Study plan

Name of study plan: Physical Engineering - Laser Technology and Photonics

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Physical Engineering

Type of study: Bachelor full-time

Required credits: 0

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

Note on the plan:

Name of the block: Compulsory courses in the specialization

Minimal number of credits of the block: 0

The role of the block: PS

Code of the group: BSPFILTFAJ1

Name of the group: BS P_FIBA LTF 1st year

Requirement credits in the group: In this group you have to gain at least credits (at most 0) 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:

Note on the g	Name of the course / Name of the group of courses					
Code	(in case of groups of courses the list of codes of their members)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
02YDEF1	History of Physics 1 Igor Jex Martin Štefa ák Igor Jex (Gar.)	Z	2	2+0	Z	PS
02YELMA	Electricity and Magnetism Iskender Yalcinkaya, Goce Chadzitaskos Goce Chadzitaskos Goce Chadzitaskos (Gar.)	Z,ZK	6	4+2	L	PS
01YLAL	Linear Algebra 1 Lubomíra Dvo áková, Petr Ambrož Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		PS
01YLALZ	Linear Algebra 1, exam Lubomíra Dvo áková, Petr Ambrož Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	0P+0C		PS
01YLAL2	Linear Algebra 2 Lubomíra Dvo áková, Petr Ambrož Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		PS
01YMAN	Calculus 1 Miroslav Kolá Miroslav Kolá (Gar.)	Z	4	4+4		PS
01YMANZ	Calculus 1, exam Miroslav Kolá Miroslav Kolá Miroslav Kolá (Gar.)	ZK	4	0P+0C		PS
01YMAN2	Calculus 2 Miroslav Kolá Miroslav Kolá (Gar.)	Z,ZK	8	4P+4C		PS
02YMECH	Mechanics Iskender Yalcinkaya, David B e Martin Štefa ák David B e (Gar.)	Z	4	4+2	Z	PS
02YMECHZ	Mechanics - Examination Iskender Yalcinkaya, David B e Martin Štefa ák David B e (Gar.)	ZK	2	-	Z	PS
00YPT	Orientation Week Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	PS
02YTER	Heat and Molecular Physics Filip Petrásek Martin Štefa ák Filip Petrásek (Gar.)	Z,ZK	4	2+2	L	PS
18YZPRO	Basics of Programming Jakub Klinkovský, Miroslav Virius, Vladimír Jarý, Zuzana Pet í ková, Jan Tomsa, Petr Pauš, Jan Vondruška Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	PS

Characteristics of the courses of this group of Study Plan: Code=BSPFILTFAJ1 Name=BS P_FIBA LTF 1st year

02YDEF1 History of Physics 1 Z 2
Physics and its place in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philosophers, Aristotle. Physics in Helenistic period, Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, Huygens. The birth of physics

as experimental science. Newton and his work.

