials of High School Math Course 2** 00MAM2 Ζ 1 0+1 V Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.) Nanotechnology 12NT 2 Ζ ΖK 2+0 V Eduard Hulicius, Jan Proška Jan Proška Eduard Hulicius (Gar.) **General Chemistry 1** Ζ Ζ 15CH1 3 2+1 v Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.) **General Chemistry 2** 15CH2 Z,ZK 3 L 2+1v Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.) Computer Algebra Systems Milan Ši or **Milan Ši or** Milan Ši or (Gar.) Ζ Ζ 12PAS 2 1P+1C v Programming in MATLAB 18PMTL 4C Ζ ΚZ 4 v Quang Van Tran, Jaromír Kukal Quang Van Tran Jaromír Kukal (Gar.) Seminar on Solid State Physics Ladislav Kalvoda Ladislav Kalvoda (Gar.) 11SFIPL ΚZ 2 1+1 V **Seminar of Mathematical Physics** 02SMF 7 2 Ζ 0+2V Ladislav Hlavatý (Gar.) Structure of Solid State 11SPLA Z,ZK 4 2P+2C L V Petr Kolenko, Ivo Kraus Petr Kolenko (Gar.) TV-1 Ζ 1 Ζ **Physical Education** V TV-2 Ζ L 1 **Physical Education** v Ζ Ζ TV-3 1 0+2 V **Physical education** TV-4 Ζ **Physical education** 1 0+2 L V

14TED	Creating Electronic Documents Aleš Materna Aleš Materna (Gar.)	Z	2	26C		V
01UP1	Introduction to Probability 1 Jan Vybíral Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	3	1P+1C		V
01UP2	Introduction to Probability 2 Milan Krbálek Milan Krbálek (Gar.)	Z,ZK	3	1P+1C		V
12UNXAP	Introduction to UNIX Milan Kucha ík Milan Kucha ík (Gar.)	Z	2	1P+1C	L	V
12UVP	Introduction to Scientific Computing Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	L	V
12ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
12ZEL2	Basic Electronics 2 Jaroslav Pavel Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	L	V
02ZM1	Foundations of Physical Measurements 1 Libor Škoda, Solangel Rojas Torres, Petr Chaloupka Petr Chaloupka (Gar.)	ZK	2	2P+0C	Z	V
02ZM2	Foundations of Physical Measurements 2 Petr Chaloupka Petr Chaloupka (Gar.)	KZ	4	0P+4L	L	V
12ZAOP	Fundamentals of Optics Ivan Richter, Pavel Kwiecien Ivan Richter Ivan Richter (Gar.)	Z,ZK	2	2+0	Z	V
Characteristics of the	courses of this group of Study Plan: Code=BSPFIFIMV Name	=BS P_FIB FI	M Optio	nal cours	ses	
	plications of Group Theory in Solid State Physics		•		ZK	2
	em symmetry allows, without any quantitative calculations, rigorously and precisely de	etermine how man	y energy sta	ates there a	re and what	t interactions
and transitions between then	n may occur. Therefore, the main purpose of this course is to describe the methods by	which we can ext	ract the info	ormation on	the object t	hat symmetry
alone will provide. The applic	ation of these methods is illustrated by an example of molecular orbitals, inner orbitals	of ions in the cry	stal field env	vironment, n	ormal mode	es of molecular
vibrations, and selection rule	s for optical absorption transitions.	-				
02DEF2 His	story of Physics 2				Z	2
	chanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, c	orpuscular and wa	ave approac	h Electricity		
	ectrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its					
	ck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherfo					
	t of Nature and Universe of today.		vay to hable	ai onorgy, i	lomonary	particico,
11ELEA Ins	trumentation and Measurement			Z	,ZK	2
	n to the instrumentation and measurement for physicists.					
	perimental Physics				ZK	2
s ,	introduce the students the principles of physics measurements, their techniques, meth	ods and instrume	nts that are	used for su	ch measure	ments, and the
analysis of measured data.						
04AKS Eng	glish Conversation				Z	1
The course will develop the s	student's communication skills acquired throughout their previous studies. It aims to in	nprove all aspects	of oral com	munication.	The studen	nt will develop
their vocabulary for various c	communication situations and will master their communication strategy. They will also p	practise their lister	ing skills in	order to be	tter follow a	nd participate
in discussions. The student w	vill be trained to express their ideas clearly and according to current English usage, ar	nd become a more	confident s	speaker.		
00MAM1 Ess	sentials of High School Course 1				Z	1
00MAM2 Ess	sentials of High School Math Course 2				Z	1
Review of basics of high sch				I	I	
	notechnology				ZK	2
	nts mainly to modern technological methods of preparation of semiconductor, metal a	nd dielectric nano	structures I			
	MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention w			-		
	articular emphasis will be focused on detail characterization of "in situ" and "ex situ" te		-	-		
	well. Some supportive technical methods - lithography, diffusion, evaporation, ion imp					
as well as soldering and enc						
-	neral Chemistry 1				Z	3
	s, quantities and units used in chemistry are introduced in the course General Chemis	try I Their signifie	ance and pr	actical use ·		-
solved in exercises.		,				
	neral Chemistry 2			7	,ZK	3
	on of the course General chemistry I. The main attention is paid to general principles g					-
	s is not restricted only to chemical processes is documented. The significance and pra		•	•	•	
in exercises.					indica by c/	
	mputer Algebra Systems				7	2
	ion to computer algebra systems (CAS): their main characteristics, ways and means o	fusing them Car	etituant nor	 t is realized	Z	
-	with CAS by solving relatively simple and basic tasks from mathematics and physics.	i using them. Con	suituent par	l is realized	in compute	r classioonis.
					K2	4
	ogramming in MATLAB	forling	mathe		KZ	
e e e e e e e e e e e e e e e e e e e	ent as efficient tool for computation in complex arrays and symbolic variables, namely	ior linear algebra,	mathemati	o analysis, s	staustics, al	goritrimization
and geometric representation						
	minar on Solid State Physics				KZ	2
	r and ?SSS? software features. 2.Module "bravais" - crystal structure and X-ray diffrac				•	
	attice versus crystal structure, primitive cell, elementary cell, lattice plane, reciprocal g				-	
	uctural analysis 4.Module "laue" - Diffraction on perfect and imperfect crystals 5.Simulati				-	
	and thermal oscillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and standing waves, normal modes,					
Peranearon, energy and mon	polarization, energy and momentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets, group and phase velocity, dispersion, pulses and their propagation,					
localized modes, anharmonicity 8."debye" module - lattice dynamics and thermal capacity ? theory 9. Simulations: Brillouine zone, dispersion relation, density of states, thermal energy,						
	nentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets city 8."debye" module - lattice dynamics and thermal capacity ? theory 9.Simulations: E	Brillouine zone, dis	persion rela	tion, density	y of states, t	hermal energy,
heat capacity 10."drude" mod	nentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets city 8."debye" module - lattice dynamics and thermal capacity ? theory 9.Simulations: E dule - dynamics of classical electron gas in 2D ? theory 11.Simulations: diffuse electron	Brillouine zone, dis on movement, elec	persion rela	an external	of states, t electric field	hermal energy, d, Haynes and
heat capacity 10."drude" mod	nentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets city 8."debye" module - lattice dynamics and thermal capacity ? theory 9.Simulations: E	Brillouine zone, dis on movement, elec	persion rela	an external	of states, t electric field	hermal energy, d, Haynes and

