Study plan

Name of study plan: Fyzikální inženýrství - Inženýrství pevných látek

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: 0

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

Note on the plan:

Name of the block: Compulsory courses in the specialization

Minimal number of credits of the block: 0

The role of the block: PS

Code of the group: BSPFIIPL1

Name of the group: BS P_FIB IPL 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

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
02DEF1	History of Physics 1 Igor Jex Martin Štefa ák Igor Jex (Gar.)	Z	2	2+0	Z	PS
02ELMA	Electricity and Magnetism Iskender Yalcınkaya, Josef Schmidt, Ji í Hrivnák, Goce Chadzitaskos, Jan Vysoký Jan Vysoký Josef Schmidt (Gar.)	Z,ZK	6	4+2	L	PS
01LAL	Linear Algebra 1 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		PS
01LALZ	Linear Algebra 1, exam Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	0P+0C		PS
01LAL2	Linear Algebra 2 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		PS
01MAN	Calculus 1 Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	Z	4	4+4		PS
01MANZ	Calculus 1, exam Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	ZK	4	0P+0C		PS
01MAN2	Calculus 2 Miroslav Kolá, Edita Pelantová, Maksym Dreval Edita Pelantová Maksym Dreval (Gar.)	Z,ZK	8	4P+4C		PS
02MECH	Mechanics David Be Antonín Hoskovec David Be (Gar.)	Z	4	4+2	Z	PS
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, Stanislav Skoupý, Petr Novotný, David Be, Filip Petrásek, Antonín Hoskovec Antonín Hoskovec David Be (Gar.)	ZK	2	-	Z	PS
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	PS
02TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	PS
11UFPLN	Introduction to Solid State Physics Petr Kolenko	ZK	2	2+0	L	PS

	Maksym Dreval, Nichita Vatamaniuc, Jan Vondruška, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	PS
Characteristics	of the courses of this group of Study Plan: Code=BSPFIIPL1 Name=	BS P_FIB IF	PL 1st yea	ar		
02DEF1	History of Physics 1	_			Z	2
Physics and its place	in the system of sciences. The relationship of man and nature. Natural sciences in ancient Ori	entand Greece	Greek natu	ral philosoph	ers, Aristot	le. Physics in
Helenistic period, Arc	chimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano E	runo. Copernic	us, Kepler, G	alileo, Huyge	ens. The bi	rth of physics
as experimental scien	nce. Newton and his work.					
02ELMA	Electricity and Magnetism			Z	,ZK	6
Electric charge, Coul-	omb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectri	cs. Electric curr	ent and circu	its, conducti	vity. Basics	of the relativity
theory. Electrodynam	$ic\ forces,\ magnetic\ field.\ Magnetic\ dipole,\ magnetics.\ Electromagnetic\ induction,\ RLC\ circuits.$	Electromagneti	c waves, Ma	xwell equation	ns.	
01LAL	Linear Algebra 1				Z	2
1. Vector space. 2. Lir	near dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces.	5. Linear mappi	ngs. 6. Matri	ces of linear	mappings.	7. Frobenius
theorem.						
01LALZ	Linear Algebra 1, exam				ZK	2
01LAL2	Linear Algebra 2			Z	,ZK	4
Outline: 1. Inverse ma	atrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector	, diagonalizatioi	n). 4. Hermiti	an and quad	ratic forms	. 5. Scalar
product and orthogor	nality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Me	thods for calcul	ation of inve	rse matrices	2. Method	s of calculation
of determinants. 3. Ca	alculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form.	5. Scalar produc	ct and orthog	onality. Calc	ulation of c	rthogonal
complements, 6, Geo	metry exercises and examples. 7. Adjoint operators.					
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· · · · · · · · · · · · · · · · · · ·	Calculus 1				Z	4
01MAN					Z	4
01MAN Basic calculus (real a	Calculus 1				Z Z	4
01MAN Basic calculus (real a	Calculus 1 inalysis, functions of one real variable, differential calculus).					
01MAN Basic calculus (real a 01MANZ 01MAN2	Calculus 1 unalysis, functions of one real variable, differential calculus). Calculus 1, exam	ce, operations o	n series, abs	Z	ZK ,ZK	4 8
01MAN Basic calculus (real a 01MANZ 01MAN2 1. Continuation of diff	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2			Z solute and co	ZK ,ZK enditional c	4 8 onvergence 3.
O1MAN Basic calculus (real a O1MANZ O1MAN2 1. Continuation of diff Real and complex po	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Infinite series: criteria of convergence			Z solute and co	ZK ,ZK enditional c	4 8 onvergence 3.
01MAN Basic calculus (real a 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition),	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 rerential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation			Z solute and co	ZK ,ZK enditional c	4 8 onvergence 3.
01MAN Basic calculus (real a 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral	n of infinite seri	es. 4. Theory	solute and cc	ZK ,ZK nditional coprimitives,	4 8 onvergence 3. definite integra
O1MAN Basic calculus (real a 01MANZ 01MANZ 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics	n of infinite seri	es. 4. Theory	solute and co	ZK Z,ZK Inditional or primitives, Z equations	4 8 onvergence 3. definite integra 4 of motion for
01MAN Basic calculus (real a 01MANZ 01MANZ 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals of integ	n of infinite seri	es. 4. Theory	solute and co	ZK Z,ZK Inditional or primitives, Z equations	4 8 onvergence 3. definite integra 4 of motion for
O1MAN Basic calculus (real at 01MANZ O1MANZ 1. Continuation of diff Real and complex po (Riemann definition), O2MECH Introduction to physic one-dimensional mot of a rigid body, rotation	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals, Generalized Riemann integral Mechanics Identify the Cauchy-Hadamard theorem of integrals of integ	n of infinite seri	es. 4. Theory	solute and cc of integrals: icle, solving oblems, part	ZK Z,ZK Inditional or primitives, Z equations	4 8 onvergence 3. definite integra 4 of motion for
01MAN Basic calculus (real at 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotatic 02MECHZ	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics In the control of the cont	n of infinite seri	es. 4. Theory	solute and cc of integrals: icle, solving oblems, part	ZK Z,ZK Inditional continuous c	4 8 convergence 3. definite integra 4 of motion for ns. Mechanics
01MAN Basic calculus (real a 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotatic 02MECHZ	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Implication of a particle, basic types of motion and their superior, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination	n of infinite seri	es. 4. Theory	solute and cc of integrals: icle, solving oblems, part	ZK Z,ZK Inditional continuous c	4 8 convergence 3. definite integra 4 of motion for ns. Mechanics
01MAN Basic calculus (real at 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotatic 02MECHZ The content of the su	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Iss., physical quantities and units. Kinematics of a particle, basic types of motion and their superion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination Indiginal plan of studies. Preparatory Week	n of infinite seri	es. 4. Theory	zolute and co	ZK Z,ZK Inditional coprimitives, Z equations of icle collisio	4 8 convergence 3. definite integra 4 of motion for ns. Mechanics
01MAN Basic calculus (real at 01MANZ 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotation 02MECHZ The content of the sure 00PT 02TER	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Iderential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence were series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Identify and units. Kinematics of a particle, basic types of motion and their superion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination Biget is the examination according to the plan of studies.	n of infinite seri	es. 4. Theory	zolute and cor of integrals:	ZK Z,ZK Inditional coprimitives, Z equations occle collision ZK Z Z,ZK	4 8 convergence 3. definite integra 4 of motion for ns. Mechanics 2 2 4
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01MAN Basic calculus (real at 01MANZ) 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotatic 02MECHZ The content of the su 00PT 02TER Thermal expansion of entropy; non-chemical	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Idential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Iss., physical quantities and units. Kinematics of a particle, basic types of motion and their superion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination Indicate the examination according to the plan of studies. Preparatory Week Heat and Molecular Physics If materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and peral systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials;	n of infinite seri	es. 4. Theory nics of a part two-body pr	solute and corol integrals: icle, solving oblems, part zodynamic priocity distribut	ZK Z,ZK primitives, Z equations of the collision ZK Z Z,ZK nciple, idea	4 8 onvergence 3. definite integra 4 of motion for ns. Mechanics 2 2 4 al and real gas
01MAN Basic calculus (real at 01MANZ 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotation 02MECHZ The content of the sure the sure the content of the sure that the sure	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Idential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Is, physical quantities and units. Kinematics of a particle, basic types of motion and their superion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination Indigential September 1 is the examination according to the plan of studies. Preparatory Week Heat and Molecular Physics If materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and periods.	n of infinite seri	es. 4. Theory nics of a part two-body pr	solute and corol integrals: icle, solving oblems, part zodynamic priocity distribut	ZK Z,ZK primitives, Z equations of the collision of t	4 8 convergence 3. definite integra 4 of motion for ns. Mechanics 2 2 4 al and real gas artition theorem
01MAN Basic calculus (real at 01MANZ 01MANZ 01MAN2 1. Continuation of diff Real and complex po (Riemann definition), 02MECH Introduction to physic one-dimensional mot of a rigid body, rotation 02MECHZ The content of the sure the sure the content of the sure that the sure	Calculus 1 Inalysis, functions of one real variable, differential calculus). Calculus 1, exam Calculus 2 Idential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence wer series, the Cauchy-Hadamard theorem, expansion of function into power series, summation techniques of integration and application of integrals, Generalized Riemann integral Mechanics Is, physical quantities and units. Kinematics of a particle, basic types of motion and their superion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination Indigential Systems: Mechanics of a particle, basic types of motion and their superion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Preparatory Week Heat and Molecular Physics If materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and peral systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; Introduction to Solid State Physics	n of infinite seri	es. 4. Theory nics of a part two-body pr	solute and corol integrals: icle, solving oblems, part zodynamic priocity distribut	ZK Z,ZK primitives, Z equations of the collision of t	4 8 convergence 3. definite integra 4 of motion for ns. Mechanics 2 2 4 al and real gas artition theorem

ZK

PS

Introduction to Solid State Physics
Petr Kolenko Petr Kolenko Petr Kolenko (Gar.)

Basics of Programming

11UFP

Code of the group: BSPFIIPL2

18ZPRO

programming language.