02YELMA			
02 1 LLIVI/ (Electricity and Magnetism	Z,ZK	6
•	mb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectrics. Electric current and circuits, co	•	of the relativity
theory. Electrodynamic	cforces,magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. Electromagnetic waves,Maxwell ed	quations	
01YLAL	Linear Algebra 1	Z	2
1. Vector space. 2. Lin	ear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices o	f linear mappings.	7. Frobenius
theorem.			
01YLALZ	Linear Algebra 1, exam	ZK	2
01YLAL2	Linear Algebra 2	Z,ZK	4
Outline: 1. Inverse ma	rix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian ar	nd quadratic forms	. 5. Scalar
product and orthogona	ality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse m	atrices. 2. Method	ls of calculation
of determinants. 3. Ca	lculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonali	ity. Calculation of o	orthogonal
complements. 6. Geor	netry exercises and examples. 7. Adjoint operators.		
01YMAN	Calculus 1	Z	4
Basic calculus (real ar	alysis, functions of one real variable, differential calculus).	'	
01YMANZ	Calculus 1, exam	ZK	4
01YMAN2	Calculus 2	Z,ZK	8
1. Continuation of diffe	rential calculus: Taylor's Polynomials, Taylor's formula 2. Infinite series: criteria of convergence, operations on series, absolute	and conditional c	onvergence 3.
Real and compley now			
Troat and complex por	er series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of in	tegrals: primitives,	definite integral
	er series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of in echniques of integration and application of integrals, Generalized Riemann integral	tegrals: primitives,	definite integral
		tegrals: primitives,	definite integral
(Riemann definition), to 02YMECH	echniques of integration and application of integrals, Generalized Riemann integral	Z	4
(Riemann definition), to 02YMECH ntroduction to physics	echniques of integration and application of integrals, Generalized Riemann integral Mechanics	Z sional equations of	4 f motion, motion
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for	echniques of integration and application of integrals, Generalized Riemann integral Mechanics physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensional description in the property of the pro	Z sional equations of	4 f motion, motion
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for	echniques of integration and application of integrals, Generalized Riemann integral Mechanics physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensurces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid bo	Z sional equations of	4 f motion, motion
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ	echniques of integration and application of integrals, Generalized Riemann integral Mechanics physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensions innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid boelasticity, hydrodynamics. Sound.	Z sional equations of dy, rotation. Funda	4 f motion, motion amentals of
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ	echniques of integration and application of integrals, Generalized Riemann integral Mechanics Mec	Z sional equations of dy, rotation. Funda	4 f motion, motion amentals of
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ The content of the sub 00YPT	echniques of integration and application of integrals, Generalized Riemann integral Mechanics Mechanics Physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensurces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid both elasticity, hydrodynamics. Sound. Mechanics - Examination ject is the examination according to the plan of studies.	Z sional equations of dy, rotation. Funda ZK Z	4 f motion, motion amentals of 2
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ The content of the sub 00YPT	echniques of integration and application of integrals, Generalized Riemann integral Mechanics Mec	Z sional equations of dy, rotation. Funda ZK Z	4 f motion, motion amentals of 2
(Riemann definition), to 02YMECH ntroduction to physics in central force field, to continuum mechanics 02YMECHZ The content of the sub 00YPT The preparatory week	echniques of integration and application of integrals, Generalized Riemann integral Mechanics Mec	Z sional equations of dy, rotation. Funda ZK Z	4 f motion, motion amentals of 2
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ The content of the sub 00YPT The preparatory week first semester.	echniques of integration and application of integrals, Generalized Riemann integral Mechanics	Z sional equations of dy, rotation. Fundat ZK Z s and introductory Z,ZK	4 f motion, motion amentals of 2 2 electures for the
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ The content of the sub 00YPT The preparatory week first semester. 02YTER Thermal expansion of	echniques of integration and application of integrals, Generalized Riemann integral Mechanics	Z sional equations of dy, rotation. Fundat ZK Z s and introductory Z,ZK amic principle, ide	4 f motion, motion amentals of 2 2 r lectures for the 4 al and real gas,
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ The content of the sub 00YPT The preparatory week first semester. 02YTER Thermal expansion of	echniques of integration and application of integrals, Generalized Riemann integral Mechanics	Z sional equations of dy, rotation. Fundat ZK Z s and introductory Z,ZK amic principle, ide	4 f motion, motion amentals of 2 2 r lectures for the 4 al and real gas,
(Riemann definition), to 02YMECH ntroduction to physics in central force field, for continuum mechanics 02YMECHZ The content of the sub 00YPT The preparatory week first semester. 02YTER Thermal expansion of entropy; non-chemical 18YZPRO	echniques of integration and application of integrals, Generalized Riemann integral Mechanics	Z sional equations of dy, rotation. Funda ZK Z s and introductory Z,ZK amic principle, ide distribution, equipa	4 f motion, motion amentals of 2 2 r lectures for the 4 al and real gas, artition theorem. 4

Code of the group: BSPFILTFAJ2

Name of the group: BS P_FIBA LTF 2nd year

Requirement credits in the group: In this group you have to gain at least credits (at most 0)

Requirement courses in the group: In this group you have to complete at least 11 courses

Credits in the group: 0

Note on the grou	ρ.					
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
02YPRA1	Experimental Laboratory 1 Jaroslav Biel ik Jaroslav Biel ik (Gar.)	KZ	6	0+4	Z	PS
02YPRA2	Experimental Laboratory 2 Jaroslav Biel ik Jaroslav Biel ik (Gar.)	KZ	6	0+4	L	PS
12LTB1	Laser Technique 1 Helena Jelínková, Jan Šulc, Michal N mec Jan Šulc Helena Jelínková (Gar.)	Z,ZK	3	2P+1C	L	PS
01YANB3	Calculus B 3 Miroslav Kolá Miroslav Kolá (Gar.)	Z,ZK	8	4P+4C		PS
01YANB4	Calculus B 4 Miroslav Kolá Miroslav Kolá (Gar.)	Z,ZK	6	2P+4C		PS
12YNME1	Numerical Methods 1 Jan Vábek, Pavel Váchal Pavel Váchal (Gar.)	Z,ZK	4	2+2	L	PS
02YTEF1	Theoretical Physics 1 Ji í Hrivnák, Petr Novotný Petr Novotný Ji í Hrivnák (Gar.)	Z,ZK	4	2+2	Z	PS
02YTEF2	Theoretical Physics 2 Ji í Hrivnák, Petr Novotný Petr Novotný Ji í Hrivnák (Gar.)	Z,ZK	4	2+2	L	PS
02YTSFA	Thermodynamics and Statistical Physics Igor Jex, Jaroslav Novotný Martin Štefa ák Igor Jex (Gar.)	Z,ZK	4	2+2	L	PS
02YVOAF	Waves, Optics and Atomic Physics Petr Novotný, Josef Schmidt Josef Schmidt Petr Novotný (Gar.)	Z,ZK	6	4+2	Z	PS
12YZMDT	Measurement and Data Processing Josef Blažej, Ivan Procházka Josef Blažej Ivan Procházka (Gar.)	Z,ZK	2	1P+1C	Z	PS