02SMF	Seminar of Mathematical Physics	Z	2
The purpose of the sem	inar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics depar	tment will present	simple tasks
concerning their scientif	ic activities that could become the topics of the student?s bachelor theses in the next year		
11SPLA	Structure of Solid State	Z,ZK	4
Crystallography has an	important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stud	ly of solid state ph	nysics.
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1
TV-3	Physical education	Z	1
TV-4	Physical education	Z	1
14TED	Creating Electronic Documents	Z	2
	and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, present	1 – 1	_
office suite.			
01UP1	Introduction to Probability 1	Z,ZK	3
	e set of possible results, classical probability, independent random events 2. Probability and combinatorics 3. Probability and	1 · · 1	d's paradox
4.Conditional probability	r, Bayes' theorem, medical diagnosis, Simpson's paradox 5. Random variable with discrete state space, its distribution and m	iean value 6.Probl	ems involving
the calculation of mean	value 7. Probabilistic method in graph theory 8. Random algorithms, Morris algorithm and its variants		
01UP2	Introduction to Probability 2	Z,ZK	3
1. One-dimensional con	tinuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction	n of probability an	d connection to
measure theory. 4. Num	erical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristic	s. 6. Elementary m	nethods for point
estimations. 7. Generati	ng pseudorandom numbers from the selected distribution.		
12UNXAP	Introduction to UNIX	Z	2
	g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfa		
	systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, workin	•	
	shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard		
	etworks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configuration of a d	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 ng, data analysis, data visualisation and algorithm development.	I Some basic tools	s ion scientific
12ZEL1		774	3
	Basic Electronics 1 imary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Ci	Z,ZK	-
	c and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe		
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	1 ' 1	-
02ZM1	Foundations of Physical Measurements 1	ZK	2
-	for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however	1 1	
-	al of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired of		-
basic habits of work in a			
02ZM2	Foundations of Physical Measurements 2	KZ	4
	for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however	, it can be attende	d by students of
other branches. The goa	al of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired of	lata on a PC. Stud	lents learn the
basic habits of work in a	a physics lab.		
12ZAOP	Fundamentals of Optics	Z,ZK	2
The lecture covers the v	ery basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geo	metrical optics. Th	ne main goal of
the lecture is to obtain, o	on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with res	pect to character of	of the bachelor
	re further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane wave		
	n material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next		•
	plains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interferen		
	and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a grap		-
	sed on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics stitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical instrumen		e on geometrical
Code of the gr	oup: BSPJAZYKYZAP		

Name 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	Z	2	0+2	Z	V
04XAM2	English for Intermediate Students M2 V ra Šlechtová	Z	2	0+2	L	V
04XAM3	English for Intermediate Students M3 V ra Šlechtová	Z	2	0+2	Z	V
04XAP1	English for Advanced Students P1 V ra Šlechtová	Z	2	0+2	Z	V

04XAP2	English for Advanced Students P2 V ra Šlechtová	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 V ra Šlechtová	Z	2	0+2	Z	V
04XCESZ1	Czech for Foreigners - Beginners 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESZ2	Czech for Foreigners - Beginners 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESZ3	Czech for Foreigners - Beginners 3 Jana Ková ová (Gar.)	Z	2	2S	Z	V
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2	0+2	Z	V
04XCESM2	Czech for Foreigners - Intermediate 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	v
04XCESM3	Czech for Foreigners - Intermediate 3 V ra Šlechtová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP1	Czech for Foreign Students - Advanced 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP2	Czech for Foreigners - Advanced 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESP3	Czech for Foreigners - Advanced 3 V ra Šlechtová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XFM1	French for Intermediate Students M1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFM2	French for Intermediate Students M2	Z	2	0+2	L	V
04XFM3	French for Intermediate Students M3	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	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	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Šlechtová	Z	2	0+4	L	V
04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 V ra Šlechtová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 V ra Šlechtová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3	Z	2	0+2	Z	V
04XRM1	V ra Ślechtová Russian for Intermediate Students M1	Z	2	0+2	Z	V
04XRM2	V ra Šlechtová Zhanna Isaeva (Gar.) Russian for Intermediate Students M2	Z	2	0+2	L	V
04XRM3	Zhanna Isaeva Zhanna Isaeva (Gar.) Russian for Intermediate Students M3	Z	2	0+2	Z	V
04XRP1	V ra Slechtová Russian for Advanced Students P1	Z	2	0+2	Z	V
04XRP2	V ra Šlechtová Zhanna Isaeva (Gar.) Russian for Advanced Students P2	Z	2	0+2	L	V
04XRP3	Zhanna Isaeva Zhanna Isaeva (Gar.) Russian for Advanced Students P3	Z	2	0+2	Z	V
04XRZ1	V ra Ślechtová Russian for Beginners Z1	Z	2	0+4		V
04XRZ2	Zhanna Isaeva Žhanna Isaeva (Gar.) Russian for Beginners Z2	Z	2	0+4	z	V
04XRZ3	V ra Šlechtová Zhanna Isaeva (Gar.) Russian for Beginners Z3	Z	2	0+4		V
04XRZ4	Zhanna Isaeva Žhanna Isaeva (Gar.) Russian for Beginners Z4	Z	2	0+4	z	
UHAN <u>2</u> 4	V ra Šlechtová	Z	2	0+4	L _	V

