Study plan

Name of study plan: Physical Engineering - Physical Engineering od Materials

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Physical Engineering

Type of study: Bachelor full-time

Required credits: 6

Elective courses credits: 174 Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses in the specialization

Minimal number of credits of the block: 0

The role of the block: PS

Code of the group: BSPFIFIM1

Name of the group: BS P_FIB FIM 1st year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 13 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)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
02ELMA	Electricity and Magnetism Iskender Yalcinkaya, Ji í Hrivnák, Goce Chadzitaskos, Josef Schmidt, Jan Vysoký Jan Vysoký Ji í Hrivnák (Gar.)	Z,ZK	6	4+2	L	PS
O1LAL	Linear Algebra 1 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		PS
01LALZ	Linear Algebra 1, exam Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.) Dvo áková (Gar.)	ZK	2	0P+0C		PS
01LAL2	Linear Algebra 2 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		PS
D1MAN	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
D2MECH	Mechanics David Be Antonín Hoskovec David Be (Gar.)	Z	4	4+2	Z	PS
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, Stanislav Skoupý, David Be, Filip Petrásek, Antonín Hoskovec, Petr Novotný Antonín Hoskovec David Be (Gar.)	ZK	2	-	Z	PS
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	PS
O2TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	PS
17UING	Introduction to Engineering Jan Frýbort, Petr Haušild, Radek Mušálek Jan Frýbort (Gar.)	KZ	3	2P+1C	Z	PS

18ZPRO	Basics of Programming Maksym Dreval, 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
haracteristics	of the courses of this group of Study Plan: Code=BSPFIFIM1 Name=	BS P_FIB F	IM 1st ye	ar		
D2ELMA	Electricity and Magnetism			Z	Z.ZK	6
Electric charge, Coul	lomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectric	cs. Electric curr	ent and circu	ıits, conducti	vity. Basics	of the relativity
	nic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits.					
)1LAL	Linear Algebra 1				Z	2
. Vector space. 2. Li	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
heorem.			_			
1LALZ	Linear Algebra 1, exam				ZK	2
1LAL2	Linear Algebra 2			Z	Z,ZK	4
	atrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector,	, diagonalizatio	n). 4. Hermiti		· 1	5. Scalar
roduct and orthogo	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. Methods	s of calculation
f determinants. 3. C	alculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form.	5. Scalar produ	ct and orthog	gonality. Calc	ulation of o	rthogonal
omplements. 6. Geo	ometry exercises and examples. 7. Adjoint operators.					
1MAN	Calculus 1				Z	4
asic calculus (real a	analysis, functions of one real variable, differential calculus).			'		
1MANZ	Calculus 1, exam				ZK	4
)1MANZ)1MAN2	Calculus 1, exam Calculus 2				ZK Z,ZK	4 8
1MAN2	,	e, operations o	n series, abs	Z	Z,ZK	8
01MAN2 . Continuation of dif	Calculus 2			zolute and co	Z,ZK onditional co	8 onvergence 3
01MAN2 . Continuation of dif Real and complex po	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence			zolute and co	Z,ZK onditional co	8 onvergence 3
01MAN2 . Continuation of dif Real and complex po Riemann definition),	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation			zolute and co	Z,ZK onditional co	8 onvergence 3
11MAN2 . Continuation of differal and complex portion (Riemann definition), 12MECH	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over 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	zsolute and co	Z,ZK onditional coprimitives, of	8 onvergence 3 definite integr
01MAN2 . Continuation of dif Real and complex po Riemann definition), 02MECH ntroduction to physic	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence of 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 covor of integrals:	Z,ZK primitives, or Z equations of	8 onvergence 3 definite integr 4 of motion for
D1MAN2 . Continuation of different policy poli	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence of the cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics Calculus 2	n of infinite seri	es. 4. Theory	solute and covor of integrals:	Z,ZK primitives, or Z equations of	8 onvergence 3 definite integr 4 of motion for
ITMAN2 Continuation of diffuel and complex policies and complex policies and definition), in the continuation of the continua	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence of the cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics Calculus 2	n of infinite seri	es. 4. Theory	solute and covor of integrals:	Z,ZK primitives, or Z equations of	8 onvergence 3. definite integr 4 of motion for
21MAN2 . Continuation of different per continuation of different p	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence of the cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics Cos., physical quantities and units. Kinematics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system.	n of infinite seri	es. 4. Theory	solute and covor of integrals:	Z,ZK onditional coprimitives, of Z equations of icle collision	8 provergence 3. definite integr 4 of motion for ns. Mechanics
11MAN2 . Continuation of diffuel and complex poor Riemann definition), 12MECH attroduction to physic ne-dimensional more farigid body, rotation and the content of the sufficient of the sufficient and the	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics cs., physical quantities and units. Kinematics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination ubject is the examination according to the plan of studies.	n of infinite seri	es. 4. Theory	solute and covor of integrals:	Z,ZK onditional coprimitives, of Z equations of icle collision	8 provergence 3 definite integr 4 of motion for ns. Mechanics
11MAN2 . Continuation of difeeal and complex pooling in the content of the content of the content of the stock of the content of the content of the stock of the content	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics cs., physical quantities and units. Kinematics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination ubject is the examination according to the plan of studies. Preparatory Week	n of infinite seri	es. 4. Theory	Z solute and co y of integrals: ticle, solving oblems, part	Z,ZK onditional co primitives, of Z equations of icle collision ZK	8 onvergence 3 definite integral 4 of motion for ns. Mechanics
211MAN2 . Continuation of different process of the seal and complex position and complex position and complex position are definition). 22MECH of a rigid body, rotation are different process of a rigid body, rotation are defined by the content of the support part part part part process of the support part part part part part part part pa	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics cs., physical quantities and units. Kinematics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination ubject is the examination according to the plan of studies. Preparatory Week Heat and Molecular Physics	n of infinite seri	es. 4. Theory	Z solute and co y of integrals: ticle, solving oblems, part	Z,ZK primitives, or z equations coicle collision ZK Z,ZK	8 onvergence 3 definite integral 4 of motion for ns. Mechanics 2
DIMAN2 . Continuation of different and complex por Riemann definition), DEMECH and the definition of a rigid body, rotation of the content of the support of	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics cs., physical quantities and units. Kinematics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system. Mechanics - Examination ubject is the examination according to the plan of studies. Preparatory Week	n of infinite seri	es. 4. Theory nics of a part two-body pr	Z solute and co y of integrals: ticle, solving oblems, part	Z,ZK primitives, or z equations or icle collision ZK Z,ZK inciple, idea	8 onvergence 3 definite integr 4 of motion for ns. Mechanics 2 4 al and real gas
211MAN2 Continuation of different process of the seal and complex process of the seal and complex process of the seal and complex process of the seal and s	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics Mechanics Mechanics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system	n of infinite seri	es. 4. Theory nics of a part two-body pr	zsolute and co	Z,ZK primitives, or z equations or icle collision ZK Z,ZK inciple, idea	8 onvergence 3. definite integral 4 of motion for ns. Mechanics 2 4 4 all and real gas
D1MAN2 . Continuation of different process of the content of the support of the support of the content of the support of the s	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics	position. Dynanem of particles,	es. 4. Theory nics of a part two-body pr	zsolute and covor of integrals: ticle, solving oblems, part zodynamic prolocity distributions	Z,ZK primitives, or z equations or icle collision ZK Z,ZK inciple, idea kZ	8 onvergence 3 definite integral 4 of motion for ns. Mechanics 2 2 4 all and real gas ritition theorer 3
211MAN2 Continuation of different process of the seal and complex process of the seal and content of the seal opportunity in the seal of	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics Mechanics Mechanics of a particle, basic types of motion and their supertion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system	position. Dynanem of particles, netration; 1st an kinetic theory: I	es. 4. Theory nics of a part two-body pr d 2nd therm Maxwell's vel	zsolute and covor of integrals: ticle, solving oblems, part zodynamic prolocity distributed in the process of	Z,ZK primitives, or z equations or icle collision ZK Z,ZK inciple, idea kZ	8 onvergence 3 definite integral 4 of motion for ns. Mechanics 2 4 all and real gartition theorer 3
D1MAN2 . Continuation of different process of the second production to physical process of the second process	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics Mechanics	position. Dynanem of particles, netration; 1st an kinetic theory: I	es. 4. Theory nics of a part two-body pr d 2nd therm Maxwell's vel	zsolute and covor of integrals: ticle, solving oblems, part zodynamic prolocity distributed in the process of	Z,ZK primitives, or z equations or icle collision ZK Z,ZK inciple, idea kZ KZ	8 onvergence 3. definite integr 4 of motion for ns. Mechanics 2 2 4 al and real gas rition theorer 3
D1MAN2 . Continuation of different process of the seal and complex position of the seal and complex position of the seal and complex position. D2MECH introduction to physical production of a rigid body, rotation of a rigid body, rotation of the seal process of the seal production of the	Calculus 2 ferential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence over series, the Cauchy-Hadamard theorem, expansion of function into power series, summation, techniques of integration and application of integrals, Generalized Riemann integral Mechanics	position. Dynanem of particles, netration; 1st an kinetic theory: I	d 2nd therm Maxwell's vel	zsolute and covor of integrals: ticle, solving oblems, part zodynamic prolocity distribution in the control of the control o	Z,ZK primitives, or z equations or icle collision ZK Z,ZK inciple, idea attion, equipa KZ basics of m	8 onvergence 3 definite integral 4 of motion for as. Mechanics 2 2 4 all and real garrition theorer 3 ananufacturing 4