Characteristics of the courses of this group of Study Plan: Code=BSPFILTFAJ2 Name=BS P_FIBA LTF 2nd year

02YPRA1 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. ΚZ 02YPRA2 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 extendihe knowledge gained in lectures on physics. 12LTB1 Laser Technique 1 Z,ZK Open resonators. Stability. Transverse and Longitudinal Modes. Elements of Open Resonators. Threshold of laser oscillations. Gausian beam as an approximation of the fundamental mode. ABCD method. Optical radiation propagation in resonant medium. Two-level approximation. Equations for polarisation and inversion, dispersion, saturation. Coherent and non-coherent pulse propagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optical resonator. 01YANB3 Z.ZK Calculus B 3 8 1. Functional sequences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional series, power series, Series Expansion, Taylor's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation of variables, homogeneous equation and exact equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coefficients and special right-hand side Fuler 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. 01YANB4 Calculus B 4 Z,ZK [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 Lebesqueovy 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. 12YNME1 Numerical Methods 1 Z,ZK The course explains 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 demonstration tool. The seminars are held in computer laboratory. 02YTEF1 Theoretical Physics 1 Z,ZK The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalism as well as different approaches to description of dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is the first part of the course of classical theoretical physics (02TEF1, 02TEF2). 02YTFF2 Theoretical Physics 2 Z,ZK Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and classical field theory in the Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipole approximation. 02YTSFA Thermodynamics and Statistical Physics Z,ZK 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 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,

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

2YZMDT Measurement and Data Processing

Z,ZK

2

Basic knowledge for the measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propeties, data fitting, separation of the signal from the noise.

Code of the group: BSPFILTFAJ3

Name of the group: BS P FIBA LTF 3rd year

Requirement credits in the group: In this group you have to gain at least credits (at most 0) 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:

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
12BPFI1	Bachelor Project 1 Ivan Richter Ladislav Kalvoda (Gar.)	Z	5	0P+5C		PS
12BPFI2	Bachelor Project 2 Ivan Richter Ladislav Kalvoda (Gar.)	Z	10	0P+10C		PS
02YKM1	Quantum Mechanics 1 Martin Štefa ák Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	Z	PS
12LTB2	Laser Technique 2 Helena Jelínková, Václav Kube ek Václav Kube ek (Gar.)	Z,ZK	3	2P+1C	Z	PS

01YRMFB	Equations of Mathematical Physics B Jan Novák, Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	5	2P+2C		PS
11YBSEM	Bachelor Seminar Radka Mika Havlíková, Ladislav Kalvoda Ladislav Kalvoda (Gar.)	Z	1	0P+2C	L	PS
12YZPLT	Basic Laser Technique Laboratory Josef Blažej, Václav Kube ek Josef Blažej Václav Kube ek (Gar.)	KZ	6	0+4	L	PS
12YZPOP	Basic Optical Laboratory Alexandr Jan árek Alexandr Jan árek (Gar.)	KZ	6	0+4	L	PS
12YZELD	Fundamentals of Electrodynamics Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z,ZK	2	2+0	Z	PS
12YZFS	Fundamentals of Photonic Structures Ivan Richter, Jií tyroký Jií tyroký Ivan Richter (Gar.)	Z,ZK	2	2P	L	PS
11YZFP	Basic to Solid State Physics Ladislav Kalvoda, Eva Mihóková Ladislav Kalvoda (Gar.)	ZK	3		Z	PS
12YZAOP	Fundamentals of Optics Ivan Richter, Pavel Kwiecien Ivan Richter Ivan Richter (Gar.)	Z,ZK	2	2+0	Z	PS