04XRZ5	Russian for Beginners Z5 V ra Šlechtová	Z	2	0+4	L	V
04XSM1	Spanish for Intermediate Students M1 Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSM2	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSM3	Spanish for Intermediate Students M3 V ra Šlechtová	Z	2	0+2	Z	V
04XSP1	Spanish for Advanced Students P1 V ra Šlechtová 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 V ra Šlechtová	Z	2	0+2	Z	V
04XSZ1	Spanish for Beginners Z1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ2	Spanish for Beginners Students Z2 V ra Šlechtová Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ4	Spanish for Beginners Z4 V ra Šlechtová	Z	2	0+4	Z	V
04XSZ5	Spanish for Beginners Z5 V ra Šlechtová	Z	2	0+4	L	V
Characteristics of the	courses of this group of Study Plan: Code=BSPJAZYKYZAP I	Name=BS P i	azyky za	p		
	glish for Intermediate Students M1	,	,,,		Z	2
	udents who have successfully completed the full secondary school English language	course at least at	the A2 level	of the Com	1	
	(CEFR). It provides an introduction into English for Specific and Academic Purposes (
	communication situations. Thus it covers topics related to the student's life and needs				-	
extending the knowledge of g			0.000100			aloo pala to
					7	
	glish for Intermediate Students M2				Z	2
	student to have completed the AM1 course. It develops their skills for work with subte					
	P and EAP (e.g., definition, existence and classification of phenomena, object descript	ions). Part of the c	ourse is also	o guided wri	ting. If necess	ary, grammar
revision is included.						
04XAM3 End	glish for Intermediate Students M3				Z	2
	s that enable students to cope with features typical of professional style. Increasing atte	ntion is paid to dev	velopina sub	technical vo		l independent
	I texts. Great emphasis is placed on distinguishing different levels of formal and inform					
	includes studying abstracts and rules for writing them as well as basic rules for prepa	ning and giving a s	sion preser	itation on a	chosen topic	
student's field.						
04XAP1 Eng	glish for Advanced Students P1				Z	2
The course is designed for st	udents who have successfully completed the full secondary school English language	course (at least th	ne B1 level o	of the Comm	non Europear	n Framework
() ()	- CEFR). It provides an introduction into English for Specific and Academic Purposes	(ESP, EAP), i.e., i	nto the fund	amentals of	vocabulary, f	unctions,
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					
grammar, and style typical of	professional oral and written communication situations (fundamentals of terms in main					
grammar, and style typical of covers professional oral and v	professional oral and written communication situations (fundamentals of terms in main written communication on topics related to the undergraduate's life and needs. It develop					
grammar, and style typical of covers professional oral and v polite request). If necessary,	professional oral and written communication situations (fundamentals of terms in mar written communication on topics related to the undergraduate's life and needs. It develop revision of selected grammar topics is included.				g a CV, letter	of application,
grammar, and style typical of covers professional oral and v polite request). If necessary, 04XAP2 Eng	professional oral and written communication situations (fundamentals of terms in mar written communication on topics related to the undergraduate's life and needs. It develop revision of selected grammar topics is included. glish for Advanced Students P2	os skills for free pro	ofessional w	riting (writing	g a CV, letter o	of application,
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04XCESM2 Czech for Foreigners - Intermediate 2	Z	2
The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and rea	iding skills and tra	ins the student
in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.		
04XCESM3 Czech for Foreigners - Intermediate 3	Z	2
The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is espec		
	any locased on a	tyliotico and
lexicology and on developing the student's writing skills.		
04XCESP1 Czech for Foreign Students - Advanced 1	Z	2
The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common Eu	uropean Framewo	rk of Reference.
It is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of standard language structures typical of	science. Students	are taught the
basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies and	Student Life. Writ	ten practice
includes communication with teachers and faculty administrators.		
	7	
04XCESP2 Czech for Foreigners - Advanced 2	Z	2
This course extends the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical a	nd specialist texts	placing greater
emphasis on individual work.		
04XCESP3 Czech for Foreigners - Advanced 3	Z	2
The course develops the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation		
	n, and, initially, pre	
student's project. Writing skills necessary for professional communication are trained.	r	
04XFM1 French for Intermediate Students M1	Z	2
French - intermediate FM The objective of this three-semester course is to improve and further develop communication in the French language in bo	th written and ora	I form. Students
will be able to communicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tr	ansmit general an	nd technical
information and to solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, sy	-	
skills gained in previous study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, per	-	
to an advert, French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work		
04XFM2 French for Intermediate Students M2	Z	2
Course FM2 builds on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science	texts, features typ	ical for technical
and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scie	ence and technolc	av. French
scientists, artists and architects. Description of an object, device, shapes, dimensions, material.		3,,
	7	
04XFM3 French for Intermediate Students M3	Z	2
The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and ir	nfinitive clauses,
participle structures, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cl	ass. The paper is	linked to the
field of students' future specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w	ork compiled from	French articles
and one's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and o	coherence.	
	7	2
04XFP1 French for Advanced Students P1	<u> </u>	_
FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both with the second secon		
be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit gene	eral and technical	information and
to solve problems. FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are re-	peated and expan	nded: subjonctif,
passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactiona	al letters, CV, pers	onal statement,
request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topi	ics of specializatic	n: mathematics,
internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.	·	ŕ
	7	
04XFP2 French for Advanced Students P2	Z	2
With the link to P1 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication or	n given topics. Fea	atures typical of
technical and scientific communication are stressed (passive voice, nominalization, word formation).		
04XFP3 French for Advanded Students P3	7	2
The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in	engineering envir	onment Special
skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cov	ers a tecrifical/a	pplied science
topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.		
04XFZ1 French for Beginners Z1	Z	2
French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in s	socializing and in	professional life.
The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able	e to communicate	at elementary
level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda		-
(Francouzština pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4 : introductions,		-
	-	-
giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciat	ion and grammar.	
04XFZ2 French for Beginners Z2	Z	2
The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of t	he textbook: Prav	da - Pravdová :
French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement		
thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral comm	0	, , , , , , , , , , , , , , , , , , , ,
How does the machine work? A few expressions concerning the study. Name of University and Faculty.	dification: opcome	
04XFZ3 French for Beginners Z3	Z	2
The course builts upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - F	ravdová: French f	or Beginners.
Topics, functions and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for in	formation and lou	Id as part of
pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.		
04XFZ4 French for Beginners Z4	Z	2
	I I	
The course builds up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The c		
lessons 19 - 23 of the textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lec		
Students of FJFI. The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shop	pping, weather, ur	niversity in our
country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.		
04XFZ5 French for Beginners Z5	Z	2
All four skills acquired in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. The		
general contents is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.		
notes, success of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cla	auses, typical con	junctions,
subjunctive clauses, gerund, passive,		