Code of the group: BSPFIFIM2

Name of the group: BS P_FIB FIM 2nd year

Requirement credits in the group:

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

Credits in the group: 0

Note on the group): Předmět 02TEF1 lze absolvova	t až po abso	lvování p	oředměti	u 02MECH	IZ.
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
14DYLS	Dynamics of Linear Systems Ji í Kunz Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	2	1P+1C	6	PS
14ELM	Electron Microscopy Miroslav Karlík Miroslav Karlík (Gar.)	KZ	2	2P+0C		PS
01ANB3	Calculus B 3 Miroslav Kolá , Milan Krbálek Milan Krbálek Miroslav Kolá (Gar.)	Z,ZK	8	4P+4C		PS
01ANB4	Calculus B 4 Ji í Mikyška, Miroslav Kolá Ji í Mikyška	Z,ZK	6	2P+4C		PS
12NME1	Numerical Methods 1 Pavel Váchal Pavel Váchal Pavel Váchal (Gar.)	Z,ZK	4	2+2	L	PS
14TEM	Engineering Mechanics Ji í Kunz Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	6	4	5	PS
02TEF1	Theoretical Physics 1 Petr Novotný Michal Jex Igor Jex (Gar.)	Z,ZK	4	2+2	Z	PS
02TSFA	Thermodynamics and Statistical Physics Igor Jex, Jaroslav Novotný Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	PS
02VOAF	Waves, Optics and Atomic Physics Josef Schmidt Jan Vysoký Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	PS

Characteristics of the courses of this group of Study Plan: Code=BSPFIFIM2 Name=BS P_FIB FIM 2nd year Dynamics of Linear Systems Z.ZK 2 Abstract: Modelling of linear mechanical systems by means of simple computational system of discrete elements. Free and/or forced vibration of mechanical systems with one or two degrees of freedom. Kinetic equations of motion - their determination and solution. Analysis of motion stability. 14FLM **Electron Microscopy** 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. 01ANB3 Calculus B 3 1. Functional sequences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional series, power series, Series Expansion, Taylor's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation of variables, homogeneous equation and exact equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coefficients and special right-hand side, Euler differential equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and non-isolated point, boundary of set, completeness of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier series, trigonometric Fourier series and their convergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total derivatives and tangent plane, Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations. 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. Z,ZK **Engineering Mechanics** Abstract: The course represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with stress and strain analysis of real structure parts (elasticity, plasticity, fracture mechanics, etc.). Principles of statics, kinematics, and dynamics and their application. 02TEF1 Theoretical Physics 1 Z,ZK 4 The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms as well as diferent 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). Thermodynamics and Statistical Physics Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy. Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena.

02VOAF Waves. Optics and Atomic Physics

Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction 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: BSPFIFIM3

Name of the group: BS P FIB FIM 3rd year

Requirement credits in the group:

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

Credits in the group: 0

Note on the group:

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

analýzy a Lineární algebry

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
14BPFI1	Bachelor Thesis 1 Ji í Kunz, Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	5	5C		PS
14BPFI2	Bachelor Thesis 2 Ji í Kunz, Ladislav Kalvoda Ladislav Kalvoda Ji í Kunz (Gar.)	Z	10	10C		PS
14EM1	Elasticity 1 Aleš Materna, Vladislav Oliva Vladislav Oliva (Gar.)	Z,ZK	5	2P+2C		PS
14FKO	Metal Physics Miroslav Karlík, Jaroslav ech Miroslav Karlík Miroslav Karlík (Gar.)	Z,ZK	6	4P+2C		PS
02KF	Quantum Physics Filip Petrásek Petr Jizba Petr Jizba (Gar.)	Z,ZK	3	2P+1C	Z	PS
01NME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	PS
14PMKOP	Practicum of finite elements methods Aleš Materna Aleš Materna Aleš Materna (Gar.)	ZK	3	0P+2C		PS
01PRST	Probability and Statistics Tomáš Hobza Tomáš Hobza (Gar.)	Z,ZK	4	3+1	Z	PS

01RMAF	Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	7	4P+2C		PS
11BSEM	Bachelor Seminar Ladislav Kalvoda, Radka Mika Havlíková Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	1	0P+2C	L	PS
11ZFPL	Basic to Solid State Physics Eva Mihóková	KZ	2	26P+0C	Z	PS
11ZFP	Basic to Solid State Physics Ladislav Kalvoda, Eva Mihóková Ladislav Kalvoda (Gar.)	ZK	3		Z	PS
14ZZKOS	Testing and processing of metals and alloys Radek Mušálek, Hynek Lauschmann Hynek Lauschmann Hynek Lauschmann (Gar.)	Z,ZK	4	2P+2C		PS

of the courses of this group of Study Plan: Code=BSPFIFIM3 Name=BS P

Student under guid	ance of his/her supervisor has been working on the given particular topic for one year.		ı
14BPFI2	Bachelor Thesis 2	Z	10
Student under guid	ance of his/her supervisor has been working on the given particular topic for one year.		'
14EM1	Elasticity 1	Z,ZK	5
	e represents an introduction for several another lectures on continuum mechanics and the strength of materials. The first part co		•
	near elasticity. The second one represents a logical descent from the continuum mechanics to the practical engineering solution of	of simple problems	s on tension,
bending, shearing a	and torsion in the cross section of bars and beams.		
14FKO	Metal Physics	Z,ZK	6
Abstract: The physi	cal background of processes encountered in production and thermo-mechanical treatment of metallic materials is described, inclu	uding solidification	, crystal defects,
theory of solid solu	tions, theory of dislocations, diffusion, hardening and softening of metals and alloys.		
02KF	Quantum Physics	Z,ZK	3
State description, v	vave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heis	senberg uncertain	ty principle,
quantization of ang	ular momentum, solution of simple systems, hydrogen atom.		
01NME2	Numerical Methods 2	KZ	2
The course is devot	ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equatic	ons. It explains me	thods converting
boundary-value pro	blems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equ	uations.	
14PMKOP	Practicum of finite elements methods	ZK	3
Use of commercial	finite element code for solving practical problems in mechanics.		•

Probability and Statistics It is a basic course of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and continuing till the Kolmogorov

definition. The notions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit theorems are stated and proved. On the basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explained.