12BPFI1	Bachelor Project 1	Z	5
	ct is based on a topic approved by the administrators of the programme, department and by the dean. The student is guided by the	1	_
regular meetings a			Ü
12BPFI2	Bachelor Project 2	Z	10
The bachelor proje	ct is based on a topic approved by the administrators of the programme, department and by the dean. The student is guided by the	project supervisor	during commo
regular meetings a	nd discussions.		
02YKM1	Quantum Mechanics 1	Z,ZK	6
Abstract: The lectu	re describes the birth of quantum mechanics and description of one particle and more particles by elements of the Hilbert space a	s well as its time eve	olution. Beside
that it includes des	cription of observable quantities by operators in the Hilbert space and calculation of their spectra.		
12LTB2	Laser Technique 2	Z,ZK	3
Laser oscillator, th	e rate equation, the laser amplifier, Q-switching, mode-locking	, ,	
01YRMFB	Equations of Mathematical Physics B	Z,ZK	5
-	course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral equations, theory of integral equations, theory of integral equations is a solving integral equation of partial differential equations, theory of integral equations is a solving integral equation of partial differential equations.	1 ' 1	_
partial differential		,	
11YBSEM	Bachelor Seminar	Z	1
_	ne seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal	requirements for ba	achelors degre
projects at the fact	lty. The second part is designed as a practical training for the defence of the bachelors degree project. The students give oral pre	esentations of the co	urrent state of
he research result	s achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the po	ssibilities of improvi	ing the studer
performance.			
12YZPLT	Basic Laser Technique Laboratory	KZ	6
Lasers, solid state		1 1	
	Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmo	onic, He-Ne glow di	ischarges, las
diode, diode pump	Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmi ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-		ischarges, las
	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-		ischarges, las
12YZPOP		optic modulators.	
12YZPOP	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated.	optic modulators.	
12YZPOP The practical labor 12YZELD	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-Basic Optical Laboratory	optic modulators. KZ Z,ZK	6
12YZPOP The practical labor 12YZELD Subject starts by c	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics	optic modulators. KZ Z,ZK relativity formulae	6 2 are found for
12YZPOP The practical labor 12YZELD Subject starts by corransformation of fi	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of	optic modulators. KZ Z,ZK relativity formulae expansion into plane	6 2 are found for monochroma
12YZPOP The practical labor 12YZELD Subject starts by cransformation of fi waves methods of	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto- Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By experimental systems of coordinates with appropriate invariants.	replativity formulae expansion into plane bsoption, with dispe	6 2 are found for monochroma ersion, and
12YZPOP The practical labor 12YZELD Subject starts by cransformation of fivaces methods of non-isotropic. Fina	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto- Basic Optical Laboratory	replativity formulae expansion into plane bsoption, with dispe	6 2 are found for monochroma ersion, and
12YZPOP The practical labor 12YZELD Subject starts by cransformation of five verse methods of non-isotropic. Final	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto- Basic Optical Laboratory	reptic modulators. KZ Z,ZK relativity formulae xpansion into plane bsoption, with disperpropriate examples Z,ZK	6 2 are found for monochromaersion, and s.
12YZPOP The practical labor 12YZELD Subject starts by cransformation of five waves methods of non-isotropic. Final 12YZFS The lecture covers	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto- Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By esolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants.	representation and co	6 2 are found for monochroma ersion, and s. 2 haracterizatio
12YZPOP The practical labor 12YZELD Subject starts by comment of file waves methods of non-isotropic. Final 12YZFS The lecture covers Specifically, the lecture of the process of the start	ed Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto- Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By esolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants. The method of Photonic Structures the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their	optic modulators. KZ Z,ZK relativity formulae expansion into plane boption, with disperpropriate examples Z,ZK r preparation and cost of integrated photo	6 2 are found for monochroma ersion, and s. 2 haracterizationics for
12YZPOP The practical labor 12YZELD Subject starts by of transformation of fi waves methods of non-isotropic. Fina 12YZFS The lecture covers Specifically, the lecture populations in optimetamaterials, metamaterials,	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By esolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants. Wave and Helmholtz equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants of Photonic Structures the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures call communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations or	relativity formulae expansion into plane boption, with dispersorpropriate examples Z,ZK r preparation and c of of integrated photouctures and photon	6 2 are found for monochroma ersion, and s. 2 haracterizationics for iic crystals,
12YZPOP The practical labor 12YZELD Subject starts by cransformation of five verse methods of non-isotropic. Final 12YZFS The lecture covers Specifically, the lecture populations in optimetamaterials, metamaterials, metamaterials.	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By esolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants. Wave and Helmholtz equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants of Photonic Structures the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their structures and plasmonics and active structures call communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures.	relativity formulae expansion into plane boption, with dispersorpropriate examples Z,ZK r preparation and c of of integrated photouctures and photon	6 2 are found for monochroma ersion, and s. 2 haracterizationics for iic crystals,
12YZPOP The practical labor 12YZELD Subject starts by coransformation of fixaves methods of non-isotropic. Final 12YZFS The lecture covers Specifically, the lecture populations in optimetamaterials, measurements.	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By esolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants. Wave and Helmholtz equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants of Photonic Structures the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures call communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations or	relativity formulae expansion into plane boption, with dispersorpropriate examples Z,ZK r preparation and c of of integrated photouctures and photon	6 2 are found for monochroma ersion, and s. 2 haracterizationics for iic crystals,
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12YZPOP The practical labor 12YZELD Subject starts by cransformation of fire waves methods of non-isotropic. Final 12YZFS The lecture covers Expecifically, the letapplications in optimetamaterials, measuraisons to select	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By esolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate discusses the basic of photonic Structures Teundamentals of Photonic Structures the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures cal communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations or steed photonic laboratories. Basic to Solid State Physics amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bots of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and	Toptic modulators. KZ Z,ZK relativity formulae expansion into plane boption, with dispersion of the proper and control of the proper and photon of the proper and proper an	6 2 are found for monochroma ersion, and s. 2 haracterizationics for onic crystals, topics and 3 attween atoms erties of cryst
12YZPOP The practical labor 12YZELD Subject starts by coransformation of fixaves methods of non-isotropic. Final 12YZFS The lecture covers Specifically, the lectapplications in optimetamaterials, measuraisons to select the properties of the posolids, various types are derived. The posolids.	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By essolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants. Fundamentals of Photonic Structures The basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their true discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures call communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations or steed photonic laboratories. Basic to Solid State Physics amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced both of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electron	relativity formulae xpansion into plane boption, with dispersion or a zZK repearation and c sof integrated photouctures and photon in selected relevant zK inding interaction be basic thermal propes in solids by mean	6 2 are found for monochroma ersion, and s. 2 haracterizationics for onic crystals, topics and 3 attween atoms erties of cryst is of electron
12YZPOP The practical labor 12YZELD Subject starts by of transformation of fit waves methods of non-isotropic. Final 12YZFS The lecture covers Specifically, the let applications in opt metamaterials, me excursions to select 11YZFP Description of functions of the penergy bands explands	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By essolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their three discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures call communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations or steed photonic laboratories. Basic to Solid State Physics amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced both of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electron ained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to	relativity formulae xpansion into plane boption, with dispersion or a zZK repearation and c sof integrated photouctures and photon in selected relevant zK inding interaction be basic thermal propes in solids by mean	6 2 are found for monochroma ersion, and s. 2 haracterizationics for onic crystals, topics and 3 attween atoms erties of cryst is of electron
12YZPOP The practical labor 12YZELD Subject starts by of transformation of fit waves methods of non-isotropic. Fina 12YZFS The lecture covers Specifically, the let applications in opt metamaterials, me excursions to select 11YZFP Description of functions of the penergy bands explands explands.	Basic Optical Laboratory atories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated. Fundamentals of Electrodynamics erivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of eld vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By essolving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with ally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate invariants. Fundamentals of Photonic Structures The basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their true discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures call communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations or steed photonic laboratories. Basic to Solid State Physics amental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced both of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electron	relativity formulae xpansion into plane boption, with dispersion or a zZK repearation and c sof integrated photouctures and photon in selected relevant zK inding interaction be basic thermal propes in solids by mean	6 2 are found for monochroma ersion, and s. 2 haracterizationics for onic crystals, topics and 3 attween atoms erties of cryst is of electron