Note on the group:

Name of the group: BS P_FIB IPL 2nd year

Basics of Programming

Requirement credits in the group:

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

Credits in the group: 0

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

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

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

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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
11GNU	GNU Programming Martin Dráb Martin Dráb (Gar.)	KZ	4	2P+2C	L	PS
01ANB3	Calculus B 3 Miroslav Kolá, Milan Krbálek Milan Krbálek Miroslav Kolá (Gar.)	Z,ZK	8	4P+4C		PS
01ANB4	Calculus B 4 Ji í Mikyška, Miroslav Kolá Ji í Mikyška 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
11SFIPL	Seminar on Solid State Physics Ladislav Kalvoda Ladislav Kalvoda (Gar.)	KZ	2	1+1		PS

11SPLA	Structure of Solid State Petr Kolenko, Ivo Kraus Petr Kolenko Petr Kolenko (Gar.)	Z,ZK	4	2P+2C	L	PS
02TEF1	Theoretical Physics 1 Petr Novotný Michal Jex Igor Jex (Gar.)	Z,ZK	4	2+2	Z	PS
02TEF2	Theoretical Physics 2 Petr Novotný, Filip Petrásek Josef Schmidt Petr Novotný (Gar.)	Z,ZK	4	2+2	L	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 Jan Vysoký Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	PS

Characteristics of the courses of this group of Study Plan: Code=BSPFIIPL2 Name=BS P_FIB IPL 2nd year

11GNU **GNU Programming** ΚZ The aim of the course is to introduce students into the Linux system environment and therein used GNU utilities and programming tools to such a level, that they would be able to use these tools for creating scripts and programs for processing acquired or simulated data for their experiments in physics with the use of the facultys Hyperion cluster (however the learned skills could of course be applied to any Linux system).

01ANB3 Calculus B 3 Z,ZK

1. Functional sequences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional series, power series, Series Expansion, Taylor's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation of variables, homogeneous equation and exact equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coefficients and special right-hand side, Euler differential equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and non-isolated point, boundary of set, completeness of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier series, trigonometric Fourier series and their convergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total derivatives and tangent plane, Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations.

01ANB4 Calculus B 4

[1] Diferenciální po et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] Regulární zobrazení, zám na prom nných, nekartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstrukce Lebesgueovy míry. [7] Integrální po et funkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgueova v ta. Limita, spojitost a derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.

12NME1 Numerical Methods 1 Z,ZK

There are explained the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Methods for solution of tasks very important for physicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computational environment MATLAB is used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.

Seminar on Solid State Physics

1. Introduction of the Seminar and ?SSS? software features. 2. Module "bravais" - crystal structure and X-ray diffraction in 2D ? theory 3. Simulations of diffractive phenomena related to following themes: crystal lattice versus crystal structure, primitive cell, elementary cell, lattice plane, reciprocal grid, Laue and Bragg condition, atomic scattering factor, structural factor, extinction, practical structural analysis 4.Module "laue" - Diffraction on perfect and imperfect crystals 5.Simulations: influence of structural disorder on diffraction pattern, atomization 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, 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, heat capacity 10."drude" module - dynamics of classical electron gas in 2D? theory 11. Simulations: diffuse electron movement, electron drift in an external electric field, Haynes and Shockley experiment, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12. Assignment, elaboration and presentation of the

11SPLA Structure of Solid State Z.ZK 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 study of solid state physics.

02TFF1 Theoretical Physics 1

seminar work.

Z.ZK

The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms as well as different approaches to description of dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is the first part of the course of classical theoretical physics (02TEF1, 02TEF2).

Theoretical Physics 2 02TFF2

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

Thermodynamics and Statistical Physics

Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy. Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Boltzmann equation is usedto discusses simple transport phenomena.

Waves, Optics and Atomic Physics

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

Code of the group: BSPFIIPL3

Name of the group: BS P FIB IPL 3rd 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: Zkoušku z 01RMFB lze skládat až po složení všech zkoušek z Matematické analýzy

a Lineární algebry.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
11APLG	Applications of Group Theory in Solid State Physics Zden k Pot ek Zden k Pot ek (Gar.)	ZK	2	2	Z	PS
11BPFI1	Bachelor Thesis 1 Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	5		Z	PS
11BPFI2	Bachelor Thesis 2 Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	10		L	PS
11DAPL	Diffraction Analysis of Solid State Nikolaj Ganev, Ji í apek Nikolaj Ganev Nikolaj Ganev (Gar.)	ZK	2	2P+0C	Z	PS
11MAPL	Solid State Physics Applications and Analytic Methods Irena Kratochvílová Irena Kratochvílová (Gar.)	Z,ZK	4	2P+2C	L	PS
11KFPL	Continuum in Solid State Physics Hanuš Seiner Hanuš Seiner (Gar.)	ZK	3	2P+0C	L	PS
02KM1	Quantum Mechanics 1 Martin Štefa ák Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	Z	PS
02KM2	Quantum Mechanics 2 Martin Štefa ák Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	L	PS
01PRST	Probability and Statistics Tomáš Hobza Tomáš Hobza (Gar.)	Z,ZK	4	3+1	Z	PS
01RMFB	Equations of Mathematical Physics B Václav Klika	Z,ZK	5	2P+2C		PS
11BSEM	Bachelor Seminar Ladislav Kalvoda, Radka Mika Havlíková Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	1	0P+2C	L	PS
11CFPL	Introduction into the Chemistry and Physics of Polymer Materials	ZK	2	2+0	L	PS
11ZFP	Basic to Solid State Physics Ladislav Kalvoda, Eva Mihóková Ladislav Kalvoda (Gar.)	ZK	3		Z	PS
11ZFPL	Basic to Solid State Physics Eva Mihóková	KZ	2	26P+0C	Z	PS
11ZSKL	Introduction to Condensed Matter Simulations Ladislav Kalvoda, Jan Drahokoupil Ladislav Kalvoda Ladislav Kalvoda (Gar.)	KZ	2	1P+1C	L	PS

11APLG	Applications of Group Theory in Solid State Physics	ZK	2
Consideration of at	omic system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy stat	es there are and wha	t interactions
and transitions bety	ween them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the inforr	nation on the object t	hat symmetry
alone will provide. 7	The application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field envir	onment, normal mod	es of molecular
vibrations, and sele	ection rules for optical absorption transitions.		
11BPFI1	Bachelor Thesis 1	Z	5
On the basis of the	assignment and under the supervision of the supervisor, the student individually works on the assigned topic for 2 semesters.		
11BPFI2	Bachelor Thesis 2	Z	10
On the basis of the	assignment and under the supervision of the supervisor, the student individually works on the assigned topic for 2 semesters.	' '	
11DAPL	Diffraction Analysis of Solid State	ZK	2
The purpose of this	s course is to introduce the undergraduate students the experimental methods for studying real structure of solids.	1	
11MAPL	Solid State Physics Applications and Analytic Methods	Z,ZK	4
The subject describ	pes the electrical and magnetic properties of metals and their alloys including superconductivity. Furthermore, electrical and op	tical properties of ser	niconductors,
dielectrics and ferro	pelectrics and methods of their study are characterized.		
11KFPL	Continuum in Solid State Physics	ZK	3
The course introdu	ces students to the basics of the application of the theoretical concept of continuum to the description of the properties of solid	s. The model is demo	nstrated on
selected examples	of multiferroic		
02KM1	Quantum Mechanics 1	Z,ZK	6
Abstract: The lectur	e describes the birth of quantum mechanics and description of one particle and more particles by elements of the Hilbert space	as well as its time evo	olution. Besides
that it includes des	cription of observable quantities by operators in the Hilbert space and calculation of their spectra.		
02KM2	Quantum Mechanics 2	Z,ZK	6
Abstract: The lectur	re expands the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and	path integral. It summ	narizes the
terminology and me	ethods used in various applications of quantum mechanics and prepares the students for an effective scientific research and furtl	ner study, in particular	r, of the modern
formulations of qua	ntum field theory.		
01PRST	Probability and Statistics	Z,ZK	4
It is a basic course	of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition	and continuing till the	e Kolmogorov
definition. The notice	ons as random variable, distribution function of random variable and characteristics of random variable are treated and basic lin	nit theorems are state	ed and proved.
On the basis of this	theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are e	explained.	
01RMFB	Equations of Mathematical Physics B	Z,ZK	5
The subject of this	course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of inte	gral transformations,	and solution of
partial differential e	quations.		
11BSEM	Bachelor Seminar	Z	1
In the first part of th	e seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formation	al requirements for ba	chelors degree
projects at the facu	lty. The second part is designed as a practical training for the defence of the bachelors degree project. The students give oral p	resentations of the cu	urrent state of

the research results achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibilities of improving the students

performance.

11CFPL Introduction into the Chemistry and Physics of Polymer Materials Basic syntheses of polymer materials, polymer characterization and processing. Properties of polymer matrix on macro-, micro-, nanometric, and molecular levels and the solution of relation synthesis - properties - processing, practical examples of solutions of chosen problems. The choice of polymers for physical studies.

11ZFP Basic to Solid State Physics ZK

Description of fundamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding interaction between atoms in solids, various types of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic thermal properties of crystals are derived. The periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons in solids by means of electron energy bands explained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to systematically introduce and interpret a broad phenomenological basis of physical properties of crystalline solids

Basic to Solid State Physics 11ZFPL

Description of fundamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding interaction between atoms in solids, various types of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic thermal properties of crystals are derived. The periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons in solids by means of electron energy bands explained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to systematically introduce and

interpret a broad phenomenological basis of physical properties of crystalline solids 11ZSKL Introduction to Condensed Matter Simulations

Computer simulation in condensed matter becomes an important tool in developing new materials and technologies used by both experimenters and theorists. The solution of many practical problems is thus transferred from real to 'virtual' computer lab. During the course, students will be introduced to basic computational methods and procedures based on classical non-quantum physics models, and will test their knowledge on practical examples.