Equations of Mathematical Physics

Bachelor Thesis 1

Z.ZK

The subject of this course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral transformations, and solution of partial differential equations (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).

11BSEM **Bachelor Seminar**

01PRST

In the first part of the seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requirements for bachelors degree projects at the faculty. The second part is designed as a practical training for the defence of the bachelors degree project. The students give oral presentations of the current state of the research results achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibilities of improving the students performance.

11ZFPL Basic to Solid State Physics

Ζ

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

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

Testing and processing of metals and alloys

Z.ZK

Tension tests, hardness, impact toughness, technological testing, fatigue testing, creep testing. Light microscopy, preparation of specimens for macro- and micro-observation. Casting, forming, welding, soldering, brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, titanium alloys, special alloys of non-ferrous metals. Technical drawing

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 6

The role of the block: PV

Code of the group: BSPFIFIMPV2

Name of the group: BS P_FIB FIM Required optional courses 2nd year

Requirement credits in the group: In this group you have to gain at least 6 credits

Requirement courses in the group:

Credits in the group: 6

Note on the group:

Studenti si povinně zapisují předměty alespoň za 6 kreditů.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
14CHMA	Materials Characterization Petr Haušild, Karel Tesa Karel Tesa Petr Haušild (Gar.)	KZ	4	2P+1C		PV
02PRA1	Experimental Laboratory 1 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	Z	PV
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	L	PV
14PMA	Practicum in Materials Miroslav Karlík, Karel Tesa Miroslav Karlík Miroslav Karlík (Gar.)	KZ	3	0P+2L		PV

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

14CHMA Materials Characterization Abstract: The subject is composed of lectures, exercises and discussion regarding the basic methods of characterization. The aim of the subject is to introduce students to the most common methods of materials characterization, their outputs and the interpretation of the obtained data. An emphasis is placed on the individual work of the students with current scientific articles in the field of materials characterization. A part of the subject is an excursion to the laboratories of the department and its collaborating institutions. After passing this subject, the student should be able to choose the adequate characterization method for a particular material and evaluate the obtained results.

02PRA1 Experimental Laboratory 1

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

02PRA2 Experimental Laboratory 2

Lecture is intended especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear Engineering). But it can be also attended by students interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with theliterature), the implementation

of the measurement (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation of results. At the same time practically extendthe knowledge gained in lectures on physics.

14PMA Practicum in Materials

Abstract: The aim of this subject is to introduce students to the basics of scientific work in the form of measurements, data analysis and writing of reports. Simple case studies of materials science are designed to show students the right way of presenting the outputs of their work. The subject is focused on correct data analysis and logical structure of the reports. After completing the subject, the student should be able to individually design, execute and evaluate experiments.

Code of the group: BSSPOLVEDY-ANGL.PR.

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
00RET	Rhetoric Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2		PV

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

00RFT Rhetoric The course is focused on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the composition of public speech

as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of the course.

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:

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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
04XAMZK	English for Intermediate Students Examination	ZK	4		Z	PV

04XAPZK	English for Advanced Students Examination Slav na Brownová, Darren Copeland Jana Ková ová	ZK	4	Z	PV
04XCESZZK	Czech for Foreigners Beginners - Examination Slav na Brownová Jana Ková ová Jana Ková ová (Gar.)	ZK	4	Z	PV
04XCESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4	Z	PV
04XCESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4	Z	PV
04XFMZK	French for Intermediate Students Examination V ra Šlechtová V ra Šlechtová (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 (Gar.)	ZK	4	Z	PV
04XRPZK	Russian for Advanced Students Examination Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4	Z	PV
04XRZZK	Russian for Beginners Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	3	L	PV
04XSMZK	Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo 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 (Gar.) Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	3	L	PV

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

04XRPZK

English for Intermediate Students Examination ΖK The course content is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts - written (100 min) and oral (20-30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English courses. English for Advanced Students Examination The course content is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to apply their knowledge obtained in the three AP courses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from the student's field of study. 04XCESZZK Czech for Foreigners Beginners - Examination 7K The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04XCESZ1,2,3 courses and can only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher. 04XCESMZK Czech for Intermediate Students Examination 7K 4 The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESM1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. Czech for Foreign Students - Advanced Examination 7K The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. 04XFMZK French for Intermediate Students Examination ZK 1 The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination consists of a written and oral part and is organized according to Examination Instructions, a document available on the web. French for Advanced Students Examination The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized according to Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. 04XF77K 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. German for Intermediate Students Examination ZK 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 Examination ΖK 04XNPZK 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. Russian for Intermediate Students Examination 04XRMZK 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.

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 Advanced Students Examination

04XRZZK	Russian for Beginners Examination	ZK	3
The course content is	the examination as given by the study plan. The course is completed by taking a written and oral examination testing the know	vledge and skills a	cquired in RZ1
- RZ5. Students are e	igible 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 is	the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the writte	en part, students w	vill have obtained
non-graded assessm	ent for course SM3.Oral examination follows the written part.		
04XSPZK	Spanish for Advanced Students Examination	ZK	4
The course content is	the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite	for admission to o	ral part is having
passed the written tes	t. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student.		
04XSZZK	Spanish for Beginners Examination	ZK	3
The course content is	the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral	examination only i	f he/she has
passed the written ex	amination test.		

Code of the group: BSPFIFIMPV1

Name of the group: BS P_FI FIM Required optional courses 1st year

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:

Studenti si povinně zapisují jeden ze dvou předmětů.

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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
02DEF1	History of Physics 1 Igor Jex Igor Jex (Gar.)	Z	2	2+0	Z	PV
14TED	Creating Electronic Documents Aleš Materna, Ji i Martin ik Aleš Materna Aleš Materna (Gar.)	Z	2	26C		PV

Characteristics of the courses of this group of Study Plan: Code=BSPFIFIMPV1 Name=BS P_FI FIM Required optional courses 1st year

Onaracter istics of	the courses of this group of olddy I fail. Code-Bol I if him VI Hame-Bol _I I I him Required	optional cou	n ses ist year
02DEF1	History of Physics 1	Z	2
Physics and its place in	the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural pl	nilosophers, Aristo	otle. Physics in
Helenistic period, Archir	ned. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galile	ວ, Huygens. The b	oirth of physics
as experimental science	e. Newton and his work.		
14TED	Creating Electronic Documents	Z	2
Basic skills for creating	and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, present	ations and entire	documents in an
office cuite			

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

The role of the block: V

Code of the group: BSPFIFIMV

Name of the group: BS P_FIB FIM Optional courses

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

Credits in the group: 0

Note on the (group:					
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	V
02DEF2	History of Physics 2 Igor Jex Igor Jex (Gar.)	Z	2	2+0	L	V
11ELEA	Instrumentation and Measurement Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	2	2	L	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	٧
04AKS	English Conversation Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
00MAM1	Essentials of High School Course 1 David B e	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