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.

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 0

The role of the block: PV

Code of the group: BSPFILTFPVAJ1

Name of the group: BS P FIBA LTF Required optional courses 1st year

Requirement credits in the group: In this group you have to gain at least credits (at most 0) 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:

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
12UFN	Introduction to Photonics and Nanostructures Ivan Richter, Pavel Kwiecien, Jan Proška Ivan Richter Ivan Richter (Gar.)	KZ	3	2P+1C	L	PV
12YULTB	Introduction to Laser Technique Helena Jelínková, Jan Šulc, Michal N mec Jan Šulc Helena Jelínková (Gar.)	KZ	3	2P+1C	L	PV

Characteristics of the courses of this group of Study Plan: Code=BSPFILTFPVAJ1 Name=BS P_FIBA LTF Required optional courses 1st year

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12UFN	Introduction to Photonics and Nanostructures	KZ	3							
Overview of nanostruct	Overview of nanostructures and nanotechnologies; quantum technologies; quantum nanostructures; photonic structures; nanophotonics and nanoplasmonics; optical waveguides ar									
fibers; integrated photor	nics; computer simulations; technological realization; student presentations									
12YULTB	Introduction to Laser Technique	KZ	3							
Overview of electromag	Overview of electromagnetic radiation sources; laser principle; classification of lasers; characterization and rough application of various types of lasers; laser safety precautions. The									
laser amplifier Q-switch	ing mode-locking									