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 0

The role of the block: PV

Code of the group: BSSPOLVEDY

Name of the group: BS - Social Sciences

Requirement credits in the group:

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

Credits in the group: 0

Note on the group:

Only one of these courses is obligatory.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
00EKOT	Economy in Technology Jana Ková ová	Z	1	2+0		PV
00ETV	Ethics of Science and Technology Jakub Hají ek Jana Ková ová Jakub Hají ek (Gar.)	Z	1	0+2	L	PV
00RET	Rhetoric Jana Ková ová Jana Ková ová Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2		PV
00UPRA	Introduction to Law Martin ech Jana Ková ová Martin ech (Gar.)	Z	1	0+2		PV
00UPSY	Introduction to Psychology Jakub Haii ek Jana Koyá oyá Jakub Haii ek (Gar.)	Z	1	0+2		PV

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

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

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

Requirement courses in the group: In this group you have to complete at least 2 courses

Credits in the group: 0 Note on the group:

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

)4XAMZK	English for Intermediate Students Examination	ZK	4
he course content	is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of t	wo parts - written (100 mi	n) and oral
20-30 min). The stu	ident is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three Engli	sh courses.	
04XAPZK	English for Advanced Students Examination	ZK	4
he course content	is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the	ability to apply their know	ledge obtain
the three AP cour	ses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topi	c from the student's field	of study.
4XCESZZK	Czech for Foreigners Beginners - Examination	ZK	4
he course content	is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics o	f the 04XCESZ1,2,3 cours	ses and can
nly be taken after s	successful completion of all three courses. Detailed information is to be obtained from the teacher.		
4XCESMZK	Czech for Intermediate Students Examination	ZK	4
he course content	is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics o	f the CESM1,2,3 courses	and can only
e taken after succe	essful completion of the 3 courses. Detailed information is to be obtained from the teacher.		
4XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4
he course content	is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics o	f the CESP1,2,3 courses	and can only
e taken after succe	essful completion of the 3 courses. Detailed information is to be obtained from the teacher.		
4XFMZK	French for Intermediate Students Examination	ZK	4
he content is the e	xamination as given by the study programme. The whole French programme is ended with an examination covering the co	ontents of FM1-FM3. The	examination
onsists of a written	and oral part and is organized according to Examination Instructions, a document available on the web.		
	Franch for Advanced Ctudents Francisction		
4XFPZK	French for Advanced Students Examination	ZK	4
	French for Advanced Students Examination rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an or		•
			•
he whole French poximation Instruc	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an o		•
the whole French point in the whole French p	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an outloons, a document available on the web. Assessment of the presentation is included into the examination grading.	oral part and is organized	according to
the whole French point in the whole French point in the whole French point in the whole who	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an options, a document available on the web. Assessment of the presentation is included into the examination grading. French for Beginners Examination	oral part and is organized	according to
he whole French p xamination Instructus 4XFZZK he content is the electron for exami	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an ortions, a document available on the web. Assessment of the presentation is included into the examination grading. French for Beginners Examination xamination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The	oral part and is organized	according to
the whole French p examination Instruct MAXFZZK the content is the examination for examination	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an options, a document available on the web. Assessment of the presentation is included into the examination grading. French for Beginners Examination xamination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The ination. Its content covers the levels FZ1 - FZ5.	oral part and is organized ZK ne examination is ruled by	according to 3 the docume
The whole French p examination Instruct 04XFZZK The content is the examination for examination for examination for examination of the course content in the content in the course content in the cours	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an ortions, a document available on the web. Assessment of the presentation is included into the examination grading. French for Beginners Examination xamination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The ination. Its content covers the levels FZ1 - FZ5. German for Intermediate Students Examination	zral part and is organized ZK ne examination is ruled by ZK amination consisting of two	3 the docume
the whole French p examination Instruc- 14XFZZK the content is the enstruction for examination	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an options, a document available on the web. Assessment of the presentation is included into the examination grading. French for Beginners Examination xamination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The ination. Its content covers the levels FZ1 - FZ5. German for Intermediate Students Examination is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination and the course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting the course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting the course is consistent consis	zral part and is organized ZK ne examination is ruled by ZK amination consisting of two	3 the docume
The whole French p examination Instruct 04XFZZK The content is the examination for examination for examination for examination of the course content in the content in the course content in the cours	rogram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an options, a document available on the web. Assessment of the presentation is included into the examination grading. French for Beginners Examination xamination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The ination. Its content covers the levels FZ1 - FZ5. German for Intermediate Students Examination is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination and the course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting the course is completed by an examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting the course is consistent consis	zral part and is organized ZK ne examination is ruled by ZK amination consisting of two	3 the docume

04XRMZK	Russian for Intermediate Students Examination	ZK	4
The course content i	s 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	cquired in RM1
- RM3. Students are	eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instruc	tions by the teach	er.
04XRPZK	Russian for Advanced Students Examination	ZK	4
The course content i	s 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	cquired in RP1
- RP3. Students are	eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instruction	ons by the teache	r.
04XRZZK	Russian for Beginners Examination	ZK	3
The course content i	s 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	cquired in RZ1
- RZ5. Students are	eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructi	ons by the teache	r.
04XSMZK	Spanish for Intermediate Students Examination	ZK	4
The course content i	s the examination as given by the study plan. XSMZK examination consists of two parts: written and oral; to be eligible for the w	ritten part, studer	ts will have
obtained non-graded	assessment for course XSM3. Oral examination follows the written part.		
04XSPZK	Spanish for Advanced Students Examination	ZK	4
The course content i	s the examination as given by the study plan. Examination XSPZK consists of two parts, namely oral and written. The prerequis	ite for admission t	o oral part is
having passed the w	ritten test. Examination content is based on syllabi of courses XSP1, XSP2, and XSP3 or on an individual study plan of the study	dent.	
04XSZZK	Spanish for Beginners Examination	ZK	3
The course content i	s the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral or	examination only i	f he/she has
passed the written ex	ramination 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: BSPFIIPLV

Name of the group: BS P_FIB IPL Optional courses

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

Credits in the group: 0

Note on the group:

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

Note on the grou		en ziskanim	zapoctu	z prean	netu 15CH	1.
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.) Linear Circuit Analysis				_	
11ANEL	Pavel Jiroušek Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	4	4	Z	V
02AMS	Atomic and Molecular Spectroscopy Svatopluk Civiš Svatopluk Civiš Svatopluk Civiš (Gar.)	Z,ZK	4	2+2	Z	V
02DEF2	History of Physics 2 Igor Jex Igor Jex (Gar.)	Z	2	2+0	L	V
14ELM	Electron Microscopy Miroslav Karlík Miroslav Karlík (Gar.)	KZ	2	2P+0C		V
02EXF	Experimental Physics Jaroslav Adam, Barbara Antonina Trzeciak, Jaroslava Óbertová, Katarína K ížková Gajdošová Jaroslava Óbertová Katarína K ížková Gajdošová (Gar.)	ZK	2	2P+0C	Z	V
01FKO	Functions of Complex Variable Severin Pošta, Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	3	2+1		V
02PRA1	Experimental Laboratory 1 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	Z	V
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	L	V
11GPL	GNU Plot Martin Dráb Martin Dráb (Gar.)	Z	2	2C	Z	V
04AKS	English Conversation Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
00MAM1	Essentials of High School Course 1 David Be Martin Stefa ák	Z	1	0+1		V
00MAM2	Essentials of High School Math Course 2 Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.)	Z	1	0+1		V
11MIK	Logical Circuits and Microprocessors Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	4	4	L	V
12MOF	Molecular Physics Jan Proška, Martin Michl Martin Michl Jan Proška (Gar.)	ZK	2	2+0	L	V
12NT	Nanotechnology Jan Proška, Eduard Hulicius Jan Proška Eduard Hulicius (Gar.)	ZK	2	2+0	Z	V
15CH1	General Chemistry 1 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	V
12PAS	Computer Algebra Systems Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	Z	V

18PMTL	Programming in MATLAB Mat j Pokorný, Quang Van Tran, Jaromír Kukal Quang Van Tran Jaromír Kukal (Gar.)	KZ	4	4C	Z	V
18PPY1	Programming in Python 1 Jakub Klinkovský, Matej Mojzeš Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	2C	L	V
18PPY2	Programming in Python 2 Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	2S	Z	V
18PPY3	Programming in Python 3 Rudolf Pecinovský Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	2C	L	V
02SMF	Seminar of Mathematical Physics Martin Štefa ák Ladislav Hlavatý (Gar.)	Z	2	0+2	Z	V
11SPS	Seminar of computer simulations Jan Drahokoupil Jan Drahokoupil Jan Drahokoupil (Gar.)	Z	2	2C	L	V
11SFBM	Structure and Function of Biomolecules Petr Kolenko, Tomáš Kova Tomáš Kova Petr Kolenko (Gar.)	Z,ZK	3	2+1	Z	V
TV-1	Physical Education	Z	1		Z	V
TV-2	Physical Education	Z	1		L	V
TV-3	Physical education	Z	1	0+2	Z	V
TV-4	Physical education	Z	1	0+2	L	V
02TJNS	Transport Phenomena / Nonequilibrium Systems Igor Jex Martin Štefa ák Igor Jex (Gar.)	KZ	2	2+0	L	V
12UFN	Introduction to Photonics and Nanostructures Jan Proška, Ivan Richter, Pavel Kwiecien Ivan Richter Ivan Richter (Gar.)	KZ	3	2P+1C	L	V
01UP1	Introduction to Probability 1 Jan Vybiral Jan Vybiral (Gar.)	Z,ZK	3	1P+1C		V
01UP2	Introduction to Probability 2 Milan Krbálek, Michaela Krbálková Michaela Krbálková Milan Krbálek (Gar.)	Z,ZK	3	1P+1C		V
12UNXAP	Introduction to UNIX Milan Kucha ik Milan Kucha ik Milan Kucha ik (Gar.)	Z	2	1P+1C	L	V
12UVP	Introduction to Scientific Computing Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	L	V
12VKT	Vacuum Technology Richard Švejkar Vojt ch Petrá ek Vojt ch Petrá ek (Gar.)	KZ	4	2P+2L	Z	V
12ZPOP	Basic Optical Laboratory Alexandr Jan árek Alexandr Jan árek (Gar.)	KZ	6	0+4	L	V
18ZALG	Basics of Algorithmization Vladimír Jarý, Miroslav Virius, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková, František Gašpar Vladimír Jarý Miroslav Virius (Gar.)	Z,ZK	4	2+2	L	V
12ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
12ZFS	Fundamentals of Photonic Structures Ivan Richter, Ji í tyroký Ivan Richter Ivan Richter (Gar.)	Z,ZK	2	2P	L	V
02ZM1	Foundations of Physical Measurements 1 Solangel Rojas Torres, Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	ZK	2	2P+0C	Z	V
02ZM2	Foundations of Physical Measurements 2 Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	KZ	4	0P+4L	L	V
12ZFP	Principles of Plasma Physics Martin Jirka, Ji í Limpouch Martin Jirka Ji í Limpouch (Gar.)	Z,ZK	4	3+1	L	V
12ZAOP	Fundamentals of Optics Ivan Richter, Pavel Kwiecien Ivan Richter Ivan Richter (Gar.)	Z,ZK	2	2+0	Z	V

11ANEL Linear Circuit Analysis Z,ZK 4
The course is the introduction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especially oriented to the understanding of the computer methods of analysis. The second part gives a short list of most commonly used circuits in experimental equipment.

02AMS Atomic and Molecular Spectroscopy
The lecture is devoted to atomic and molecular spectroscopy.