12NT	Nanotechnology Eduard Hulicius, Jan Proška 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
11SFIPL	Seminar on Solid State Physics Ladislav Kalvoda Ladislav Kalvoda (Gar.)	KZ	2	1+1		V
02SMF	Seminar of Mathematical Physics Ladislav Hlavatý (Gar.)	Z	2	0+2	Z	V
11SPLA	Structure of Solid State Petr Kolenko, Ivo Kraus Petr Kolenko (Gar.)	Z,ZK	4	2P+2C	L	V
TV-1	Physical Education	Z	1		Z	V
TV-2	Physical Education	Z	1		L	V
TV-3	Physical education	Z	1	0+2	Z	V
TV-4	Physical education	Z	1	0+2	L	V
02TEF2	Theoretical Physics 2 Filip Petrásek, Petr Novotný Josef Schmidt Petr Novotný (Gar.)	Z,ZK	4	2+2	L	V
01UP1	Introduction to Probability 1 Jan Vybíral Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	3	1P+1C		V
01UP2	Introduction to Probability 2 Milan Krbálek, Michaela Krbálková Michaela Krbálková Milan Krbálek (Gar.)	Z,ZK	3	1P+1C		V
12UNXAP	Introduction to UNIX Milan Kucha ik Milan Kucha ik (Gar.)	Z	2	1P+1C	L	V
12UVP	Introduction to Scientific Computing Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	L	V
12ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
12ZEL2	Basic Electronics 2 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	L	V
02ZM1	Foundations of Physical Measurements 1 Solangel Rojas Torres, Petr Chaloupka Petr Chaloupka (Gar.)	ZK	2	2P+0C	Z	V
02ZM2	Foundations of Physical Measurements 2 Petr Chaloupka Petr Chaloupka (Gar.)	KZ	4	0P+4L	L	V
12ZAOP	Fundamentals of Optics Ivan Richter, Pavel Kwiecien Ivan Richter Ivan Richter (Gar.)	Z,ZK	2	2+0	Z	V

Characteristics of the courses of this group of Study Plan: Code=BSPFIFIMV Name=BS P_FIB FIM Optional	courses	
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 wh	at 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 informa	ition 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 environ	ment, normal mo	des of molecular
vibrations, and selection rules for optical absorption transitions.		
02DEF2 History of Physics 2	Z	2
Development of classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	lectricity and mag	netism -
electrostatics, galvanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzman	ın. The birth of mo	odern quantum
and relativistic physics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear e	nergy, Elementary	y particles,
standard model. The concept of Nature and Universe of today.		
11ELEA Instrumentation and Measurement	Z,ZK	2
The course is the introduction to the instrumentation and measurement for physicists.		
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	d for such measur	rements, and the
analysis of measured data.		
04AKS English Conversation	Z	1
The course will develop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral commun	ication. The stude	ent will develop
their vocabulary for various communication situations and will master their communication strategy. They will also practise their listening skills in order		and participate
in discussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more confident spea	ker.	
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.		
12NT Nanotechnology	ZK	2
Lectures will introduce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Phys	ical and chemical	fundaments of
different technologies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technologies	ogies which are s	ubstantial for
nanostructure preparation. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for he		
growths will be discussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric la	yer preparation w	ill be mentioned

as well as soldering and encasement.

The root an incorrect, quantities and units used in chemistry 2. General Chemistry 2. General Chemistry 2. SZ/K 3 The subject is the continuation of the course General Chemistry 2. The main attention is paid to general principles governing chemical processes. Using various examples, the fact that the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated by examples subvet the validity of these principles are illustrated only to the principles are interested to the control of the principles are interested to the principles are interested and principles are interested to the principles are interested and principles are interested				
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SCHC General Chemistry 2	•	cepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practic	al use are illustra	ted by examples
The subjects in the continuation of the course General chemistry i. The main attention is paid to general principles governing chemical processes. Using various examples, the feat state the validate where the validates of these processes. Using various examples, the feat state the validates. **PAPS*** Computer Algebra Systems** Z Particulative control of the control of the processes of the control of the various of the various of the processes of the control of the various				
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Computer Algebra Systems		opies is not restricted only to chemical processes is documented. The significance and practical use of explained principles	are illustrated by t	examples solved
reactions previeted instructions computer signature systems (CAS); held man characteristics, ways and means of using them. Constituent part is resizzed in computer classrooms. Intentional control of the computer classrooms to the computer of the computer classrooms. Intentional part to the computer classrooms to the computer of the computer classrooms to the computer of the computer classrooms. Intentional part of the computer computer classrooms to the computer computer classrooms to the computer computer computer classrooms. In the computer classrooms to the computer classrooms to the computer classrooms. In the computer classrooms to the computer classrooms to the computer classrooms to the computer classrooms. In the computer classrooms to the computer classrooms to the computer classrooms to the computer classrooms. In the computer classrooms to the computer classrooms to the computer classrooms to the computer classrooms. In the computer classrooms to the computer classrooms to the computer classrooms to the computer classrooms. In the computer classrooms to the computer classrooms to the computer classrooms to the computer classrooms. In the computer classrooms to the computer classr		Computer Algebra Systems	7	2
subsents explain basic skills with CAS by solving relatively simple and basic tasks from mathematics and physics. IRPMTL Programming in MATLAB environments as efficient tool for computation in correlex arrays and symbolic variables, namely for linear algabos, mathematic analysis, statistics, algorithmization and geometic representation of results. ISFIPL Seminar on Solid State Physics Instructure on the Seminar and 7558 refuser features. Abdouble "bravies" - crystal structure and X-ray diffraction in 20.7 theory 3.5 mutations of diffraction phenomena related to following themse: crystal structure variables. Addouble "law" - Diffraction on perfect explains Simulations, and structural addouble" on diffraction patient, anomalia confidence structural and collections, caused crystals is "brom" recorded - dynamics of crystalline grid in 10.7 theory 7.5 imulations, planar waves, traveling and standing waves. normal modes, distriction, among and momentum travelum, inclination and inclination of productions and productions and there in a decident productions, caused crystals is "brom" recorded - dynamics of crystalline grid in 10.7 theory 7.5 imulations, planar waves, traveling and standing waves. normal modes, doctoration, are also advantaged and momentum travelum, inclinations, and interest crystals is "brom" recorded - dynamics of crystalline grid in 10.7 theory 7.5 imulations, planar waves, structure and productions, and the productions of the dynamics of crystalline grid in 10.7 theory 7.5 imulations, planar waves, structure and productions, and the productions of the dynamics of crystalline grid in 10.7 theory 7.5 imulations, planar waves, structure and productions of the crystal structure and productions and pro	-		_	_
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12ZAOP Fundamentals of Optics

The lecture covers the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geometrical optics. The main goal of the lecture is to obtain, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with respect to character of the bachelor work. Particular topics are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves in vacuum (including polarization effects), and further from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next informs on consequences in anisotropic media, it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference processes, explains elements of two-wave interference and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a graphical form, including fundamentals of grating diffraction. Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics limit. It takes notice on geometrical approach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical instruments.

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

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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
04XAM1	English for Intermediate Students M1 Jana Ková ová	Z	2	0+2	Z	V
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04XAM3	English for Intermediate Students M3 Jana Ková ová	Z	2	0+2	Z	V
04XAP1	English for Advanced Students P1 Jana Ková ová	Z	2	0+2	Z	V
04XAP2	English for Advanced Students P2 Jana Ková ová	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 Jana Ková ová	Z	2	0+2	Z	V
04XCESZ1	Czech for Foreigners - Beginners 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESZ2	Czech for Foreigners - Beginners 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESZ3	Czech for Foreigners - Beginners 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	2S	Z	V
04XCESM1	Czech for Foreigners - Intermediate 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESM2	Czech for Foreigners - Intermediate 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESM3	Czech for Foreigners - Intermediate 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP1	Czech for Foreign Students - Advanced 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP2	Czech for Foreigners - Advanced 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESP3	Czech for Foreigners - Advanced 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XFM1	French for Intermediate Students M1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFM2	French for Intermediate Students M2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFM3	French for Intermediate Students M3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP1	French for Advanced Students P1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP2	French for Advanced Students P2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFP3	French for Advanded Students P3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFZ1	French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ3	French for Beginners Z3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ4	French for Beginners Z4 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V