04XNM2	German for Intermediate Students M2	Z	2
The course introduces	other more complex grammatical structures and their application in communication based on technical texts, such as the relation	n between techno	logy and society,
e e e	ing 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	natically revises o	ther grammatical
	for professional discourse (participles, relative clauses).		
04XNM1	German for Intermediate Students M1	Z	2
-	urse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and		
-	ses (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Reput		
	ogether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicist	ts, and the fundar	nentals of IT
	communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	_	
04XNM3	German for Intermediate Students M3	Z	2
	other more complex grammatical structures and their application in communication based on technical texts, such as the relation		
	ing of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and	0,7	
	rmation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	natically revises o	ther grammatical
	for professional discourse (participles, relative clauses).	_	2
04XNP1	German for Advanced Students P1	Z	2
	bod grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be le		
	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for	,	
-	structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on	practical everyday	communication,
i.e., telephoning.	O among fair A diamaged Officiality DO	7	0
04XNP2	German for Advanced Students P2	Z	2
	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	a practising format	communication,
	XV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).	7	0
04XNP3	German for Advanced Students P3	Z	2
	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 used	-	
	process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The	ne course also inc	ludes translation
practice to and from Ge			0
04XRM1	Russian for Intermediate Students M1	Z	2
, e	for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphab		
-	mmunication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, ask		
	nmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement	level of the RZ2	course. The
Contents and scope of	the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.		
		_	_
04XRM2	Russian for Intermediate Students M2	Z	2
04XRM2 The course is based or	Russian for Intermediate Students M2 the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	1	
04XRM2 The course is based or 04XRM3	Russian for Intermediate Students M2 the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable. Russian for Intermediate Students M3	Z	2
04XRM2 The course is based or 04XRM3 The course develops th	Russian for Intermediate Students M2 the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	Z	2
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44XR25 Russian for Beginners Z5 Z 2 he course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding, extracting and summarizing iformation form a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication skills are trained on veryday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication (verbal adjectives, participles, assive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite request, etc.) 4XSM1 Spanish for Intermediate Students M1 Z 2 he course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester course develops standard ocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and ubjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts or listening to them. 4XSM2 Spanish for Intermediate Students M3 Z 2 4XSM3 Spanish for Intermediate Students M3 Z 2 2 he course develops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific purposes in order to be ble to work with specialized texts on the Intermeti
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AXSM1 Spanish for Intermediate Students M1 Z 2 he course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester course develops standard ocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and ubjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts or listening to them. 4XSM2 Spanish for Intermediate Students M3 Z 2 he course develops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific purposes in order to be ble to work with specialized texts on the Internet. Z 2 4XSM3 Spanish for Intermediate Students M3 Z 2 he course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic style. They will be competent nough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short articles and summaries. The
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nal part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.
4XSP1 Spanish for Advanced Students P1 Z 2
course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication. Course prerequisites: level B2
f CEFR.
4XSP2 Spanish for Advanced Students P2 Z 2
course SP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax and focuses on independent
ritten communication.
4XSP3 Spanish for Advanced Students P3 Z 2
course SP3 is the final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focused on written communication
ased on what students will need in their career.
4XSZ1 Spanish for Beginners Z1 Z 2
ourse SZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental grammar structures and will
e able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish and will develop it.
4XSZ2 Spanish for Beginners Students Z2 Z 2
ourse SZ2 is based on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis will be chosen so as to enable
nem to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others such as the Czech Republic.
ealia of Spanish-speaking countries are also included.
4XSZ3 Spanish for Beginners Z3 Z 2
he course is based on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the Spanish-speaking countries,
nainly of Spain. It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative). It includes written and oral
ommunication on a given general topic, for which the student is trained by reading texts or listening to them.
4XSZ4 Spanish for Beginners Z4 Z 2
he course is based on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish speaking countries, mainly of
pain. It pays attention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive),
o written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.
4XSZ5 Spanish for Beginners Z5 Z 2
he course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for specific purposes. In its final
art, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination.

List of courses of this pass:

Code	Name of the course	Completion	Credits
00EKOT	Economy in Technology	Z	1
	The course introduces the basics of micro- and macroeconomics.		
00ETV	Ethics of Science and Technology	Z	1
00MAM1	Essentials of High School Course 1	Z	1
00MAM2	Essentials of High School Math Course 2	Z	1
	Review of basics of high school mathematics.	•	
00PT	Preparatory Week	Z	2
00RET	Rhetoric	Z	1
The course is foc	used on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the	composition of put	blic 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	e course.
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	Z	1
01ANB3	Calculus B 3	Z,ZK	8
		·	·

1. Functional sequences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional series, power series, Series Expansion, Taylor's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation of variables, homogeneous equation and exact equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coefficients and special right-hand side, Euler differential equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and non-isolated point, boundary of set, completeness of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier series, trigonometric Fourier

	nvergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total d Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations		join plane,
01ANB4	Calculus B 4	Z,ZK	6
	p et funkcí více prom nných a funkcionálních vektor. [2] Funkce zadané implicitn. [3] Taylorovy ady funkce více prom nných. [4] R	,	
	kartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstr		
Integrální po et f	unkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgue	eova v ta. Limita, s	spojitost a
01LAL	derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty. Linear Algebra 1	7	2
	Linear Argebra i Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of li		
	theorem.	inedi indpinger i	
01LAL2	Linear Algebra 2	Z,ZK	4
	se matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian and	-	
	onality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse matri		
or determinants.	 Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonality complements. 6. Geometry – exercises and examples. 7. Adjoint operators. 	y. Calculation of or	inogonai
01LALZ	Linear Algebra 1, exam	ZK	2
01MAN	Calculus 1	Z	4
	Basic calculus (real analysis, functions of one real variable, differential calculus).		
01MAN2	Calculus 2	Z,ZK	8
	differential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence, operations on series, absolute an		-
Real and complex	power series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integra (Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral	ais: primitives, defi	nite integrai
01MANZ	Calculus 1, exam	ZK	4
01NME2	Numerical Methods 2	KZ	2
The course is devo	ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations.	It explains methods	s converting
	lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differ	-	
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 o ons as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the	-	-
	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testir		ina provea.
01RMAF	Equations of Mathematical Physics	Z,ZK	7
The subject of this	course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral tra-	ansformations, and	solution of
	partial differential equations (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).		
01UP1	Introduction to Probability 1 ith finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and ge	Z,ZK	3 s paradox
	bability, Bayes' theorem, medical diagnosis, Simpson's paradox 5.Random variable with discrete state space, its distribution and mea	-	
	the calculation of mean value 7. Probabilistic method in graph theory 8. Random algorithms, Morris algorithm and its variant		Ũ
01UP2	Introduction to Probability 2	Z,ZK	3
	I continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction of		
measure theory. 4.	Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics. 6. estimations. 7. Generating pseudorandom numbers from the selected distribution.	Elementary metho	as for point
000554			
02DEF1	History of Physics 1	Z	2
02DEF1 Physics and its pl	History of Physics 1 ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo	Z sophers, Aristotle.	_
Physics and its pl	ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, H	sophers, Aristotle.	Physics in
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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 th		
of the measuremer	t (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	on of results. At the	same time
	practically extend the knowledge gained in lectures on physics.		
02SMF	Seminar of Mathematical Physics	Z	2
The purpose of the	he seminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics department of the second has a solution of the second has a solu	ent will present sin	nple tasks
	concerning their scientific activities that could become the topics of the student?s bachelor theses in the next year		
02TEF1	Theoretical Physics 1	Z,ZK	4
	troduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalism		
-	lynamics (Newton's, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementar		-
problem, the mou	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).	or mechanics. The	subject is
02TER	Heat and Molecular Physics	Z.ZK	4
	n of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynami	I ' I	-
	cal systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity dis		-
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		
Dasics of many boo	dy descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical of crystals and the black body radiation). The Boltzmann equation is usedto discusses simple transport phenomena.	ensemble, remi g	Jas, mouels
		774	6
02VOAF	Waves, Optics and Atomic Physics		-
	a in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polariza metrical optics. Introduction toquantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Bro		
concretence. Geo	equation, stationary states and spectra of finite systems.	glie waves, the Sch	irouirigei
02ZM1		ZK	2
-	Foundations of Physical Measurements 1 aned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it of		_
other branches. If	he goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data	a on a PC. Students	s learn the
007140	basic habits of work in a physics lab.	1/7	4
02ZM2	Foundations of Physical Measurements 2	KZ	4
-	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it of		
other branches. In	he goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data	a on a PC. Students	s learn the
0441/0	basic habits of work in a physics lab.	7	4
04AKS	English Conversation		1 I
	velop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication strategy that are acquired throughout their previous studies. It aims to improve all aspects of oral communication of the studies of the s		-
-	r various communication situations and will master their communication strategy. They will also practise their listening skills in order t iscussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more cor		participate
04XAM1			2
	English for Intermediate Students M1		
-	ned for students who have successfully completed the full secondary school English language course at least at the A2 level of the C nguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of	-	
	nd written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical int		
professional oral a	extending the knowledge of grammar issues used in EAP.	siest. Allention is a	130 paid to
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	I – I	
	pical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided	-	
and lexical items ty	revision is included.	writing. If necessar	y, grannar
04XAM3	English for Intermediate Students M3	Z	2
	bs the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnic	I I	
	professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication	-	
•	urse 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
	gned 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	-	
	e typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, g	-	
	oral and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writing (w		-
•	polite request). If necessary, revision of selected grammar topics is included.	0	
04XAP2	English for Advanced Students P2	Z	2
	based on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen bra	I I	
	s it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorica		-
	d, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguistical		
	s the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writ		
	paragraph structure, linking, cohesion and coherence in texts.		
04XAP3	English for Advanced Students P3	Z	2
	based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It in	ا 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
	communication.		

The course content	English for Advanced Students Examination	ZK	4
	is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to a		-
	courses. The examination consists of 2 parts - written (110 min) and oral (30 min) and includes also oral presentation of a topic from	the student's field	
04XCESM1 The course is focus	Czech for Foreigners - Intermediate 1 ed on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the st social situations.	Z udent´s vocabulary	2 y for various
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
The course develo	ps the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and reading	g skills and trains	the student
	in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.		
04XCESM3	Czech for Foreigners - Intermediate 3	Z	2
The last course r	evises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especia	ally focused on styl	istics and
	lexicology and on developing the student's writing skills. Czech for Intermediate Students Examination	ZK	4
04XCESMZK	t 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.	111,2,0 0001000 uli	la ball only
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	ean Framework of	Reference.
It is focused partly	on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of sciences and the s	ence. Students are	taught the
basics of functior	al style of engineering and professional communication, both in spoken and written form. The topics include University Studies and S	Student Life. Writter	n practice
	includes communication with teachers and faculty administrators.		
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extend	s the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and s emphasis on individual work.	specialist texts plac	cing greater
04205002		7	2
04XCESP3	Czech for Foreigners - Advanced 3 so the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, a	∠ And finally present	
	student's knowledge non older 2. It includes working with adult into specialist matching, then met protation and presentation, the student's project. Writing skills necessary for professional communication are trained.	and, maily, present	
04XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4
	It 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.		
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
The course is desig	ned for students on the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and g	rammar features) a	and they will
	anguage and speaking skills. The course focuses on pronounciation exercises, simple social phrases, and oral and written communic		
communicative situ	ations. The course covers roughly lessons 1-5 in "Chcete mluvit esky" by H. Remediosová and E. echová. At the end of the course, i A1 (CEFR) approximately.	the students will ha	ave reached
04XCESZ2	Czech for Foreigners - Beginners 2	7	2
	communication competences acquired in CESZ1 are further developed. Students extend their knowledge of Czech declension and co	- 1	_
	frequent topics. The course covers roughly lessons 6-10 in "Chcete mluvit esky" by H. Remediosová and E. echová. At the end of		
	have reached A2 (CEFR) approximately.		
04XCESZ3	Czech for Foreigners - Beginners 3	7	
	r develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on I	_	2
correct pronunciat		building up basic v	ocabulary,
of dialogues. Th	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and	building up basic v they practise freq	ocabulary, uent types
	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and ey also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons	building up basic v they practise freq	ocabulary, uent types
04XCESZZK	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and ey also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons Czech for Foreigners – Beginners - Examination	building up basic v d they practise freq 5-7 in "eština exp ZK	ocabulary, uent types ores 1". 4
04XCESZZK	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and ey also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons Czech for Foreigners – Beginners - Examination nt is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04X	building up basic v d they practise freq 5-7 in "eština exp ZK	ocabulary, uent types ores 1". 4
04XCESZZK The course conte	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and ey also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons Czech for Foreigners – Beginners - Examination nt is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04X only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.	building up basic v they practise freq 5-7 in "eština exp ZK CESZ1,2,3 course	ocabulary, uent types ores 1". 4 s and can
04XCESZZK The course conte 04XFM1	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and ey also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons Czech for Foreigners – Beginners - Examination nt is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04X only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher. French for Intermediate Students M1	building up basic v they practise freq 5-7 in "eština exp ZK CESZ1,2,3 course Z	ocabulary, uent types pres 1". 4 s and can 2
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04XCESZZK The course conte 04XFM1 French - intermedia will be able to co information and to skills gained in prev to an advert, 04XFM2 Course FM2 builds and scientific lan 04XFM3 The course is focus participle structur field of students' fu and one 04XFMZK The content is the 04XFP1 FP advanced cour be able to commun to solve problems. I passé composé-im	ion, deepening grammar, including grammar practice, and introducing Czech culture. Students are asked to produce simple texts and ey also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons Czech for Foreigners – Beginners - Examination only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher. French for Intermediate Students M1 the FM The objective of this three-semester course is to improve and further develop communication in the French language in both v mmunicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tra- solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, syste ious study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, persor French for Intermediate Students M2 on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science texts, wo French for Intermediate Students M2 on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science text guage (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scientists, artists and architects. Description of an object, device, shapes, dimensions, material. French for Intermediate Students M3 et on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (sub es, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-clas ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work 's own knowledge/experien	building up basic vi building up basic vi d they practise freq 5-7 in , eština exp ZK CESZ1,2,3 course Z vritten and oral forr nsmit general and mizes and expand and statement, requ rk based on these Z s, features typical f nce and technolog Z ordinate and infinit ss. The paper is lini compiled from Fre on and coherence. ZK f FM1-FM3. The exp can and oral form. St and technical infor ated and expanded tters, CV, personal of specialization: m	ocabulary, uent types ores 1". 4 s and can 2 m. Students technical s language est, answer texts. 2 for technical y, French 2 ive clauses, ked to the nch articles 4 camination 2 tudents will mation and I: subjonctif, statement,