02DEF2 History of Physics 2
Development of classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. Electricity and magnetism - electrostatics, galvanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics. Boltzmann. The birth of modern quantum

electrostatics, galvanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann. The birth of modern quantum and relativistic physics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear energy, Elementary particles, standard model. The concept of Nature and Universe of today.

14ELM Electron Microscopy KZ 2

Abstract: In this course the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The introductory part is dedicated to the analogy of light and electron microscopy and to various types of microscopes. An important part of the course is given to the interaction of different types of radiation with matter, mathematical formulations and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and dynamic theory of diffraction, types of contrast, and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques in atomic resolution.

02EXF Experimental Physics ZK 2
The goal of this subject is to introduce the students the principles of physics measurements, their techniques, methods and instruments that are used for such measurements, and the

analysis of measured data.

01FKO	Functions of Complex Variable	Z,ZK	3
	utlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable ar	· ·	
1 '	d the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Ca	, ,	·
	norphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy	estimates, Laurer	nt series, residue
theorem.	Cynorimontal Laboratory 1	V7	-
	Experimental Laboratory 1 cially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclea	KZ	t it can be also
-	rested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work wit		
I	quire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluations are records of measurement.		
· ·	owledge gained in lectures on physics.		
02PRA2	Experimental Laboratory 2	KZ	6
1	cially 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	rested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work wit	th theliterature), the	e implementation
·	quire of different experimental procedures and routines), willteach writing the records of measurement, processing and eval	uation of results. A	At the same time
· · · · · · · · · · · · · · · · · · ·	owledge gained in lectures on physics.		
	GNU Plot	Z	2
	to introduce the Gnuplot program to students and teach them to use this flexible, universal and free tool to produce various of the produ		
	oplied within other courses where they need to produce graphs and images from data (practical classes, etc.) and also later		1
	English Conversation the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication.	Z	
· ·	the student's communication skills acquired throughout their previous studies. It aims to improve an aspects of oral communication strategy. They will also practise their listening skills in order		-
I -	ent will be trained to express their ideas clearly and according to current English usage, and become a more confident spea		and participate
	Essentials of High School Course 1	Z	1
	to mathematical concepts and methods used in the introductory physics course.	_	
00MAM2	Essentials of High School Math Course 2	Z	1
Review of basics of high	<u> </u>	1	
11MIK	Logical Circuits and Microprocessors	Z,ZK	4
1	action to the digital electronics for physicists. It describes the function principles of combination circuits, simple sequential circuits	1	circuits like
microprocessors. The mi	crocomputer architecture and principles of interfacing is shown.		
12MOF	Molecular Physics	ZK	2
Basic ideas on physics of	f molecules and molecular matter, and on structure-to-physical properties relationship. Methods of molecular structure dete	ermination.	
12NT	Nanotechnology	ZK	2
	tudents mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Phys		
_ :	IBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technol	_	
· · ·	on. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for he		
as well as soldering and	d as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric la encasement	iyer preparation w	iii be memioned
	General Chemistry 1	Z	3
	cepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practic	_	
solved in exercises.			
15CH2	General Chemistry 2	Z,ZK	3
	uation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Us	ing various examp	les, the fact that
the validity of these prince	ciples is not restricted only to chemical processes is documented. The significance and practical use of explained principles	are illustrated by	examples solved
in exercises.		,	
	Computer Algebra Systems	Z	2
· ·	duction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is r	realized in comput	er classrooms:
	kills with CAS by solving relatively simple and basic tasks from mathematics and physics.	1/7	4
	Programming in MATLAB	KZ	4
and geometric represent	onment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic an	ialysis, statistics, a	aigorithmization
	Programming in Python 1	Z	2
1	rrogramming in Fythorial resolution is a common scientific packages. The course covers both object-oriented	1	
	part of the course describes the use of Python in the fields of scientific and technical computing (NumPy and SciPy packages),		
	Programming in Python 2	Z	2
-	tudents to practical applications of the Python language in scientific as well as commercial fields. The course is a seminar w	_	
	demo of a real-world application in the specific field.	, , , , , , , , , , , , , , , , , , , ,	
18PPY3	Programming in Python 3	Z	2
	intended for students who have basic experience with programming in Python and using its libraries. It introduces students to	advanced conce	ots of the Python
language and modules the	hey are based on.		
02SMF	Seminar of Mathematical Physics	Z	2
The purpose of the semi	nar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics depart	tment will present	simple tasks
	c activities that could become the topics of the student?s bachelor theses in the next year		
1	Seminar of computer simulations	Z	2
1	b) is one of the most widespread atomistic simulation methods used, for example, in the prediction of experimental data, stu		
	nt of drugs. Within this course, basic principles of MD will be discussed with the active involvement of students during teaching the property of property of the course of the property of the prop		
	ct illustrating practical applications of MD. Interim results or problems will be discussed and solved collectively. The output o his way, not only knowledge of MD, but also teamwork, independent research and presentation skills will be developed.	n each project will	be a scientific
· ·		Z,ZK	3
	Structure and Function of Biomolecules ecular structure is crucial for the understanding of its function. The subject is focused on the introduction to building blocks of		
•	recutal structure is crucial for the understanding of its function. The subject is locused on the introduction to building blocks of I relationship including macromolecular complexes.	aoromoiecules,	Svoidii Structure
	Physical Education	Z	1
	Physical Education	Z	1
, . • - 1	, 5.55. = 500000011		

TV-3	Physical education	Z	1
TV-4	Physical education	Z	1
02TJNS	Transport Phenomena / Nonequilibrium Systems	KZ	2
	es the students to the field of transport phenomena. The concept of a distribution function, Boltzmann equation, and H theorem a	re discussed. The g	eneral concepts
	e applied specifically to problems of plasma physics.	1/7	
12UFN	Introduction to Photonics and Nanostructures ructures and nanotechnologies; quantum technologies; quantum nanostructures; photonic structures; nanophotonics and nanop	KZ	3
	ractures and nanotechnologies, quantum technologies, quantum nanostructures, photonic structures, nanophotonics and nanophotonics computer simulations; technological realization; student presentations	iasmonics; optical	waveguides and
01UP1	Introduction to Probability 1	Z,ZK	3
	finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and	1 '	_
	bility, Bayes theorem, medical diagnosis, Simpsons paradox 5.Random variable with discrete state space, its distribution and m	-	-
•	value 7.Probabilistic method in graph theory 8.Random algorithms, Morris algorithm and its variants		3
01UP2	Introduction to Probability 2	Z,ZK	3
	continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction	1 ' 1	d connection to
measure theory. 4. I	Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristic	cs. 6. Elementary m	ethods for point
estimations. 7. Gen	erating pseudorandom numbers from the selected distribution.		
12UNXAP	Introduction to UNIX	Z	2
Computer and oper	$\dot{ ext{s}}$ systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interference of the systems of the system	ace. Hardware and	software.
	ing systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, workir	_	
•	er (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standar	•	
· · · · · · · · · · · · · · · · · · ·	ter networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a	computer. Network	services:
	nail, scp, etc. Network applications		
12UVP	Introduction to Scientific Computing	Z	2
=	Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with the course of the course is realized in computer classroom. Students get acquinted with the course of the co	n some basic tools	fort scientific
	puting, data analysis, data visualisation and algorithm development.	1/7	4
12VKT	Vacuum Technology	KZ	4
-	isic concepts and relations; diffusion,flow of rarefied gases. Flow and current of gas, conductivity. Interaction of gas with solid su Slid matter; evaporation, condensation;Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and the	•	
	Sliding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Ads		
	tter pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. M		
and seals.Practical			•
12ZPOP	Basic Optical Laboratory	KZ	6
_	tories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated	1	
18ZALG	Basics of Algorithmization	Z,ZK	4
This course is devo	ted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of	1 1	lexity.
12ZEL1	Basic Electronics 1	Z,ZK	3
	s primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. C		ods for linear
circuits include sym	bolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe	ects inside linear ci	cuits.
12ZFS	Fundamentals of Photonic Structures	Z,ZK	2
	he basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes the		
Specifically, the lect	ure discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures	s of integrated phot	onics for
	al communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic str	•	-
	asurfaces, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations of	n selected relevant	topics and
	ed photonic laboratories.		
02ZM1	Foundations of Physical Measurements 1	ZK	2
•	ned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), howeve		•
basic habits of work	goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired	data on a PC. Stud	ents learn the
	Foundations of Physical Measurements 2	V7	4
02ZM2	roundations of Physical Measurements 2 ned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), howeve	KZ	-
-	e goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired		=
basic habits of work		data on a 1 o. otda	chis icam the
12ZFP	Principles of Plasma Physics	Z,ZK	4
	h temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants	1 1	-
	electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and pa	· ·	· ·
	troduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas are introduced		
12ZAOP	Fundamentals of Optics	Z,ZK	2
	he very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and get	1 1	
	ain, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with res	· ·	=
	cs are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane wave	-	
work. Farticular top	of are farmer diagonated during departmental made of program the footable from the disease and manner of plane man	,	
· · · · · · · · · · · · · · · · · · ·	from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next		uences in
effects), and further		informs on consec	
effects), and further anisotropic media, i of two-wave interfer	from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next texplains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a grant processes.	informs on consec nce processes, exp phical form, includi	lains elements ng fundamentals
effects), and further anisotropic media, i of two-wave interfere of grating diffraction	from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next texplains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interferences.	informs on consect nce processes, exp phical form, including limit. It takes notice	lains elements ng fundamentals

Code of the group: BSPJAZYKYZAP Name of the group: BS P jazyky zap Requirement credits in the group: Requirement courses in the group: Credits in the group: 0

approach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical instruments.