04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XRM1	Russian for Intermediate Students M1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRM2	Russian for Intermediate Students M2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRM3	Russian for Intermediate Students M3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP1	Russian for Advanced Students P1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP2	Russian for Advanced Students P2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRP3	Russian for Advanced Students P3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRZ1	Russian for Beginners Z1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ2	Russian for Beginners Z2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ3	Russian for Beginners Z3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ4	Russian for Beginners Z4 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ5	Russian for Beginners Z5 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XSM1	Spanish for Intermediate Students M1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSM2	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSM3	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSP1	Spanish for Advanced Students P1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSP2	Spanish for Advanced Students P2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSP3	Spanish for Advanced Students P3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSZ1	Spanish for Beginners Z1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ2	Spanish for Beginners Students Z2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ4	Spanish for Beginners Z4 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ5	Spanish for Beginners Z5 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V

Characteristics of the courses of this group of Study Plan: Code=BSPJAZYKYZAP Name=BS P jazyky zap

English for Intermediate Students M1

English for Intermediate Students M3

04XAM3

The course is designed for students who have successfully completed the full secondary school English language course at least at the A2 level of the Common European Framework

The course develops the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnical vocabulary and independent understanding of professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication and their appropriate Czech equivalents. The course also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation on a chosen topic related to the student's field.

-	English for Advanced Students P1 for students who have successfully completed the full secondary school English language course (at least the B1 level of the	=	
grammar, and style typi covers professional oral	ages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundame cal of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writing sary, revision of selected grammar topics is included.	, graph description	ns, etc). It also
04XAP2	English for Advanced Students P2	Z	2
The AP2 course is base the students' needs it c	on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen oncentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rheto	branches of sciend brical functions (e.g	ce. According to g., various types
	possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguistic	-	-
paragraph structure, lin	student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal king, cohesion and coherence in texts.	Z	2
04XAP3 The AP3 course is base	English for Advanced Students P3 d on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text.	. – .	
communication skills ar	d functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writ on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal lan	ting an abstract) a	nd, if possible,
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
	for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic an	1	
	and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communicat	-	
situations. The course of	overs roughly lessons 1-3 of eština Express (Czech Express) by L. Holá and P. Bo ilová.		
	Czech for Foreigners - Beginners 2 munication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and	Z conjugation syster	2 m and practise
	pics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.		
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
fixing correct pronuncia	elops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses o tion and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produe. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers rough	uce simple texts a	nd they practise
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2
	n correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending th		
social situations.		io diadoin o vocas	a.a.y.o.vaouo
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
	e topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and rea	ading skills and tra	ins the student
in understanding comm	on abbreviations, abbreviated words, and mathematical terms and formulas.		
04XCESM3	Czech for Foreigners - Intermediate 3	Z	2
	morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is espec	cially focused on s	tylistics and
	oping the student's writing skills.	7	
04XCESP1	Czech for Foreign Students - Advanced 1 course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common Ei	Z	2 rk of Poforonco
	evision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of		
	e of engineering and professional communication, both in spoken and written form. The topics include University Studies and		-
includes communication	with teachers and faculty administrators.		•
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
	e student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical a	and specialist texts	placing greater
emphasis on individual			
04XCESP3	Czech for Foreigners - Advanced 3	Z	2
•	e student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentatio g skills necessary for professional communication are trained.	on, and, finally, pre	esentation of the
04XFM1	French for Intermediate Students M1	Z	2
	M The objective of this three-semester course is to improve and further develop communication in the French language in bo		
	cate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tr		
information and to solve	e problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, sy	ystemizes and exp	ands language
	study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, pe		
	ture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work		
04XFM2 Course FM2 builds on F	French for Intermediate Students M2 M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science	texts, features typ	2 ical for technical
	(passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scientiates. Description of an object, device, shapes, dimensions, material.	ence and technolo	gy, French
04XFM3	French for Intermediate Students M3	Z	2
The course is focused of	n improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and ir	nfinitive clauses,
	mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cl		
	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w	•	French articles
	ge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and o		
04XFP1 EP advanced course Th	French for Advanced Students P1 Is a popiective of this three-semester course is to improve and further develop communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in both with the communication in the French language in the communication in the com	Z ritten and oral form	2 n. Students will
	e to social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general		
	The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are re		
passé composé-imparfa	ait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactions	al letters, CV, pers	onal statement,
•	dvert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Top	ics of specializatio	n: mathematics,
internet, physics, chemi	stry. Reading of technical and popular science texts, further work with these texts and interpretation.		