04XFP2	French for Advanced Students P2	Z	2
With the link to P1	contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g	iven topics. Feature	es typical of
	technical and scientific communication are stressed (passive voice, nominalization, word formation).		
04XFP3	French for Advanded Students P3	Z	2
	sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in en		-
skill - translation c	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.	s a technical /appli	ed science
04XFPZK	French for Advanced Students Examination	ZK	4
	h program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part a	1 1	-
	Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination gr	•	iooranig to
04XFZ1	French for Beginners Z1	Z	2
French for beginne	brs 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	alizing and in profe	essional life.
	les French for specific / technical communication and reading of popular science and scientific texts. FZ1 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 textbook Pravda - Pravd		•
· ·	za áte ky). It is extended with situations of 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		
04XFZ2	French for Beginners Z2 ng up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the	∠ textbook: Pravda -	2 Pravdová ·
	ners. Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreeme		
•	, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communi		
	How does the machine work? A few expressions concerning the study. Name of University and Faculty.		
04XFZ3	French for Beginners Z3	Z	2
The course builts	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravda	avdová: French for F	Beginners.
Topics, functions	s and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf	ormation and loud	as part of
	pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.		
04XFZ4	French for Beginners Z4	Z	2
	s up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The count he textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lectur		
	The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp		0 0
	country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, intern	-	iony in our
04XFZ5	French for Beginners Z5	Z	2
	red in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They p		
	is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. To		
notes, success	of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate classified and complemented with syntax) and the systemized and complemented with syntax (subordinate classified and systemized	auses, typical conju	unctions,
	subjunctive clauses, gerund, passive.	,	
04XFZZK	French for Beginners Examination	ZK	3
The content is the	examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examin	ation is ruled by the	e document
0.41/10.04	Instruction for examination. Its content covers the levels FZ1 - FZ5.	-	0
04XNM1	German for Intermediate Students M1		2
-	e course is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and st n processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repu		
	sues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists		
	terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and underst	standability.	
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	etween technology	and society,
	beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
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 of	grammatical
0.00000	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 beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		-
	r information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati		
,	phenomena important for professional discourse (participles, relative clauses).	, , , , , , , , , , , , , , , , , , , ,	,
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	consisting of two pa	rts - written
and oral, which co	over the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessm is to be obtained from the teacher.	ent. More detailed i	nformation
04XNP1	German for Advanced Students P1	Z	2
	res good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be level	-	-
	se is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for d	,	•
more difficult gram	nar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on pra i.e., telephoning.	cucai everyday com	munication,
04XNP2	German for Advanced Students P2	Z	2
	ps the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending	1 1	
	It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and pr		
b	oth written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indi	rect speech).	
04XNP3	German for Advanced Students P3	Z	2
	sts of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variation of the structure of		
	nd car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the voca		
	ngineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. 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		
	practice to and from German.		