Code of the group: BSSPOLVEDYAJ

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:

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
04YAPI	Presentation Course Beatriz Vadillo Gonzalo Jana Ková ová Beatriz Vadillo Gonzalo (Gar.)	Z	2	2S	Z	PV

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

04YAPI	Presentation Course	Z	2	l
The course will prepare	students for presenting issues in their field by mastering the strategies and techniques of oral presentation. The course includ	es discussions (e	xpressing views,	
comments, agreement,	disagreement). Students will be able to respond to comments on their presentation and answer questions addressed to them	after the present	tation, which is a	l
skill required for the def	ence of the Bachelor Project. Students will learn the basic structure of a Bachelor Project and rules for writing a paper.		ŀ	l

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 gr	oup.					
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAMZK	English for Intermediate Students Examination Jana Ková ová, Slav na Brownová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XAPZK	English for Advanced Students Examination Slav na Brownová, Darren Copeland Jana Ková ová Darren Copeland (Gar.)	ZK	4		Z	PV
04XCESZZK	Czech for Foreigners Beginners - Examination Slav na Brownová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XFMZK	French for Intermediate Students Examination V ra Šlechtová V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4		Z	PV

04XFPZK	French for Advanced Students Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4	Z	PV
04XFZZK	French for Beginners Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	3	L	PV
04XNMZK	German for Intermediate Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	4	Z	PV
04XNPZK	German for Advanced Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	4	Z	PV
04XRMZK	Russian for Intermediate Students Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4	Z	PV
04XRPZK	Russian for Advanced Students Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4	Z	PV
04XRZZK	Russian for Beginners Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	3	L	PV
04XSMZK	Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	4	Z	PV
04XSPZK	Spanish for Advanced Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) 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 English for Intermediate Students Examination ZK 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 04XAPZK ZK 4 The course content is the examination as given by the study plan. The student is supposed to demonstrate mastering the 04XAP3 syllabus and the ability to apply their knowledge obtained in the three 04XAP courses. In addition to passing courses 04XAP1, 04XAP2, and 04XAP3, a prerequisite for taking the exam is a presentation on a specialized topic in the student's field. The examination consists of 2 parts - written and oral. 04XCFS77K 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. 04XCFSMZK Czech for Intermediate Students Examination ZK 4 The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 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. 04XCESPZK Czech for Foreign Students - Advanced Examination ZK 4 The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 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 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. 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. ZK 3 04XF77K French for Beginners Examination 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. ZK 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 Examination ZK 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. 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 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 Examination 04XRZZK 3 The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge 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. Spanish for Intermediate Students Examination 04XSMZK 7K 1 The course content is the examination as given by the study plan. XSMZK examination consists of two parts: written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course XSM3. Oral examination follows the written part. Spanish for Advanced Students Examination ZK 04XSP7K

The course content is the examination as given by the study plan. Examination XSPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is

having passed the written test. Examination content is based on syllabi of courses XSP1, XSP2, and XSP3 or on an individual study plan of the student.

04XSZZK Spanish for Beginners Examination

The course content is the examination as given by the study plan. Examination consists of two parts: written and oral. Students can register for oral examination only if they have passed the written examination test.

ZK

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

The role of the block: V

Code of the group: BSPFILTFAJV

Name of the group: BS P_FIBA LTF Optional courses

Requirement credits in the group: In this group you have to gain at least credits (at most 0)

Requirement courses in the group:

Credits in the group: 0 Note on the group:

Note on the gr	oup:					
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
12YAPL	Application of Lasers Helena Jelínková, Alexandr Jan árek Helena Jelínková Helena Jelínková (Gar.)	Z,ZK	2	2+0	Z	V
02YDEF2	History of Physics 2 Igor Jex Igor Jex (Gar.)	Z	2	2P+0C	L	V
14YELM	Electron Microscopy Miroslav Karlík Miroslav Karlík (Gar.)	KZ	2	2P+0C		V
01YFKO	Functions of Complex Variable Severin Pošta Severin Pošta Severin Pošta (Gar.)	Z,ZK	3	2+1		V
02YFYS1	Physical Seminar 1 Martin Štefa ák Filip Petrásek (Gar.)	Z	2	0+2	Z	V
02YKM2	Quantum Mechanics 2 Martin Štefa ák Martin Štefa ák (Gar.)	Z,ZK	6	4P+2C	L	V
12LAS	Laser Systems Václav Kube ek Václav Kube ek (Gar.)	Z,ZK	3	2+1	L	V
00YMAM1	Essentials of High School Course 1 David B e David B e (Gar.)	Z	1	0+1	Z	V
00YMAM2	Essentials of High School Math Course 2 Jan Novák, Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.)	Z	1	0+1		V
12MPP1	Microprocessor Laboratory 1 David Vyhlídal David Vyhlídal (Gar.)	KZ	4	0+3	Z	V
12MPP2	Microprocessor Laboratory 2 David Vyhlídal David Vyhlídal (Gar.)	KZ	4	0+3	L	V
12MPR1	Microprocessors 1 Miroslav ech Miroslav ech (Gar.)	ZK	4	4+0	Z	V
12MPR2	Microprocessors 2 Miroslav ech Miroslav ech (Gar.)	ZK	2	2+0	L	V
12MOF	Molecular Physics Jan Proška, Martin Michl Martin Michl (Gar.)	ZK	2	2+0	L	V
12NT	Nanotechnology Jan Proška, Eduard Hulicius Jan Proška Eduard Hulicius (Gar.)	ZK	2	2+0	Z	V
01YNME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	V
15YCH1	General Chemistry 1 Petr Distler, Václav uba, Ond ej Holas Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Petr Distler, Václav uba, Ond ej Holas Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	V
12OSY	Operating Systems Miroslav ech Miroslav ech (Gar.)	ZK	3	3+0	Z	V
12YPAS	Computer Algebra Systems Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	Z	V
01YPRST	Probability and Statistics Herman Goulet-Ouellet, Tomáš Hobza Tomáš Hobza Herman Goulet-Ouellet (Gar.)	Z,ZK	4	3+1	Z	V
18YPRC1	Programming in C++ 1 Miroslav Virius, Vladimír Jarý Miroslav Virius Miroslav Virius (Gar.)	Z	4	2+2	Z	V
18YPRC2	Programming in C++ 2 Miroslav Virius, Vladimír Jarý Miroslav Virius Miroslav Virius (Gar.)	KZ	4	2+2	L	V
12YRSEN	Control Systems and Sensors David Vyhlidal David Vyhlidal (Gar.)	Z,ZK	4	4	Z	V
TV-1	Physical Education	Z	1		Z	V
TV-2	Physical Education	Z	1		L	V

TV-3	Physical education	Z	1	0+2	Z	V
ΓV-4	Physical education	Z	1	0+2	L	V
4YTED	Creating Electronic Documents Aleš Materna Aleš Materna (Gar.)	Z	2	26C		V
1UFP	Introduction to Solid State Physics Petr Kolenko Petr Kolenko (Gar.)	ZK	3		L	V
1UP1	Introduction to Probability 1 Jan Vybíral Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	3	1P+1C		V
1UP2	Introduction to Probability 2 Michaela Krbálková, Milan Krbálek Michaela Krbálková Milan Krbálek (Gar.)	Z,ZK	3	1P+1C		V
2YUNXAP	Introduction to UNIX Milan Kucha ik Milan Kucha ik Milan Kucha ik (Gar.)	Z	2	1P+1C	L	V
2YUVP	Introduction to Scientific Computing Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	L	V
2YVKT	Vacuum Technology Richard Švejkar Richard Švejkar Vojt ch Petrá ek (Gar.)	KZ	4	2P+2L	Z	V
2VTV	Scientific and Technical Computing Ivan Procházka Ivan Procházka (Gar.)	Z	2	1+1	L	V
2YVPMF	Selected Topics in Modern Physics Jan Pšikal Jan Pšikal Jan Pšikal (Gar.)	Z	3	2P+1C	L	V
2VFT	High Frequency and Impulse Circuitry Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	2	2+0	L	V
2EPR1	Basic Electronics Practicum 1 Ivan Procházka, Jaroslav Pavel Ivan Procházka Jaroslav Pavel (Gar.)	KZ	3	0+2	Z	V
2EPR2	Basic Electronics Practicum 2 Ivan Procházka, Jaroslav Pavel Ivan Procházka Jaroslav Pavel (Gar.)	KZ	3	0+2	L	V
8YZALG	Basics of Algorithmization Miroslav Virius Miroslav Virius	Z,ZK	4	2+2	L	V
2ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
2ZEL2	Basic Electronics 2 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	L	V
02YZM1	Foundations of Physical Measurements 1 Solangel Rojas Torres, Libor Škoda, Peter Švihra, Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	ZK	2	2P+0C	Z	V
2YZM2	Foundations of Physical Measurements 2 Solangel Rojas Torres, Libor Škoda, Peter Švihra, Petr Chaloupka Martin Štefa ák Petr Chaloupka (Gar.)	KZ	4	0P+4L	L	V
2YZFP	Principles of Plasma Physics Martin Jirka, Ji í Limpouch Martin Jirka Ji í Limpouch (Gar.)	Z,ZK	4	3+1	L	V
2ZFD	Physical Data Visualization Josef Blažej Josef Blažej Josef Blažej (Gar.)	KZ	2	1P+1C	Z	V