In Course in the course further develops language skills. Focus is put on reading popular science texts and on oral communication on given topic technical and scientific communication are stressed (passive voice, nominalization, word formation). With the link to PT communication are stressed (passive voice, nominalization, word formation). WAXFP3 French for Advanded Students P3 Z The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering 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 technic topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. ### Advanced or Strench for Beginners Z1 Z French for Beginners Z1 Z French for Beginners Z1 French for Specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate in French orally and in writing in situations of everyday life in socializing a fine course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communication or 20 at a ket ky). It is extended with situations of communication and present oral science or 20 at 2 Z Z Z Z Z Z Z Z Z	environment. Special /applied scients 2 and in professional icate at elementa or beginners formation, asking mar. 2 Pravda - Pravdougement, apology, pecific topics covered at loud as part of the property
technical and scientific communication are stressed (passive voice, nominalization, word formation). AVAFP3 French for Advanded Students P3 The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering 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 technic topic, it is a creative work complied from 3 French sources. Preparation of several set topics for oral examination. AVAFZ1 French for Beginners Z1 Z 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 i, in socializing a rithe course includes French for specific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to communicate in French orally and in writing in situations of everyday life i, in socializing a french course is includes French for specific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and text the science and scientific texts. F21 The objective is to be able to communication and interminication and science	environment. Special /applied scients 2 and in professional icate at elementa or beginners formation, asking mar. 2 Pravda - Pravdougement, apology, pecific topics covered at loud as part of the property
Prench for Advanded Students P3 The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering skills - 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 technic point is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. VAXFZ1	environment. Special /applied sciential /applied sc
The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering 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 technicopic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. 24XF21 French for Beginners Z1 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 a The course includes French for specific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to commune evel, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for French for Beginners or za šte kyl, it is extended with situations of communication and functions from the textbook sceps. I, lessons 1 - 4 introductions, personal in giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and gran dVAFZ2 French for Beginners 22 The course is linking up with F21. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook French for Beginners. Additional topics and skills are flitled in from the textbook Espaces I, lesson 1 - 5 (Introductions, invitation, welcoming, agreement - disagre transing, travelling, map of France, foot, expressions of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Si flow does the machine work? A few expressions concerning the study, Name of University and Faculty. 04XFZ3 French for Beginners Z4 The course builts upon F22. Basic linguistic knowledge and skills are developed. The co	environment. Special /applied sciential /applied sc
iskill - 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 technic policy. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. JAXFZ1 French for Beginners Z1 Z French for Beginners Z1 Z 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 a fine course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate in French orally and in writing in situations of everyday life, in socializing a fine course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communication and several science and scientific texts. FZ1 The objective is to be able to communication and several provided in the textbook of the textbook Francouzistina provided in the textbook forms of the textbook forms of the textbook with FZ1. It is extended with situations of communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook and the textbook with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook reach forms of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Spidow does the machine work? A few expressions concerning the study. Name of University and Faculty. JAXFZ3 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. Pravida - Pravidová: Franch for Beginners and specific topics in the few few plants and situations are complemented from other materials. Stress is put on oral communic	d in professional icate at elementa or beginners formation, asking mar. 2 Pravda - Pravdouement, apology, ecific topics covered to loud as part of 2 ughly covered with rench for Engineer, university in or 2 urally in the class. ysics from lecture at conjunctions, 2 chnology and socogy etc. Students
Prench for Beginners Z1 French for beginners Developed by the Selvet occurse is to be able to communicate in French orally and in writing in situations of everyday life , in socializing a The course includes French for spedific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and grant to the textbook Fravida - Pravdová. French in the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová. French in the science of the science of the science is linking up with F21. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook French for Beginners Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagrethanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Sylhow does the machine work? A few expressions concerning the study. Name of University and Faculty. 04XFZ3 French for Beginners Z3 Z The course builts upon F22. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravdová: Fri Topics, functions and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for information are pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. 04XFZ4 French for Beginners Z4 French for Beginners Z5 12 24 25 25 26 26 27 27 27 28 28 29 29 29 29 29 20 20 20 20 20	and in professional icate at elementa or beginners formation, asking mar. 2 Pravda - Pravdouement, apology, becific topics covered at loud as part of the process of the p
The course includes French for specific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to communication and reading of popular science and scientific texts. F21 The objective is to be able to communication studies french for specific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to communication studies from the text of	and in professional icate at elementa or beginners formation, asking mar. 2 Pravda - Pravdouement, apology, becific topics covered at loud as part of the process of the p
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 a The course includes French for specific / technical communication and reading of popular science and scientific texts. F21 The objective is to be able to communicate with exercise includes French for Seguinary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravad - Pravdová, French (Francouzstina pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal in giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grar 04XFZ2	icate at elementa or beginners formation, asking nmar. 2 Pravda - Pravdov ement, apology, ecific topics cove 2 ench for Beginners ad loud as part of 2 ughly covered with rench for Enginee er, university in or 2 urally in the class. ysics from lecture al conjunctions, 2 chnology and soc ogy etc. Students
level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French: (Francouzstina pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal in giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grar 04XFZ2 French for Beginners Z2 Z The course is linking up with F21. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook French for Beginners. Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagrethanking, travelling, map of France, food, expressions concerning the study. Name of University and Faculty. 04XFZ3 French for Beginners Z3 Z Z Z Z Z Z Z Z Z	or beginners formation, asking finar. 2 Pravda - Pravdouement, apology, pecific topics covered and loud as part of the period o
(Francouzština pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal in giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grant OAXFZ2 French for Beginners Z2 French for Beginners Z2 Z Z Z 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 French for Beginners. Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagre thanking, travelling, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Spellow does the machine work? A few expressions concerning the study. Name of University and Faculty. O4XFZ3	ormation, asking nmar. 2 Pravda - Pravdov ement, apology, secific topics cove 2 ench for Beginners and loud as part of 2 ughly covered with rench for Enginee er, university in our 2 erally in the class. ysics from lecture all conjunctions, 2 chnology and socogy etc. Students
OAXFZ2 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 French for Beginners. Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagrethanking, travelling, map of France, tood, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication. Sphow does the machine work? A few expressions concerning the study. Name of University and Faculty. DAYFZ3 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: Pravdo - Pravdová: Fricopics, functions and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for information are pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. DAXFZ4 French for Beginners Z4 The course builds up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The contents is reseasons 19 - 23 of the textbook French for Beginners, and is expanded with topics and functions from ther materials. Reading is developed from the lecture notes Functions and in the stream of th	Pravda - Pravdovement, apology, becific topics covered and loud as part of the process of the pr
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O4XNM1 German for Intermediate Students M1 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 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 German language of the course topics referring to higher education in both the Czech Republic and German language of the course focuses on revision of more difficult phenomena and structures 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 German language.	
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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 Germanic environmental issues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists, and the fu	2
environmental issues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists, and the fu	e.g. the passive)
	nany, current
	ndamentals of IT
terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	
04XNM3 German for Intermediate Students M3 Z	2
The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between te	chnology and soc
the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technol	
practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revision in the course systematical rev	es other gramma
phenomena important for professional discourse (participles, relative clauses).	
04XNP1 German for Advanced Students P1 Z	2
This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the course required at the	
course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It rev	
more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical eve	yday communica
i.e., telephoning.	
04XNP2 German for Advanced Students P2 Z	2
The course develops the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending their ger vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and practising for	
both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).	Titiai communicai
04XNP3 German for Advanced Students P3 Z	2
The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variety of less	1
(traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocabulary ra	
nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By means	-
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 als	•
practice to and from German.	o includes transla
04XRM1 Russian for Intermediate Students M1 Z	o includes transla
The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (both prin	o includes transla
basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking the way a	2
they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement level of the	2 ted and handwritt
contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.	2 ted and handwritt and giving directio
1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 ted and handwritt and giving directio
04XRM2 Russian for Intermediate Students M2 Z	2 ted and handwritt and giving directio
	2 ted and handwritt and giving directio RZ2 course. The
04XRM2 Russian for Intermediate Students M2 Z	2 ted and handwritt and giving directio RZ2 course. The
O4XRM2 Russian for Intermediate Students M2 The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	2 ted and handwritt and giving directio RZ2 course. The

04XRP1	Duscine for Advanced Students D1	Z	2
-	Russian for Advanced Students P1 ment for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, p	-	1
	ding the fundamentals of technical language and training writing skills.	actionly more unit	icuit graniinai
04XRP2	Russian for Advanced Students P2	Z	2
-	n RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives	_	. –
	put on independent oral and written communication.	, verb aspects, spe	come symaciie
04XRP3	Russian for Advanced Students P3	Z	2
	on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphra	_	. –
	previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations)	-	
	tudy is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and		
levelop their subtech	nical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write	accurately and w	ith confidence
echnical topics.			
04XRZ1	Russian for Beginners Z1	Z	2
The course represen	ts the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Rus	ssian. Thus it begir	ns with masteri
he Russian alphabe	(for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and spea	king). Students wi	II be able to rea
	ked stress, understand its contents and summarize it.	,	
)4XRZ2	Russian for Beginners Z2	Z	2
	r of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short s		
	using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will	I also develop thei	ir vocabulary a
	natical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.		
)4XRZ3	Russian for Beginners Z3	Z	2
	on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for tra	•	•
	roduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will l opress their opinion. Writing skills will be trained on guided writing tasks and note-taking.	be able to respond	a so as to be
)4XRZ4		Z	2
	Russian for Beginners Z4 on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with	_	1
	cation in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular ve	•	•
	; imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time).		-
=	ore specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e	-	
	ormation from the timetable, learn about Russian holidays and typical meals.	g., 0.2011a/, 10a11	
4XRZ5	Russian for Beginners Z5	Z	2
_	he student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understa	anding, extracting:	1
•	ecialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. C		
veryday topics. Stud	lying grammar is based on professional and technical texts and only includes items typically used in professional communication	on (verbal adjectiv	es, participles
assive voice). Stude	nts develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite requ	est, etc.)	
04XSM1	Spanish for Intermediate Students M1	Z	2
he course is design	ed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-sem	ester course deve	lops standard
ocabulary and pays	attention to further grammar topics (e.g., perífrasis verbales, futuro imperfecto, direct object and indirect object pronouns, neg-	ative form of the in	mperative, and
ubjunctive), to writte	n and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts	or listening to then	n.
04XSM2	Spanish for Intermediate Students M3	Z	2
he course develops	the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish fo	r specific purpose	s in order to be
ble to work with spe	cialized texts on the Internet.		
04XSM3	Spanish for Intermediate Students M3	Z	2
	e supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acadesis and acquainted with the peculiarities of acadesis acquainted with the peculiarities of acadesis and acquainted with the peculiarities of acadesis acquainted with the peculiarities acquainted with the p		
•	ternet in Spanish and search for information of their specialization or field of interest. Students will use the information to write	short articles and	summaries. T
	amme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.		
)4XSP1	Spanish for Advanced Students P1	Z	2
	on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communica	tion. Course prere	quisites: level
of CEFR.			
)4XSP2	Spanish for Advanced Students P2	Z	2
	cond part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and s	yntax and focuses	on independe
ritten communicatio			
14XSP3	Spanish for Advanced Students P3	Z	2
	al part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is	rocused on writter	n communicat
	nts will need in their career.		
)4XSZ1	Spanish for Beginners Z1	Z	2
	st stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundants at an elementary level on topics of everyday life. They will acquire and extend fundamental vecabulary of general Spanish	=	
	ate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish		
14XSZ2	Spanish for Beginners Students Z2 on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and	Z	2
	hort adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and countries are continuous.		
	eaking countries are also included.	Allers such as the	Ozcon Repub
4XSZ3	Spanish for Beginners Z3	Z	2
	Spanish for Degitiners 2.3 on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of	_	
	ys attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperati		
	given general topic, for which the student is trained by reading texts or listening to them.	/	and oral
04XSZ4	Spanish for Beginners Z4	Z	2
	on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Span	1	1
	on to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of		=
	mmunication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.		,
04XSZ5	Spanish for Beginners Z5	Z	2
14A3Z3			
	e supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanis	sh for specific pure	ooses. In its fin