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAM1	English for Intermediate Students M1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XAM2	English for Intermediate Students M2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XAM3	English for Intermediate Students M3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XAP1	English for Advanced Students P1 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	Z	V
04XAP2	English for Advanced Students P2 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	Z	V
04XCESZ1	Czech for Foreigners - Beginners 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESZ2	Czech for Foreigners - Beginners 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESZ3	Czech for Foreigners - Beginners 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	2S	Z	V
04XCESM1	Czech for Foreigners - Intermediate 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESM2	Czech for Foreigners - Intermediate 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESM3	Czech for Foreigners - Intermediate 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP1	Czech for Foreign Students - Advanced 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP2	Czech for Foreigners - Advanced 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESP3	Czech for Foreigners - Advanced 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XFM1	French for Intermediate Students M1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFM2	French for Intermediate Students M2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFM3	French for Intermediate Students M3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP1	French for Advanced Students P1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP2	French for Advanced Students P2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFP3	French for Advanded Students P3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFZ1	French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ3	French for Beginners Z3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ4	French for Beginners Z4 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XRM1	Russian for Intermediate Students M1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRM2	Russian for Intermediate Students M2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRM3	Russian for Intermediate Students M3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V

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

	Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSZ1	Spanish for Beginners Z1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ2	Spanish for Beginners Students Z2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ4	Spanish for Beginners Z4 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ5	Spanish for Beginners Z5 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
Characteristics of the	courses of this group of Study Plan: Code=BSPJAZYKYZAP	Name=BS P j	azyky za	p		
04XAM1 En	glish for Intermediate Students M1				Z	2
	tudents who have successfully completed the full secondary school English language	course at least at	the A2 level	of the Com	mon Furon	ean Framework
	, , , , , , , , , , , , , , , , , , , ,					
	(CEFR). It provides an introduction into English for Specific and Academic Purposes (
professional oral and written	communication situations. Thus it covers topics related to the student's life and needs	s as well as topics	of subtechr	ical interest	. Attention	is also paid to
extending the knowledge of	grammar issues used in EAP.					
04XAM2 En	glish for Intermediate Students M2				Z	2
-	student to have completed the AM1 course. It develops their skills for work with subte	echnical texts focu	ısina also m	ore on spec	_	_
'	SP and EAP (e.g., definition, existence and classification of phenomena, object descript	,	J	•	•	
revision is included.	or and EAF (e.g., definition, existence and dassification of phenomena, object descript	ions). Fait of the c	ourse is also	guided will	iiig. ii riece	ssary, grammar
l l	glish for Intermediate Students M3				Z	2
	s that enable students to cope with features typical of professional style. Increasing atte	'			,	
understanding of professions	al texts. Great emphasis is placed on distinguishing different levels of formal and inforr	nal oral and writte	n communic	ation and th	neir approp	riate Czech
oquivalente. The course also						
equivalents. The course also	includes studying abstracts and rules for writing them as well as basic rules for prepa	ring and giving a s	short presen	tation on a	chosen top	ic related to the
student's field.	includes studying abstracts and rules for writing them as well as basic rules for prepa	ring and giving a s	short presen	tation on a	chosen top	ic related to the
student's field.		ring and giving a s	short presen	tation on a		
student's field. 04XAP1 En	glish for Advanced Students P1				Z	2
student's field. 04XAP1 En The course is designed for s	glish for Advanced Students P1 tudents who have successfully completed the full secondary school English language	course (at least th	ne B1 level o	of the Comm	Z non Europe	2 ean Framework
student's field. 04XAP1 En The course is designed for s of Reference for Languages	glish for Advanced Students P1 tudents who have successfully completed the full secondary school English language - CEFR). It provides an introduction into English for Specific and Academic Purposes	course (at least th	ne B1 level on	of the Commamentals of	Z non Europe	2 ean Framework y, functions,
student's field. 04XAP1 En The course is designed for s of Reference for Languages grammar, and style typical or	glish for Advanced Students P1 tudents who have successfully completed the full secondary school English language - CEFR). It provides an introduction into English for Specific and Academic Purposes f professional oral and written communication situations (fundamentals of terms in ma	course (at least th (ESP, EAP), i.e., in thematics and phy	ne B1 level onto the fund	of the Commamentals of ons, graph	Z non Europe vocabulary description	2 ean Framework y, functions, is, etc). It also
student's field. 04XAP1 En The course is designed for s of Reference for Languages grammar, and style typical o covers professional oral and	glish for Advanced Students P1 tudents who have successfully completed the full secondary school English language - CEFR). It provides an introduction into English for Specific and Academic Purposes f professional oral and written communication situations (fundamentals of terms in ma written communication on topics related to the undergraduate's life and needs. It develop	course (at least th (ESP, EAP), i.e., in thematics and phy	ne B1 level onto the fund	of the Commamentals of ons, graph	Z non Europe vocabulary description	2 ean Framework y, functions, is, etc). It also
student's field. 04XAP1 En The course is designed for s of Reference for Languages grammar, and style typical o covers professional oral and polite request). If necessary,	glish for Advanced Students P1 tudents who have successfully completed the full secondary school English language - CEFR). It provides an introduction into English for Specific and Academic Purposes f professional oral and written communication situations (fundamentals of terms in ma written communication on topics related to the undergraduate's life and needs. It develop revision of selected grammar topics is included.	course (at least th (ESP, EAP), i.e., in thematics and phy	ne B1 level onto the fund	of the Commamentals of ons, graph	Z non Europe vocabulary description g a CV, lette	2 ean Framework y, functions, is, etc). It also er of application,
student's field. 04XAP1 En The course is designed for s of Reference for Languages grammar, and style typical o covers professional oral and polite request). If necessary,	glish for Advanced Students P1 tudents who have successfully completed the full secondary school English language - CEFR). It provides an introduction into English for Specific and Academic Purposes f professional oral and written communication situations (fundamentals of terms in ma written communication on topics related to the undergraduate's life and needs. It develop	course (at least th (ESP, EAP), i.e., in thematics and phy	ne B1 level onto the fund	of the Commamentals of ons, graph	Z non Europe vocabulary description	2 ean Framework y, functions, is, etc). It also
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04XCESZ2 Czech for Foreigners - Beginners 2 The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and or communication competences acquired in CESZ1 are further developed.	Z conjugation syste	2 m and practise
basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.	,g	
04XCESZ3 Czech for Foreigners - Beginners 3	Z	2
The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses of fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce the course fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce the course fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture.		
frequent types of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers rough		
1.		
04XCESM1 Czech for Foreigners - Intermediate 1	Z	2
The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending th social situations.	ie student's vocab	oulary for various
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	ı	
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 especilexicology and on developing the student's writing skills.	ially focused on s	tylistics and
04XCESP1 Czech for Foreign Students - Advanced 1	7	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 Et	- 1	_
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.	•	
basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies and	Student Life. Writ	tten practice
includes communication with teachers and faculty administrators.	7	0
04XCESP2 Czech for Foreigners - Advanced 2 This course extends the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical a	Z nd specialist texts	2 s placing greater
emphasis on individual work.	na specialist texte	s placing greater
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	on, and, finally, pre	esentation of the
student's project. Writing skills necessary for professional communication are trained.		
04XFM1 French for Intermediate Students M1	Z	2
French - intermediate FM The objective of this three-semester course is to improve and further develop communication in the French language in bo 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		
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	based on these to	
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 and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science.		
scientists, artists and architects. Description of an object, device, shapes, dimensions, material.	chec and technolog	ogy, i renen
04XFM3 French for Intermediate Students M3	Z	2
The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (
participle structures, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cl		
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 and one's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and compared to the compared to th	•	n French articles
04XFP1 French for Advanced Students P1	Z	2
FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both wi	ı	
be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general	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	-	=
passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactionarequest, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topi		
internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.	ioo or opoolalizatio	manomano,
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 of	n given topics. Fe	atures typical of
technical and scientific communication are stressed (passive voice, nominalization, word formation).		
04XFP3 French for Advanded Students P3 The course is focused as a veterilization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in	Z	2
The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covered to the contraction of the language of the course of the cours		-
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	_	•
The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able level actively using the knowledge of change depends on the content is roughly cuttined by lessenged. The content is roughly cuttined by lessenged. The content is roughly cuttined by lessenged.		=
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	•	
04XFZ2 French for Beginners Z2	Z	2
The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the scope is given b		
French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement thanking travelling man of France food expression of will wich order prohibition placeure). Correct propulgiation is practiced. Stress on order prohibition placeure.	_	
thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral comm How does the machine work? A few expressions concerning the study. Name of University and Faculty.	unication. Specific	cupius cuvered:
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	_	_
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	ıd 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
· · · · · · · · · · · · · · · · · · ·	n FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The court basic linguistic knowledge and skills are further developed. Oral communication and reading is developed from the local form the l		
	xtbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lec ourse covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, sho _l		
	now to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.	oping, weather, di	iivorsity iii oui
04XFZ5	French for Beginners Z5	Z	2
	n FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. The		
•	ered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.		
	ch science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cla	auses, typical con	junctions,
subjunctive clauses, ge		7	
04XNM2	German for Intermediate Students M2 other more complex grammatical structures and their application in communication based on technical texts, such as the relation	Z	2
	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
•	mation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	• • • • • • • • • • • • • • • • • • • •	
phenomena important f	or professional discourse (participles, relative clauses).		
04XNM1	German for Intermediate Students M1	Z	2
	irse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and		
•	es (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Reput gether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicist	· ·	
	communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	s, and the fundam	incritais of 11
04XNM3	German for Intermediate Students M3	Z	2
The course introduces of	ther more complex grammatical structures and their application in communication based on technical texts, such as the relation	n between techno	logy and society,
-	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
-	rnation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	natically revises of	ther grammatical
04XNP1	or professional discourse (participles, relative clauses).	7	2
•	German for Advanced Students P1 od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be lev	Z velled off at the be	
	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for		
	tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on	-	
i.e., telephoning.			
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 V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).	practising formal	communication,
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		
(traffic problems and ca	r accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vertical accidents are considered as a constant of the constant	ocabulary range i	n fields such as
·	ing, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used	-	
practice to and from Ge	process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The	ie course also inc	ludes translation
04XRM1	Russian for Intermediate Students M1	Z	2
-	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, aski		
	nmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement	level of the RZ2	course. The
	he course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.		
04XRM2	Russian for Intermediate Students M2 the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	Z	2
04XRM3	Russian for Intermediate Students M3	Z	2
	e knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, he		
in the timetable.		,	
04XRP1	Russian for Advanced Students P1	Z	2
•	ent for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, pra	acticing more diffi	cult grammar
	ng the fundamentals of technical language and training writing skills.		
04XRP2	Russian for Advanced Students P2	Z	2
	RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, it on independent oral and written communication.	verb aspects, spe	cific syntactic
04XRP3	Russian for Advanced Students P3	Z	2
	RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphras		
courses require good pr	revious knowledge of general language at secondary level (listening, reading, correct communication in everyday situations).	The courses deve	elop and expand
	dy is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and	-	
develop their subtechnic technical topics.	cal vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write a	accurately and wit	in confidence on
04XRZ1	Russian for Beginners Z1	Z	2
	ا المحافظة ا The first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russ		=
· · · · · · · · · · · · · · · · · · ·	or both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speak	_	- 1
	stress, understand its contents and summarize it.		
04XRZ2	Russian for Beginners Z2	Z	2
	f the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short suring short contained and appropriate structures, and read aloud with confidence a short text without marked stress. They will		
	sing short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will ical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.	aiso uevelop trieli	vocabulary and
	,		