04XNPZK	German for Advanced Students Examination	ZK	4
	t is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination of		
and oral, which o	ever the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded information is to be obtained from the teacher.	d assessment. More	e detailed
04XRM1	Russian for Intermediate Students M1	Z	2
The course is desig	ned for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet	both printed and h	andwritten),
basic vocabulary fo	r communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking	the way and giving	directions),
they can use bas	sic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement		urse. The
	contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetat		0
04XRM2	Russian for Intermediate Students M2 The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in th	Z	2
04XRM3	Russian for Intermediate Students M3	Z	2
	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, how		
	in the timetable.	71/	
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 ents are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given inst		
04XRP1	Russian for Advanced Students P1	7	2
-	uirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, practice of the course is revision of standard language structures.	. – .	
	structures, understanding the fundamentals of technical language and training writing skills.	5	0
04XRP2	Russian for Advanced Students P2	Z	2
The course is bas	ed on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, ve	erb aspects, specifi	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 paraphrasin		
	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 w chnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write acc	-	
	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	1 1	-
- RP3. Stud	ents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given inst	ructions by the tead	cher.
04XRZ1	Russian for Beginners Z1	Z	2
The course represe	ents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian	n. Thus it begins wit	h mastering
the Russian alphat	bet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking). Students will be a	able to read
	a short text with marked stress, understand its contents and summarize it.		
04XRZ2	Russian for Beginners Z2	Z	2
The second semes	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subto		lents will be
The second semes	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtr te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als	o develop their voc	lents will be
The second semes able to communica	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtr te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in	o develop their voc writing.	lents will be abulary and
The second semes able to communica 04XRZ3	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtr te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3	o develop their voc writing.	lents will be abulary and 2
The second semes able to communica 04XRZ3 The course is base	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtr te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in	o develop their voc writing. Z various forms of re	lents will be abulary and 2 eading skills
The second semes able to communica 04XRZ3 The course is base	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtrate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training	o develop their voc writing. Z various forms of re	lents will be abulary and 2 eading skills
The second semes able to communica 04XRZ3 The course is base	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtrate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be	o develop their voc writing. Z various forms of re	lents will be abulary and 2 eading skills
The second semes able to communica 04XRZ3 The course is base and listening) an 04XRZ4 The course is base	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtrate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 d on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a context shift)	o develop their voc writing. Z g various forms of re e able to respond so Z ertain percentage of	ents will be abulary and 2 eading skills o as to be 2 of unfamiliar
The second semes able to communica 04XRZ3 The course is base and listening) an 04XRZ4 The course is base words, oral comm	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtrate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 d on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a constant in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verses)	o develop their voc writing. Z g various forms of re e able to respond so Z ertain percentage os s, differences in ver	ents will be abulary and 2 eading skills o as to be 2 of unfamiliar b patterns
The second semes able to communica 04XRZ3 The course is base and listening) an 04XRZ4 The course is base words, oral comm from Czech, mod	Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtrate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 d on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a constrained to use grammar structures effectively (e.g., irregular versor dality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), and the stand to develop communication skills for everyday situations (food, travelling, free time), and the standing of solution of the standing of situations (food, travelling, free time), and the standing of solution situations (food, travelling, free time), and the standing of solution situations (food, travelling, free time), and the standing of solution alsol.	o develop their voc writing. Z g various forms of re e able to respond so Z ertain percentage os s, differences in ver and practice oral ar	ents will be abulary and 2 eading skills o as to be 2 of unfamiliar b patterns ad written
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04XSP1	Spanish for Advanced Students P1	Z	2
	es on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication. of CEFR.		
04XSP2 Course SP2 is the	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax	Z k and focuses on in	2 idependent
	written communication.		
04XSP3 Course SP3 is the	Spanish for Advanced Students P3 final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focu	Z sed on written com	2 Imunication
	based on what students will need in their career.		
04XSPZK	Spanish for Advanced Students Examination	ZK	4
The course conten	t is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for a passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the	-	art is having
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 communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spani	al grammar structu	res and will
04XSZ2	Spanish for Beginners Students Z2	Z	2
	ed on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis	will be chosen so a	
them to understan	d short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others	such as the Czec	h Republic.
	Realia of Spanish-speaking countries are also included.		
04XSZ3	Spanish for Beginners Z3	Z	2
	ed on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the		-
mainly of Spain.	It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative) communication on a given general topic, for which the student is trained by reading texts or listening to them.	. It includes written	and oral
04XSZ4	Spanish for Beginners Z4	7	2
	ed on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish	- 1	
	ention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the		-
	to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listenir	ng to them.	•
04XSZ5	Spanish for Beginners Z5	Z	2
The course books	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for	r specific purposes	. In its final
	part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examinat	tion.	
04XSZZK	Spanish for Beginners Examination	ZK	3
The course cont	ent is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination consists of two parts - written and oral.	amination only if he	e/she has
	passed the written examination test.		
11APLG	Applications of Group Theory in Solid State Physics atomic system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy states the	ZK	2
	tween them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the information		
	The application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field environmer	-	
	vibrations, and selection rules for optical absorption transitions.		
11BSEM	Bachelor Seminar	Z	1
In the first part of the	ne seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requi	rements for bache	or's degree
	ulty. The second part is designed as a practical training for the defence of the bachelor's degree project. The students give oral preser		
the research res	sults achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the p	ossibilities of impro	oving the
	student's performance.	7 71/	2
11ELEA	Instrumentation and Measurement The course is the introduction to the instrumentation and measurement for physicists.	Z,ZK	2
11SFIPL	Seminar on Solid State Physics	KZ	2
	he Seminar and ?SSS? software features. 2.Module "bravais" - crystal structure and X-ray diffraction in 2D ? theory 3.Simulations of c	1	
	es: crystal lattice versus crystal structure, primitive cell, elementary cell, lattice plane, reciprocal grid, Laue and Bragg condition, atomi	-	
factor, extinction, p	ractical structural analysis 4. Module "laue" - Diffraction on perfect and imperfect crystals 5. Simulations: influence of structural disorder on	-	atomization
		diffraction pattern,	
	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand	•	modes,
	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand y and momentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets, group and phase velocity, dispersion	ling waves, normal , pulses and their p	ropagation,
localized modes, a	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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	ling waves, normal , pulses and their p nsity of states, ther	ropagation, mal energy,
localized modes, a heat capacity 10."	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exten	ling waves, normal , pulses and their p nsity of states, ther rnal electric field, F	ropagation, mal energy, laynes and
localized modes, a heat capacity 10."	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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	ling waves, normal , pulses and their p nsity of states, ther rnal electric field, F	ropagation, mal energy, laynes and
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localized modes, a heat capacity 10." Shockley experime 11SPLA	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exter ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, electron	ling waves, normal I, pulses and their p nsity of states, then rnal electric field, H pration and present Z,ZK	ropagation, mal energy, laynes and ration of the 4
localized modes, a heat capacity 10." Shockley experime 11SPLA	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exter ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elac seminar work.	ling waves, normal I, pulses and their p nsity of states, then rnal electric field, H pration and present Z,ZK	ropagation, mal energy, laynes and ration of the 4
localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exten- ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elec- seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu-	ling waves, normal I, pulses and their p nsity of states, there rnal electric field, H pration and present Z,ZK Idy of solid state pt KZ	ropagation, mal energy, łaynes and ation of the 4 nysics. 2
localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exter ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics lamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding as of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic	ling waves, normal , pulses and their p nsity of states, ther rnal electric field, H pration and present Z,ZK idy of solid state pt KZ g interaction between thermal properties	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals
localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type are derived. The	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exten- ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics lamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding 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	ling waves, normal , pulses and their p nsity of states, their rnal electric field, H pration and present Z,ZK idy of solid state pt KZ g interaction between thermal properties a solids by means of	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals of electron
localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type are derived. The	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exten- ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics lamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding as 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 kplained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s	ling waves, normal , pulses and their p nsity of states, their rnal electric field, H pration and present Z,ZK idy of solid state pt KZ g interaction between thermal properties a solids by means of	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals of electron
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localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type are derived. The energy bands ex 12NME1	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exten- ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics lamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding as 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 kplained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s	ling waves, normal a, pulses and their p nsity of states, therir rnal electric field, H pration and present Z,ZK idy of solid state pr KZ g interaction between thermal properties a solids by means of systematically introd Z,ZK	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals of electron duce and 4
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localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type are derived. The energy bands ex 12NME1 There are explained	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exter ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics lamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding 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 cylained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s interpret a broad phenomenological basis of physical properties of crystalline solids Mumerical Methods 1 d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Met	ling waves, normal a, pulses and their p nsity of states, theri- rnal electric field, H pration and present Z,ZK idy of solid state pr KZ g interaction betwee thermal properties a solids by means of systematically introd Z,ZK thods for solution o	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals of electron duce and 4 f tasks very
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localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type are derived. The energy bands ex 12NME1 There are explaine important for phys 12NT Lectures will intro	cillations, quasi crystals 6 "born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 extent ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding so 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 kplained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s interpret a broad phenomenological basis of physical properties of crystalline solids Numerical Methods 1 d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Met sicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computati used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory. Nanotechnology duce students mainly to modern technological methods of preparation of semicondu	ting waves, normal a, pulses and their p nsity of states, ther rnal electric field, H pration and present Z,ZK idy of solid state ph KZ g interaction between thermal properties a solids by means of systematically introd Z,ZK thods for solution o ional environment f ZK and chemical fund	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals of electron duce and 4 f tasks very MATLAB is 2 daments of
localized modes, a heat capacity 10." Shockley experime 11SPLA Crystallograp 11ZFPL Description of func solids, various type are derived. The energy bands ex 12NME1 There are explaine important for phys 12NT Lectures will intro- different technolo	cillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand 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 exter ent, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabor seminar work. Structure of Solid State hy has an important role in the modern sciences because of its interdisciplinary nature. The aim of this lecture is to lay the basis of stu Basic to Solid State Physics tamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding 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 explained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s interpret a broad phenomenological basis of physical properties of crystalline solids Numerical Methods 1 d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Met sicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computati used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory. Nanotechnology	ting waves, normal a, pulses and their p nsity of states, there rnal electric field, H pration and present Z,ZK idy of solid state ph KZ g interaction between thermal properties a solids by means of systematically introd Z,ZK thods for solution of ional environment for ZK and chemical func- ies which are subs	ropagation, mal energy, laynes and ation of the 4 nysics. 2 en atoms in s of crystals of electron duce and 4 f tasks very MATLAB is 2 daments of tantial for