List of courses of this pass:

Code	Name of the course	Completion	Credits
00MAM1	Essentials of High School Course 1 Students are introduced to mathematical concepts and methods used in the introductory physics course.	Z	1
00MAM2	Essentials of High School Math Course 2 Review of basics of high school mathematics.	Z	1
00PT	Preparatory Week	Z	2
00RET	Rhetoric	7	1
	ised on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the	_	olic speech
as well as to its	nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an	integral part of the	e course.
01ANB3	Calculus B 3	Z,ZK	8
	quences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional	•	
equation and exact side, Euler different	r's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separatior equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coetial equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and so f space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fouri	efficients and special of the specia	al right-hand it, boundary
	onvergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total or Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equation	derivatives and tan	
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] l	-	
	kartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konsti unkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgu derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.		
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 theorem.	inear mappings. 7.	Frobenius
01LAL2	Linear Algebra 2	Z,ZK	4
	se matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian an		
١.	onality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse matr 3. Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonali		
or determinants.	complements. 6. Geometry exercises and examples. 7. Adjoint operators.	ly. Calculation of of	triogoriai
01LALZ	Linear Algebra 1, exam	ZK	2
01MAN	Calculus 1	Z	4
	Basic calculus (real analysis, functions of one real variable, differential calculus).	1	l
01MAN2	Calculus 2	Z,ZK	8
	differential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence, operations on series, absolute a		
	ower series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integ (Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral		inite integral
01MANZ	Calculus 1, exam	ZK	4
01NME2	Numerical Methods 2	KZ	2
	ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations.	•	s converting
	lary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial diffe Probability and Statistics	Z,ZK	4
01PRST	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and		4 Colmogorov
	ons as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the	=	-
On the	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testi	ng are explained.	•
01RMAF	Equations of Mathematical Physics	Z,ZK	7
The subject of this	course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral to	ransformations, and	d solution of
041104	partial differential equations (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).	7 71/	
01UP1	Introduction to Probability 1	Z,ZK	3
	rith finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and g bility, Bayes theorem, medical diagnosis, Simpsons paradox 5.Random variable with discrete state space, its distribution and mean	· -	-
	calculation of mean value 7.Probabilistic method in graph theory 8.Random algorithms, Morris algorithm and its variants		
01UP2	Introduction to Probability 2	Z,ZK	3
1. One-dimensiona	l continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction o	f probability and co	nnection to
measure theory. 4.	Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics. 6	. Elementary metho	ods for point
000554	estimations. 7. Generating pseudorandom numbers from the selected distribution.		
02DEF1	History of Physics 1 ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo	Z	Physics in
	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, l as experimental science. Newton and his work.	-	-
02DEF2	History of Physics 2	Z	2
	f classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	1	l
alastrostation	vanione electrody various and electromagnetics. Forestand vaniell Thermodynamics and its laws, statistical physics. Poltzmann		

and relativistic physics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. T standard model. The concept of Nature and Universe of today.	he way to nuclear energy, Elementary particles,
02ELMA Electricity and Magnetism	Z,ZK 6
Electric charge, Coulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric curre	
theory. Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Elec	-
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.	The state of the s
analysis of measured data.	
02KF Quantum Physics	Z,ZK 3
State description, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödi	nger equation, Heisenberg uncertainty principle,
quantization of angular momentum, solution of simple systems, hydrogen atom.	
02MECH Mechanics	Z 4
Introduction to physics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dyna	
one-dimensional motion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles,	two-body problems, particle collisions. Mechanics
of a rigid body, rotation.	71/ 0
02MECHZ Mechanics - Examination The content of the subject is the examination according to the plan of studies.	ZK 2
	KZ 6
02PRA1 Experimental Laboratory 1 Lecture is intended especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Englishment)	l l
attended by students interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (i	S
of the measurement (acquire of different experimental procedures and routines), willteach writing the records of measurement, pro-	=
practically extendthe knowledge gained in lectures on physics.	
02PRA2 Experimental Laboratory 2	KZ 6
Lecture is intended especially for students who intend to study some of the physical specializations of FNSPE(branch Physical English	gineering, Nuclear Engineering). But it can be also
$attended \ by \ students \ interested \ in \ the \ other specializations. \ In \ Experimental \ laboratory \ students \ learn \ how \ to \ prepare \ for \ experiments \ (in \ experimental) \ experimental \ laboratory \ experimental) \ experimental \ experimen$	ncluding work with theliterature), the implementation
of the measurement (acquire of different experimental procedures and routines), willteach writing the records of measurement, pro-	cessing and evaluation of results. At the same time
practically extendthe knowledge gained in lectures on physics.	
02SMF Seminar of Mathematical Physics	Z 2
The purpose of the seminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of	
concerning their scientific activities that could become the topics of the student?s bachelor these	-
02TEF1 Theoretical Physics 1 The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hai	Z,ZK 4
to description of dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated to the second of the	* *
problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential at	
the first part of the course of classical theoretical physics (02TEF1, 02TEF2).	,
	Z,ZK 4
	The state of the s
02TEF2 Theoretical Physics 2	ivistic mechanics and classical field theory in the
O2TEF2 Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation.	ivistic mechanics and classical field theory in the ectric media, electromagnetic radiation in the dipole
Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation. O2TER Heat and Molecular Physics	ivistic mechanics and classical field theory in the ectric media, electromagnetic radiation in the dipole Z,ZK 4
Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation. O2TER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and	ivistic mechanics and classical field theory in the ectric media, electromagnetic radiation in the dipole
Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation. O2TER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st an entropy; non-chemical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: N	ivistic mechanics and classical field theory in the ectric media, electromagnetic radiation in the dipole
Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation. O2TER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st an entropy; non-chemical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: No O2TSFA Thermodynamics and Statistical Physics	ivistic mechanics and classical field theory in the extric media, electromagnetic radiation in the dipole Z,ZK 4 d 2nd thermodynamic principle, ideal and real gas, flaxwell's velocity distribution, equipartition theorem.
Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation. O2TER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st an entropy; non-chemical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: No O2TSFA Thermodynamics and Statistical Physics Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium,	ivistic mechanics and classical field theory in the extric media, electromagnetic radiation in the dipole
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Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relat Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in diele approximation. O2TER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st an entropy; non-chemical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Noundation of thermodynamics and statistical physics Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transfer.	ivistic mechanics and classical field theory in the extric media, electromagnetic radiation in the dipole
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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 followed product the 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 appir	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 prac	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
The course develop	s the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, a student's project. Writing skills necessary for professional communication are trained.	Z and, finally, presentation	2 n of the
The course develop 04XCESPZK	s the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, a student's project. Writing skills necessary for professional communication are trained. Czech for Foreign Students - Advanced Examination	Z and, finally, presentation	2 n of the
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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. 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. 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 4 7K The course content is the examination as given by the study plan. SMZK examination consists of two parts - written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course SM3. Oral examination follows the written part. Spanish for Advanced Students P1 Course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication. Course prerequisites: level B2 Spanish for Advanced Students P2 Ζ 2 Course SP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax and focuses on independent written communication. 04XSP3 Spanish for Advanced Students P3 Ζ 2 Course SP3 is the final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focused on written communication based on what students will need in their career. 04XSPZK Spanish for Advanced Students Examination 4 The course content is the examination as given by the study plan. Examination SPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is having passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student. 04XSZ1 Spanish for Beginners Z1 2 Course SZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and 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. 04XS72 Spanish for Beginners Students Z2 Course SZ2 is based on course SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis will be chosen so as to 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 The course is based on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the Spanish-speaking countries, mainly of Spain. It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative). It includes written and oral communication on a given general topic, for which the student is trained by reading texts or listening to them. 04XS74 Spanish for Beginners Z4 7 2 The course is based on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish speaking countries, mainly of Spain. It pays attention to further grammar topics (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 general or subtechnical topic, for which the student is trained by reading texts or listening to them. 04XSZ5 2 Spanish for Beginners Z5 The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for specific purposes. In its final part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination. Spanish for Beginners Examination 3 The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination only if he/she has passed the written examination test. 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. 11BSEM **Bachelor Seminar** In the first part of the seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requirements for bachelors degree projects at the faculty. The second part is designed as a practical training for the defence of the bachelors degree project. The students give oral presentations of the current state of the research results achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibilities of improving the students performance. 11ELEA Z,ZK 2 Instrumentation and Measurement The course is the introduction to the instrumentation and measurement for physicists.