04XRZ3	Russian for Beginners Z3	Z	2
	I on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for tra		
	ntroduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will	•	•
٠,	express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4	Russian for Beginners Z4	Z	2
	on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with	_	
	nication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular ve	•	•
	ty, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time).		•
	nore specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e	•	
	offormation from the timetable, learn about Russian holidays and typical meals.	.3.,,,	
04XRZ5	Russian for Beginners Z5	Z	2
	the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understa	1	
•	pecialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. C		
	idying grammar is based on professional and technical texts and only includes items typically used in professional communication		
	lents develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite requ	· ·	50, pao.p.00,
04XSM1	Spanish for Intermediate Students M1	7	2
-	ned for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-sem		_
-	s attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, neg		-
	ten and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts of		-
04XSM2	Spanish for Intermediate Students M3	7	2
	s the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish fo		
-	s the students. Knowledge from the previous course (5MT), Students are gradually acquainted with fundamentals of Spanish to ecialized texts on the Internet.	specific purposes	s in order to be
<u>'</u>		7	0
04XSM3	Spanish for Intermediate Students M3	Z	2
	re supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acar		-
•	nternet in Spanish and search for information of their specialization or field of interest. Students will use the information to write	snort articles and	summaries. In
	gramme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.		
		_	
04XSP1	Spanish for Advanced Students P1	Z	2
Course concentrate	Spanish for Advanced Students P1 s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication.	1	
Course concentrate of CEFR.	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica	tion. Course prered	quisites: level E
Course concentrate of CEFR.	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica Spanish for Advanced Students P2	tion. Course prered	quisites: level E
Course concentrate of CEFR. 04XSP2 Course XSP2 is the	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica Spanish for Advanced Students P2	tion. Course prered	quisites: level E
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica Spanish for Advanced Students P2	Z syntax and focuses	quisites: level E 2 on independe
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica Spanish for Advanced Students P2	Z syntax and focuses	quisites: level E 2 on independe
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the	Son more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communical Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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	Z syntax and focuses	quisites: level E 2 on independe
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica Spanish for Advanced Students P2	Z syntax and focuses	quisites: level E 2 on independe
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the	Son more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communical Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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	Z syntax and focuses	quisites: level E 2 on independe
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the based on what stud 04XSZ1 Course XSZ1 is the	Son more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communical Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functions.	Z syntax and focuses Z focused on writter Z damental grammal	quisites: level by the property of the propert
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the based on what stud 04XSZ1 Course XSZ1 is the	Son more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communical Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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 ents will need in their career. Spanish for Beginners Z1	Z syntax and focuses Z focused on writter Z damental grammal	quisites: level B 2 on independe 2 n communication 2 r structures and
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the based on what stud 04XSZ1 Course XSZ1 is the will be able to communicat course contracts.	Son more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communical Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functions.	Z syntax and focuses Z focused on writter Z damental grammal	quisites: level B 2 on independe 2 n communication 2 r structures and
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the based on what stud 04XSZ1 Course XSZ1 is the will be able to communicat 04XSZ2	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental vocabulary of general Spanish course of spanish or specific purposes as well as written communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish	Z syntax and focuses Z focused on writter Z damental gramman ish and will develo	2 on independe 2 n communication 2 structures an p it.
Course concentrate of CEFR. 04XSP2 Course XSP2 is the written communicat 04XSP3 Course XSP3 is the based on what stud 04XSZ1 Course XSZ1 is the will be able to communicat out out of the will be able to communicate outside the will be able to	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sion. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2	Z syntax and focuses Z focused on writter Z damental grammal ish and will develo Z and lexis will be c	2 on independe 2 n communication 2 structures and p it. 2 hosen so as to
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Course concentrate of CEFR. D4XSP2 Course XSP2 is the written communicat D4XSP3 Course XSP3 is the based on what stud D4XSZ1 Course XSZ1 is the will be able to communicat D4XSZ2 Course XSZ2 is basenable them to und Republic. Realia of	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sition. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2 seed on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures seerstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries Spanish-speaking countries are also included.	Z syntax and focuses Z focused on writter Z damental grammal ish and will develo Z and lexis will be c	2 on independe 2 n communication 2 structures an p it. 2 hosen so as to
Course concentrate of CEFR. D4XSP2 Course XSP2 is the written communicat D4XSP3 Course XSP3 is the based on what stud D4XSZ1 Course XSZ1 is the will be able to communicate of CAXSZ2 Course XSZ2 is basenable them to und Republic. Realia of D4XSZ3	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sion. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fununicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Span Spanish for Beginners Students Z2 seed on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures serstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries.	Z syntax and focuses Z focused on writter Z damental grammal ish and will develo Z and lexis will be c as and others such	2 on independe 2 n communication 2 structures an p it. 2 hosen so as to as the Czech 2
Course concentrate of CEFR. D4XSP2 Course XSP2 is the written communicat D4XSP3 Course XSP3 is the based on what stud D4XSZ1 Course XSZ1 is the will be able to communicate of AXSZ2 Course XSZ2 is basenable them to und Republic. Realia of D4XSZ3 This course builds to	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sition. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2 seed on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures cerstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries Spanish for Beginners Z3	Z syntax and focuses Z focused on writter Z damental grammal ish and will develo Z and lexis will be c and others such	2 on independence 2 on communication 2 or structures and point. 2 on see the Czech 2 on to the realiant to the
Course concentrate of CEFR. D4XSP2 Course XSP2 is the written communicat D4XSP3 Course XSP3 is the based on what stud D4XSZ1 Course XSZ1 is the will be able to communicate of CASSZ2 Course XSZ2 is basenable them to und Republic. Realia of D4XSZ3 This course builds up and cultural context	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2 seed on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures certaind short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries Spanish for Beginners Z3 spon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes	Z syntax and focuses Z focused on writter Z damental grammar ish and will develo Z and lexis will be c s and others such Z udes an introduction grams Z udes an introduction grams z udes an introduction grams z	2 on independence 2 on communication 2 on structures and point. 2 on the season so as the Czech 2 on to the realizer fecto, pretérit
Course concentrate of CEFR. D4XSP2 Course XSP2 is the written communicat D4XSP3 Course XSP3 is the based on what stud D4XSZ1 Course XSZ1 is the will be able to communicate of CASSZ2 Course XSZ2 is basenable them to und Republic. Realia of D4XSZ3 This course builds up and cultural context ndefinido, pretérito	Spanish for Advanced Students P2 second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and ston. 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 ents will need in their career. Spanish for Beginners Z1 first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamentate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2 seed on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures sensiand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries Spanish-speaking countries are also included. Spanish for Beginners Z3 upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It include Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, include	Z syntax and focuses Z focused on writter Z damental grammar ish and will develo Z and lexis will be c s and others such Z udes an introduction grams Z udes an introduction grams z udes an introduction grams z	2 on independe 2 n communication 2 restructures an prit. 2 hosen so as to as the Czech 2 on to the realiaerfecto, pretéri
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List of courses of this pass:

Code	Name of the course	Completion	Credits
00EKOT	Economy in Technology	Z	1
'	The course introduces the basics of micro- and macroeconomics.	'	'
00ETV	Ethics of Science and Technology	Z	1
00MAM1	Essentials of High School Course 1	Z	1
'	Students are introduced to mathematical concepts and methods used in the introductory physics course.	'	
00MAM2	Essentials of High School Math Course 2	Z	1
'	Review of basics of high school mathematics.	'	'
00PT	Preparatory Week	Z	2