growths will be discussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer preparation will be mentioned

	as well as soldering and encasement.		
12PAS	Computer Algebra Systems	Z	2
Practically oriente	d introduction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is rea students acquire basic skills with CAS by solving relatively simple and basic tasks from mathematics and physics.	lized in computer c	lassrooms:
12UNXAP	Introduction to UNIX	Z	2
	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfa		
Principles of opera	ting systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working wi	ith files. Text editors	: vi, emacs.
Command interpr	eter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard t	ools. Graphical use	r interface
X-windows. Con	nputer networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a c	omputer. Network	services:
	hardware sharing, mail, scp, etc. Network applications		
12UVP	Introduction to Scientific Computing	Z	2
Practically oriente	d Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with s	some basic tools for	rt scientific
	and technicval computing, data analysis, data visualisation and algorithm development.		
12ZAOP	Fundamentals of Optics	Z,ZK	2
	the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geome	-	-
	tain, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with respec		
	ics are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves in		-
	ther from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next i it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference		
-	ence and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a graphic		
	 Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics limit 		
0 0	proach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optic		<u>.</u>
12ZEL1	Basic Electronics 1	Z.ZK	3
	des primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circu	1 '	-
	e symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient eff	-	
12ZEL2	Basic Electronics 2	Z,ZK	3
	vs up with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic th	1	
14BPFI1	Bachelor Thesis 1	Z	5
	Student under guidance of his/her supervisor has been working on the given particular topic for one year.	-	Ŭ
14BPFI2	Bachelor Thesis 2	Z	10
	Student under guidance of his/her supervisor has been working on the given particular topic for one year.		10
14CHMA	Materials Characterization	КZ	4
-	ect is composed of lectures, exercises and discussion regarding the basic methods of characterization. The aim of the subject is to in	1	-
-	s of materials characterization, their outputs and the interpretation of the obtained data. An emphasis is placed on the individual worl		
	the field of materials characterization. A part of the subject is an excursion to the laboratories of the department and its collaborating		
	subject, the student should be able to choose the adequate characterization method for a particular material and evaluate the obtain	-	U U
14DYLS	Dynamics of Linear Systems	Z,ZK	2
	of linear mechanical systems by means of simple computational system of discrete elements. Free and/or forced vibration of mecha		
	degrees of freedom. Kinetic equations of motion - their determination and solution. Analysis of motion stability.		
14ELM	Electron Microscopy	KZ	2
	irse the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The		
	th and electron microscopy and to various types of microscopes. An important part of the course is given to the interaction of differen		
	ulations and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and dyna	-	
	and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging technique		
14EM1	Elasticity 1	Z,ZK	5
	se represents an introduction for several another lectures on continuum mechanics and the strength of materials. The first part conta		-
small strains and	linear elasticity. The second one represents a logical descent from the continuum mechanics to the practical engineering solution of	simple problems o	n tension,
	bending, shearing and torsion in the cross section of bars and beams.	7 71/	<u> </u>
14FKO	Metal Physics	Z,ZK	6 stal defects
Abstract. The physi	cal background of processes encountered in production and thermo-mechanical treatment of metallic materials is described, includin theory of solid solutions, theory of dislocations, diffusion, hardening and softening of metals and alloys.	g soliullication, cry	stal delects,
14PMA	Practicum in Materials	KZ	3
	n of this subject is to introduce students to the basics of scientific work in the form of measurements, data analysis and writing of rep	1	
	re designed to show students the right way of presenting the outputs of their work. The subject is focused on correct data analysis and	-	
	After completing the subject, the student should be able to individually design, execute and evaluate experiments.	logical structure of	and reporte.
14PMKOP	Practicum of finite elements methods	ZK	3
	Use of commercial finite element code for solving practical problems in mechanics.		0
14TED	Creating Electronic Documents	Z	2
	ting and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentatio		
	office suite.		
14TEM	Engineering Mechanics	Z,ZK	6
	se represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with stress and strain a		
	(elasticity, plasticity, fracture mechanics, etc.). Principles of statics, kinematics, and dynamics and their application.	,	
14ZZKOS	Testing and processing of metals and alloys	Z,ZK	4
	ness, impact toughness, technological testing, fatigue testing, creep testing. Light microscopy, preparation of specimens for macro- a		
	oldering, brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, titanium alloys, special alloys of non-fer		
	and CAD.		
15CH1	General Chemistry 1	Z	3
	t concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical u	use are illustrated b	y examples
	solved in exercises.		

15CH2	General Chemistry 2	Z,ZK	3
The subject is the c	ontinuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using	various examples,	the fact that
the validity of these	principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are	illustrated by exar	mples solved
	in exercises.		
17UING	Introduction to Engineering	KZ	3
This course provid	es introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and beha	vior, basics of ma	inufacturing
а	nd production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will	be included.	
18PMTL	Programming in MATLAB	KZ	4
Introducing Matlab	environment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic analy	sis, statistics, algo	rithmization
	and geometric representation of results.		
18ZPRO	Basics of Programming	Z	4
This course is in	tended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	, mming and with th	e Python
	programming language.		
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1
TV-3	Physical education	Z	1
TV-4	Physical education	7	1

For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2024-05-19, time 18:55.