11SFIPL			
IIOIIFL	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 a	diffractive phenom	ena related
to following theme	is: crystal lattice versus crystal structure, primitive cell, elementary cell, lattice plane, reciprocal grid, Laue and Bragg condition, atom	ic scattering factor	r, 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	illations, quasi crystals 6."born" module - dynamics of crystalline grid in 1D ? theory 7.Simulations: planar waves, traveling and stand	ding waves, norma	I modes,
polarization, energy	and momentum transport, infinite chain, chain of finite lenght, boundary conditions, wave packets, group and phase velocity, dispersion	n, pulses and their	propagation,
localized modes, ar	harmonicity 8."debye" module - lattice dynamics and thermal capacity ? theory 9.Simulations: Brillouine zone, dispersion relation, de	nsity of states, the	rmal energy,
heat capacity 10."d	lrude" module - dynamics of classical electron gas in 2D ? theory 11.Simulations: diffuse electron movement, electron drift in an exte	rnal electric field,	Haynes and
Shockley experimen	nt, electron mobility, electron motion in magnetic field, cyclotron frequency, Hall experiment, magnetorezistence 12.Assignment, elabo	oration and preser	tation of the
	seminar work.		
11SPLA	Structure of Solid State	Z,ZK	4
Crystallograph	ny has an important role in the modern sciences because of its interdisciplinary nature.The aim of this lecture is to lay the basis of st	ldy of solid state p	hysics.
11ZFP	Basic to Solid State Physics	ZK	3
—	amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding		_
· · · · · · · · · · · · · · · · · · ·	s of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic	=	
	periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons in		
-	plained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s		
onorgy bands ox	interpret a broad phenomenological basis of physical properties of crystalline solids	yotomatioally intro	adoo and
11ZFPL	Basic to Solid State Physics	KZ	2
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	amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding s of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basi		
	periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons in		
energy bands ex	plained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to s	systematically intro	duce and
	interpret a broad phenomenological basis of physical properties of crystalline solids		
12NME1	Numerical Methods 1	Z,ZK	4
· ·	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Me		=
important for physi	cists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computat	ional environment	MATLAB is
	used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.		
12NT	Nanotechnology	ZK	2
Lectures will introd	uce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Physica	l and chemical fur	daments of
different technolo	gies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technolog	jies which are sub	stantial for
nanostructure prep	paration. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for heter	rostructure and na	nostructure
growths will be disc	cussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer	preparation will be	e mentioned
	as well as soldering and encasement.		
12PAS	Computer Algebra Systems	Z	2
Practically oriented	d introduction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is real	ı ized in computer (lassrooms:
,	students acquire basic skills with CAS by solving relatively simple and basic tasks from mathematics and physics.	·	
12UNXAP	Introduction to UNIX	Z	2
	introduction to CIVIX		
	nerating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfa-		1
•	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfa-	ce. Hardware and	software.
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14ELM	Electron Microscopy	KZ	2
	urse the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The		
•	ght 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	•	
	, and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging technique		
14EM1	Elasticity 1	Z,ZK	5
	rse represents an introduction for several another lectures on continuum mechanics and the strength of materials. The first part contains		-
smail strains and	I linear elasticity. The second one represents a logical descent from the continuum mechanics to the practical engineering solution of	simple problems	on tension,
4.451/0	bending, shearing and torsion in the cross section of bars and beams.	7.71/	
14FKO	Metal Physics	Z,ZK	6
Abstract: The phys	ical background of processes encountered in production and thermo-mechanical treatment of metallic materials is described, including theory of solid solutions, theory of dislocations, diffusion, hardening and softening of metals and alloys.	g solidification, cl	rystal defects,
14PMA	Practicum in Materials	KZ	3
Abstract: The air	m of this subject is to introduce students to the basics of scientific work in the form of measurements, data analysis and writing of rep	orts. Simple case	e studies of
materials science a	are designed to show students the right way of presenting the outputs of their work. The subject is focused on correct data analysis and	logical structure	of the reports
	After completing the subject, the student should be able to individually design, execute and evaluate experiments.		
14PMKOP	Practicum of finite elements methods	ZK	3
	Use of commercial finite element code for solving practical problems in mechanics.		
14TED	Creating Electronic Documents	Z	2
Basic skills for crea	ating and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentatio	ns and entire do	cuments in ar
	office suite.		
14TEM	Engineering Mechanics	Z,ZK	6
Abstract: The cour	rse represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with stress and strain a	analysis of real st	tructure parts
	(elasticity, plasticity, fracture mechanics, etc.). Principles of statics, kinematics, and dynamics and their application.		
14ZZKOS	Testing and processing of metals and alloys	Z,ZK	4
Tension tests, hard	ness, impact toughness, technological testing, fatigue testing, creep testing. Light microscopy, preparation of specimens for macro- a	nd micro-observa	ation. Casting,
forming, welding, s	oldering, brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, titanium alloys, special alloys of non-fer	rous metals. Tech	nnical drawing
	and CAD.		
15CH1	General Chemistry 1	Z	3
The most importan	nt concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical u	ise are illustrated	by examples
	solved in exercises.		
15CH2	General Chemistry 2	Z,ZK	3
The subject is the	continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using	various examples	s, the fact tha
the validity of these	e principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are	illustrated by exa	amples solved
	in exercises.		
17UING	Introduction to Engineering	KZ	3
•	des introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and beha		anufacturing
	and production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be	e included.	
18PMTL	Programming in MATLAB	KZ	4
Introducing Matlat	o environment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic analy	sis, statistics, alg	orithmization
	and geometric representation of results.		
18ZPRO	Basics of Programming	Z	4
This course is i	intended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	nming and with t	he 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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