OODET	Dhataria	Z	
00RET The course is focu	Rhetoric used on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the	_	1 olic speech
	nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an		
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	Z	1
01ANB3	Calculus B 3 uences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional	Z,ZK	8 Series
	r's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation		
· · · · · · · · · · · · · · · · · · ·	equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coe		- 1
	tial equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and	=	- 1
•	is of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fouri Invergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total c	_	
	Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations	S.	
01ANB4	Calculus B 4	Z,ZK	6
	o et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] F kartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstr		
	unkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgu		
<u> </u>	derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.	,	. ,
01FKO	Functions of Complex Variable	Z,ZK	3
	om outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable are ex on and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Cauch	•	
•	holomorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy esti		
	theorem.		
01LAL	Linear Algebra 1	Z	2
1. Vector space. 2	Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of litheorem.	inear mappings. 7.	Frobenius
01LAL2	Linear Algebra 2	Z,ZK	4
	se matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian and	'	5. Scalar
	conality. 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 orthogonalit complements. 6. Geometry exercises and examples. 7. Adjoint operators. 	y. Calculation of ol	rtnogonai
01LALZ	Linear Algebra 1, exam	ZK	2
01MAN	Calculus 1	Z	4
04144110	Basic calculus (real analysis, functions of one real variable, differential calculus).	7 714	
01MAN2	Calculus 2	Z,ZK	8
	differential calculus. Taylor e Polynomiais, Taylor e formula 2. Infinite series, criteria of convergence, operations on series, absolute ar	nd conditional conv	vergence 3
	differential calculus: Taylor´s Polynomials, Taylor´s formula 2. Infinite series: criteria of convergence, operations on series, absolute ar bower series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integr		- 1
Real and complex p	ower series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integral (Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral	rals: primitives, def	inite integral
Real and complex p	power series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integral (Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral Calculus 1, exam	rals: primitives, def	inite integral
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02KM1	Quantum Mechanics 1	Z,ZK	6
Abstract: The lectur	e describes the birth of quantum mechanics and description of one particle and more particles by elements of the Hilbert space as we that it includes description of observable quantities by operators in the Hilbert space and calculation of their spectra.	ll as its time evolution	on. Besides
02KM2	Quantum Mechanics 2	Z,ZK	6
	ture expands the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and path	-	
terminology and me	ethods used in various applications of quantum mechanics and prepares the students for an effective scientific research and further stu- formulations of quantum field theory.	dy, in particular, of	tne modern
02MECH	Mechanics	Z	4
	ysics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle, so	lving equations of	motion for
one-dimensional n	notion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles, two-body problems,	particle collisions.	Mechanics
201450117	of a rigid body, rotation.	714	
02MECHZ	Mechanics - Examination The content of the subject is the examination according to the plan of studies.	ZK	2
02PRA1	Experimental Laboratory 1	KZ	6
	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E		_
attended by student	ts interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with the	eliterature), the imp	lementation
of the measuremer	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	on of results. At the	same time
0200 42	practically extendithe knowledge gained in lectures on physics.	V7	6
02PRA2 Lecture is intended	Experimental Laboratory 2 d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E	KZ naineerina). But it c	6 can be also
	is interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with th	0,	
of the measuremer	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	on of results. At the	same time
	practically extendthe knowledge gained in lectures on physics.		
02SMF	Seminar of Mathematical Physics	Z	2
rne purpose or tr	e seminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics departm concerning their scientific activities that could become the topics of the student?s bachelor theses in the next year	ent will present sin	iipie tasks
02TEF1	Theoretical Physics 1	Z,ZK	4
	roduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms		approaches
•	dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary		
problem, the moti-	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).	of mechanics. The	subject is
02TEF2	Theoretical Physics 2	Z,ZK	4
	sformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and		
Minkowski space-ti	me. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electron	nagnetic radiation in	n the dipole
	approximation.		
02TER	Heat and Molecular Physics of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynami	Z,ZK	4
	ror materials, near transier, stationary and non-stationary near conduction, near transier and penetration, 1st and 2nd thermodynamic cal systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity dis		
02TJNS	Transport Phenomena / Nonequilibrium Systems	KZ	2
The course introduc	ces the students to the field of transport phenomena. The concept of a distribution function, Boltzmann equation, and H theorem are dis	cussed. The gener	ral concepts
	and approaches are applied specifically to problems of plasma physics.		
02TSFA	Thermodynamics and Statistical Physics nodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatel	Z,ZK	4
	dy description from 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 used to discusses simple transport phenomena.		,
02VOAF	Waves, Optics and Atomic Physics	Z,ZK	6
-	a in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polariza		
coherence. Geor	metrical optics. Introduction to quantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Bro equation, stationary states and spectra of finite systems.	iglie waves,the Sch	nrodinger
02ZM1	Foundations of Physical Measurements 1	ZK	2
	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it of		
other branches. The	ne 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
	basic habits of work in a physics lab.		
02ZM2	Foundations of Physical Measurements 2 gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it c	KZ	4
	gned for students of physical specializations (experimental particle physics, Physical engineering, Nuclear engineering), nowever, it can be goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data	-	
	basic habits of work in a physics lab.		
04AKS	English Conversation	Z	1
	velop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication skills acquired throughout their previous studies.		- 1
	r various communication situations and will master their communication strategy. They will also practise their listening skills in order t	o better follow and	participate
iii d			
04XAM1	scussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more cor	fident speaker.	2
04XAM1 The course is design		fident speaker.	2 Framework
The course is desig	iscussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more cor English for Intermediate Students M1	afident speaker. Z Common European	Framework
The course is desig of Reference for La	English for Intermediate Students M1 gned for students who have successfully completed the full secondary school English language course at least at the A2 level of the Conguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical introduction.	fident speaker. Z Common European vocabulary and sty	Framework rle typical of
The course is design of Reference for La professional oral a	English for Intermediate Students M1 Indeed for students who have successfully completed the full secondary school English language course at least at the A2 level of the Conguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical intermediate.	fident speaker. Z Common European vocabulary and sty erest. Attention is a	Framework rie typical of also paid to
The course is design of Reference for La professional oral a 04XAM2	English for Intermediate Students M1 gned for students who have successfully completed the full secondary school English language course at least at the A2 level of the Congueges (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical into extending the knowledge of grammar issues used in EAP. English for Intermediate Students M2	offident speaker. Z Common European vocabulary and sty erest. Attention is a	Framework rele typical of also paid to
The course is design of Reference for La professional oral a 04XAM2 The AM2 course of the course of the	English for Intermediate Students M1 Indeed for students who have successfully completed the full secondary school English language course at least at the A2 level of the Conguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical intermediate.	dident speaker. Z Common European vocabulary and sty erest. Attention is a	Framework rele typical of also paid to 2 functions,
The course is design of Reference for La professional oral a 04XAM2 The AM2 course of the course of the	English for Intermediate Students M1 gned for students who have successfully completed the full secondary school English language course at least at the A2 level of the Conguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical into extending the knowledge of grammar issues used in EAP. English for Intermediate Students M2 expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more or	dident speaker. Z Common European vocabulary and sty erest. Attention is a	Framework rele typical of also paid to 2 functions,

04XAM3			
	English for Intermediate Students M3	Z	2
	s the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnic	•	
_	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		loral
04XAP1	00 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three E English for Advanced Students P1	Z Z	2
	gned for students who have successfully completed the full secondary school English language course (at least the B1 level of the C		
	Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundament		
	e typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, grant and written communication stated to the undergraduate of life and product the developes skille for free professional writing (w		
covers professional	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.	Titing a C v, letter or appli	ication,
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 brain		- 1
	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 the student´s subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writi	,	
	paragraph structure, linking, cohesion and coherence in texts.	3 3	
04XAP3	English for Advanced Students P3	Z	2
	pased on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It in	•	
	lls and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal lang		
aloo proparing a	communication.	aago boar ar orar ana wi	
04XAPZK	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 (100 min) and oral (30 min) and includes also oral presentation of a topic from	the student's field of stu	
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 si	∠ tudent´s vocabulary for v	2 various
	social situations.	tudom o rocabaia, y ioi i	
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
The course develo	os the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and readir	ng skills and trains the st	tudent
047/05/04/0	in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.	7	
04XCESM3 The last course r	Czech for Foreigners - Intermediate 3 evises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especia		2 and
	lexicology and on developing the student's writing skills.	,	
04XCESMZK	Czech for Intermediate Students Examination	ZK	4
The course conter	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	SM1,2,3 courses and car	n only
04XCESP1	be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. 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		
	on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of sciences.		
basics of function	al style of engineering and professional communication, both in spoken and written form. The topics include University Studies and S	Student Life. Written pra	ctice
04VCESD2	includes communication with teachers and faculty administrators.	7	2
04XCESP2 This course extend	Czech for Foreigners - Advanced 2 sthe student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and	Z	2
	emphasis on individual work.	specialist texts placing of	ureater i
		specialist texts placing (greater
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
	s the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation,	Z	2
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information and to solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, systemizes and expands language skills gained in previous study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work based on these texts. French for Intermediate Students M2 2 Course FM2 builds on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science texts, features typical for technical and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science and technology, French scientists, artists and architects. Description of an object, device, shapes, dimensions, material. French for Intermediate Students M3 The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and infinitive clauses, participle structures, compound tenses). Text summary. -Students prepare a written paper which will be delivered in form of an oral presentation in-class. The paper is linked to the field of students' future specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work compiled from French articles and one's own knowledge/experience. -Longer monologues on topics /situations set for the examination are prepared. Text structure, cohesion and coherence. French for Intermediate Students Examination 04XFMZK 7K 4 The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination consists of a written and oral part and is organized according to Examination Instructions, a document available on the web. 04XFP1 French for Advanced Students P1 2 FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general and technical information and to solve problems. FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repeated and expanded: subjonctif, passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics of specialization: mathematics, internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation. 04XFP2 French for Advanced Students P2 2 With the link to P1 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on given topics. Features typical of technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 04XFP3 7 2 The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering environment. Special skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covers a technical /applied science topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. 04XFPZK ZK French for Advanced Students Examination The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized according to Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. 04XFZ1 French for Beginners Z1 2 French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in socializing and in professional life. The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at elementary level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners (Francouzština pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal information, asking and giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grammar. 04XF72 French for Beginners Z2 The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook: Pravda - Pravdová: French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagreement, apology, thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Specific topics covered: How does the machine work? A few expressions concerning the study. Name of University and Faculty. 04XFZ3 7 2 French for Beginners Z3 The course builts upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravdová: French for Beginners. Topics, functions and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for information and loud as part of pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. 04XFZ4 French for Beginners Z4 Ζ 2 The course builds up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The contents is roughly covered with lessons 19 - 23 of the textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lecture notes French for Engineering Students of FJFI. The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopping, weather, university in our country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet. French for Beginners Z5 All four skills acquired in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They present it orally in the class. The general contents is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. Topics: on physics from lecture notes, success of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate clauses, typical conjunctions, subjunctive clauses, gerund, passive. 04XFZZK French for Beginners Examination 7K 3 The content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is ruled by the document Instruction for examination. Its content covers the levels FZ1 - FZ5. 04XNM1 German for Intermediate Students M1 2 The objective of the course is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and structures (e.g. the passive) and word formation processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Republic and Germany, current environmental issues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists, and the fundamentals of IT terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability. 04XNM2 German for Intermediate Students M2 The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses).

04XNM3 German for Intermediate Students M3 The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses). 04XNMZK German for Intermediate Students Examination The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. More detailed information is to be obtained from the teacher. German for Advanced Students P1 This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the beginning of the course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It revises and develops more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical everyday communication, i.e., telephoning. 04XNP2 German for Advanced Students P2 The course develops the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending their general and subtechnical vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and practising formal communication. both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). German for Advanced Students P3 The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variety of less common situations (traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocabulary range in fields such as nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By means of a presentation, students are trained to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The course also includes translation practice to and from German. 04XNPZK German for Advanced Students Examination The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed information is to be obtained from the teacher. 04XRM1 Russian for Intermediate Students M1 The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (both printed and handwritten), basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking the way and giving directions), they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement level of the RZ2 course. The contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable. 04XRM2 Russian for Intermediate Students M2 2 The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable. 04XRM3 Russian for Intermediate Students M3 7 2 The course develops the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, however, for half of the time allotted in the timetable. 04XRMZK Russian for Intermediate Students Examination ZK The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RM1 - RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher. Russian for Advanced Students P1 7 2 The entrance requirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, practicing more difficult grammar structures, understanding the fundamentals of technical language and training writing skills. 04XRP2 Russian for Advanced Students P2 Ζ 2 The course is based on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, verb aspects, specific syntactic structures). Stress is put on independent oral and written communication. 04XRP3 Russian for Advanced Students P3 2 The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing, translation). The RP1 - RP3 courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The courses develop and expand these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and written interpretation). Students develop their subtechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accurately and with confidence on technical topics. 04XRPZK Russian for Advanced Students Examination The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RP1 - RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions by the teacher. Russian for Beginners Z1 The course represents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian. Thus it begins with mastering the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking). Students will be able to read a short text with marked stress, understand its contents and summarize it. 04XR72 Russian for Beginners Z2 The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtechnical texts. Students will be able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also develop their vocabulary and master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing. 04XRZ3 Russian for Beginners Z3 The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training various forms of reading skills and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be able to respond so as to be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. 04XRZ4 Russian for Beginners Z4 The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a certain percentage of unfamiliar words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs, differences in verb patterns from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), and practice oral and written

communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g., Siberia), learn how to fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. 04XR75 Russian for Beginners Z5 7 2 The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding, extracting and summarizing information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication skills are trained on everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication (verbal adjectives, participles, passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite request, etc.) 04XRZZK Russian for Beginners Examination The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RZ1 - RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions by the teacher. 04XSM1 Spanish for Intermediate Students M1 The course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester course develops standard vocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts or listening to them. 04XSM2 Spanish for Intermediate Students M3 2 The course develops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific purposes in order to be able to work with specialized texts on the Internet. 04XSM3 7 2 Spanish for Intermediate Students M3 The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic style. They will be competent enough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short articles and summaries. The final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination. 04XSMZK Spanish for Intermediate Students Examination 7K 4 The course content is the examination as given by the study plan. XSMZK examination consists of two parts: written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course XSM3. Oral examination follows the written part. Spanish for Advanced Students P1 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 Spanish for Advanced Students P2 Ζ 2 Course XSP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax and focuses on independent written communication. 04XSP3 Spanish for Advanced Students P3 Ζ 2 Course XSP3 is the final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focused on written communication based on what students will need in their career. 04XSPZK Spanish for Advanced Students Examination The course content is the examination as given by the study plan. Examination XSPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is having passed the written test. Examination content is based on syllabi of courses XSP1, XSP2, and XSP3 or on an individual study plan of the student. 04XSZ1 Spanish for Beginners Z1 2 Course XSZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental grammar structures and will be able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish and will develop it. Spanish for Beginners Students Z2 7 Course XSZ2 is based on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis will be chosen so as to enable them to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others such as the Czech Republic. Realia of Spanish-speaking countries are also included. Spanish for Beginners Z3 This course builds upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes an introduction to the realia and cultural context of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including the pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. Students are prepared for this through targeted reading and listening activities. 04XSZ4 Spanish for Beginners Z4 2 The course is based on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish speaking countries, mainly of Spain. It pays attention to further grammar topics (perifrasis verbales, future imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive). to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them. 04XSZ5 Spanish for Beginners Z5 2 The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for specific purposes. In its final part, the general Spanish course based on the course book will end with a written and oral examination. 04XSZZK Spanish for Beginners Examination 3 7K The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination only if he/she has passed the written examination test. 11ANFL Linear Circuit Analysis 1 The course is the introduction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especially oriented to the understanding of the computer methods of analysis. The second part gives a short list of most commonly used circuits in experimental equipment. 11APLG Applications of Group Theory in Solid State Physics ZK 2 Consideration of atomic system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy states there are and what interactions and transitions between them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the information on the object that symmetry alone will provide. The application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field environment, normal modes of molecular vibrations, and selection rules for optical absorption transitions. 11BPFI1 Ζ Bachelor Thesis 1 5 On the basis of the assignment and under the supervision of the supervisor, the student individually works on the assigned topic for 2 semesters. 11BPFI2 10 **Bachelor Thesis 2** On the basis of the assignment and under the supervision of the supervisor, the student individually works on the assigned topic for 2 semesters.

11BSEM	Bachelor Seminar	Z	1
In the first part of th	e seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requ	irements for bache	elors degree
projects at the fact	ulty. The second part is designed as a practical training for the defence of the bachelors degree project. The students give oral presen	ntations of the curre	ent state of
the research results	achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibi	lities of improving t	the students
	performance.		
11CFPL	Introduction into the Chemistry and Physics of Polymer Materials	ZK	2
	polymer materials, polymer characterization and processing. Properties of polymer matrix on macro-, micro-, nanometric, and molecular		solution of
-	relation synthesis - properties - processing, practical examples of solutions of chosen problems. The choice of polymers for physical	al studies.	
11DAPL	Diffraction Analysis of Solid State	ZK	2
115/112	The purpose of this course is to introduce the undergraduate students the experimental methods for studying real structure of s		-
11GNU	GNU Programming	KZ	4
	rse is to introduce students into the Linux system environment and therein used GNU utilities and programming tools to such a level,		
	ting scripts and programs for processing acquired or simulated data for their experiments in physics with the use of the facultys Hyperio	•	
illese tools for creat	skills could of course be applied to any Linux system).	in cluster (nowever	ine learned
11GPL	GNU Plot	7	2
	l	 he and imperse from	
	se is to introduce the Gnuplot program to students and teach them to use this flexible, universal and free tool to produce various grap In then be applied within other courses where they need to produce graphs and images from data (practical classes, etc.) and also la	ŭ	
11KFPL	Continuum in Solid State Physics	ZK	3
The course introd	luces students to the basics of the application of the theoretical concept of continuum to the description of the properties of solids. The	ie model is demon	strated on
	selected examples of multiferroic		
11MAPL	Solid State Physics Applications and Analytic Methods	Z,ZK	4
The subject descri	bes the electrical and magnetic properties of metals and their alloys including superconductivity. Furthermore, electrical and optical properties of metals and their alloys including superconductivity.	properties of semic	conductors,
	dielectrics and ferroelectrics and methods of their study are characterized.		
11MIK	Logical Circuits and Microprocessors	Z,ZK	4
The course is the	introduction to the digital electronics for physicists. It describes the function principles of combination circuits, simple sequential circu	uits and complex c	ircuits like
	microprocessors. The microcomputer architecture and principles of interfacing is shown.		
11SFBM	Structure and Function of Biomolecules	Z,ZK	3
Knowledge of macr	omolecular structure is crucial for the understanding of its function. The subject is focused on the introduction to building blocks of mac	cromolecules, over	all structure
	and its structure:function relationship including macromolecular complexes.		
11SFIPL	Seminar on Solid State Physics	KZ	2
1.Introduction of th	e Seminar and ?SSS? software features. 2.Module "bravais" - crystal structure and X-ray diffraction in 2D ? theory 3.Simulations of c	diffractive phenome	ena related
to following theme	s: crystal lattice versus crystal structure, primitive cell, elementary cell, lattice plane, reciprocal grid, Laue and Bragg condition, atomi	ic scattering factor	, structural
factor, extinction, pra	actical structural analysis 4.Module "laue" - Diffraction on perfect and imperfect crystals 5.Simulations: influence of structural disorder on	diffraction pattern,	atomization
and thermal osc	sillations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stanc	ding waves, normal	l modes,
polarization, energy	and momentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets, group and phase velocity, dispersion	, pulses and their p	oropagation,
localized modes, ar	nharmonicity 8."debye" module - lattice dynamics and thermal capacity ? theory 9.Simulations: Brillouine zone, dispersion relation, der	!4 41	
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	trude" module - dynamics of classical electron gas in 2D ? theory 11. Simulations: diffuse electron movement, electron drift in an exte	rnal electric field, I	Haynes and
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12NT	Nanotechnology	ZK	2
	duce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Physical		
	gies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technolog		
•	paration. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for heter cussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer		
growths will be dis	as well as soldering and encasement.	preparation will be	mentioned
12PAS	Computer Algebra Systems	Z	2
_	d introduction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is real	- 1	
•	students acquire basic skills with CAS by solving relatively simple and basic tasks from mathematics and physics.	·	
12UFN	Introduction to Photonics and Nanostructures	KZ	3
Overview of nanos	tructures and nanotechnologies; quantum technologies; quantum nanostructures; photonic structures; nanophotonics and nanoplasm	onics; optical wave	guides and
	fibers; integrated photonics; computer simulations; technological realization; student presentations		
12UNXAP	Introduction to UNIX	Z	2
•	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface		II.
	ting systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working with		
-	eter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard to	="	
X-windows. Cor	nputer networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a configuration of a	omputer. Network s	ervices:
12UVP		Z	2
	Introduction to Scientific Computing d Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with s		
r ractically oriente	and technicval computing, data analysis, data visualisation and algorithm development.	one basic tools for	Solontino
12VKT	Vacuum Technology	KZ	4
	basic concepts and relations; diffusion,flow of rarefied gases. Flow and current of gas, conductivity. Interaction of gas with solid surface		
-	olid matter; evaporation, condensation; Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and their pro		- 1
	m, Sliding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Adsorp	•	
NEG pumps, Ion	jetter pumpsVacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. Mater	ials and vacuum co	mponents
	and seals.Practical exercises.		
12ZAOP	Fundamentals of Optics	Z,ZK	2
The lecture covers	the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geome	trical optics. The ma	ain goal of
	otain, 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 various are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves in various are further elaborated during departmental masters program.	, ,,	
•	ther from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next in	-	
•	it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference presence and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a graphical		
	n. Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics limit.		
	proach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical	-	Comotinoai
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	, ,	-
	e symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe	-	
12ZFP	Principles of Plasma Physics	Z,ZK	4
Basic physics of hi	gh temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants, line	ar theory of waves	in plasmas
and propagation of	electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and parameters and parameters are self-focusing and parameters.	tric instabilities are	explained.
	comprises brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas ar	e introduced.	
12ZFS	Fundamentals of Photonic Structures	Z,ZK	2
	the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their pre	-	
	lecture discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures		
• • •	otical communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic struct		
metamateriais, i	netasurfaces, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations on s excursions to selected photonic laboratories.	selected relevant to	pics and
12ZPOP		KZ	6
	Basic Optical Laboratory ne practical laboratories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be		0
14ELM	Electron Microscopy	KZ	2
	rse the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The		
	that and electron microscopy and to various types of microscopes. An important part of the course is given to the interaction of different		
•	ulations and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and dyna		
matnematical form			on.
	and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging technique	s in atomic resoluti	2
	and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging technique General Chemistry 1	s in atomic resolution	3
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18PPY3	Programming in Python 3	Z	2
This advanced cou	rse is intended for students who have basic experience with programming in Python and using its libraries. It introduces students to ad- language and modules they are based on.	vanced concepts of	of the Pythor
18ZALG	Basics of Algorithmization	Z,ZK	4
This course is	devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of	the algorithm con	plexity.
18ZPRO	Basics of Programming	Z	4
This course is in	ntended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	nming and with th	e Python
	programming language.		
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1
TV-3	Physical education	Z	1
TV-4	Physical education	Z	1

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