Characteristics of the courses of this group of Study Plan: Code=BSPFILTFAJV Name=BS P_FIBA LTF Optional courses

12YAPL	Application of Lasers	Z,ZK	2
<u> </u>	industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and other branches		,
02YDEF2	History of Physics 2	Z	2
•	al mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	, ,	•
, 0	m, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzman		•
	Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear encept of Nature and Universe of today.	nergy, Elementar	y particles,
14YELM	Electron Microscopy	KZ	2
Abstract: In this course	the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles.	The introductory	part is dedicated
to the analogy of light a	and electron microscopy and to various types of microscopes. An important part of the course is given to the interaction of diffe	rent types of radia	ation with matter,
mathematical formulati	ons and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and d	lynamic theory of	diffraction, types
of contrast, and diffract	ion and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques in	atomic resolution	
01YFKO	Functions of Complex Variable	Z,ZK	3
	outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable ar	e explained in det	ail: the derivative
The course starts from	outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Ca	•	
The course starts from of a complex function a		auchy's integral th	eorem, Morera's
The course starts from of a complex function a	nd the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Ca	auchy's integral th	eorem, Morera's
The course starts from of a complex function a theorem, roots of a hold	nd the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Ca	auchy's integral th	eorem, Morera's
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted	and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Capamorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy	estimates, Laurer Z ss presented in th	eorem, Morera's nt series, residue
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted	and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Capmorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1	estimates, Laurer Z ss presented in th	eorem, Morera's nt series, residue
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2	Ind the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Capmorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1 It to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physicals are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equivalents.	zuchy's integral the estimates, Laurer Z cs presented in the ipments. Z,ZK	ecorem, Morera's nt series, residue
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture experies a complex from the course of the cour	and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1 It to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equitive Quantum Mechanics 2	Z cs presented in the ipments. Z,ZK th integral. It sum	eorem, Morera's nt series, residue 2 e course of 6 marizes the
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture experies a complex from the course of the cour	Ind the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1 It to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physicals are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equitive Quantum Mechanics 2 Expands the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and particular discussions of quantum mechanics and prepares the students for an effective scientific research and further	Z cs presented in the ipments. Z,ZK th integral. It sum	eorem, Morera's Int series, residue 2 e course of 6 marizes the
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture exterminology and method	Ind the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1 It to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physicals are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equitive Quantum Mechanics 2 Expands the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and particular discussions of quantum mechanics and prepares the students for an effective scientific research and further	Z cs presented in the ipments. Z,ZK th integral. It sum	eorem, Morera's Int series, residue 2 e course of 6 marizes the
The course starts from of a complex function a theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture e terminology and methof formulations of quantum 12LAS	Indithe Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1 It to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical may are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equitive Quantum Mechanics 2 It is provided the introduction to quantum mechanics with more general formalism of quantum theory, approximate methods and particular descriptions of quantum mechanics and prepares the students for an effective scientific research and further in field theory.	zuchy's integral the estimates, Laurer Z cs presented in the ipments. Z,ZK the integral. It summer study, in particular	eorem, Morera's nt series, residue 2 e course of 6 marizes the ar, of the modern
The course starts from of a complex function at theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture eterminology and method formulations of quantum 12LAS Pulsed solid state nand	Indithe Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy Physical Seminar 1 If to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical series are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equitive Quantum Mechanics 2 If the content of the content o	z cs presented in the ipments. Z,ZK th integral. It sum restudy, in particular	eorem, Morera's nt series, residue 2 e course of 6 marizes the ar, of the modern 3 ic generators
The course starts from of a complex function at theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture eterminology and methof formulations of quantum 12LAS Pulsed solid state nand and raman lasers. Sem	Indite Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy individual sequence of the continuation of the cauchy individual sequence of the cauchy of interesting physical problems. It should help students to deeper understanding of fundamentals of physical sequence of the continuation of the cauchy of the students themselves, with the possibility to use PC and physical laboratory equinal laboratory equin	z cs presented in the ipments. Z,ZK th integral. It sum restudy, in particular	eorem, Morera's nt series, residue 2 e course of 6 marizes the ar, of the modern 3 ic generators
The course starts from of a complex function at theorem, roots of a hold theorem. 02YFYS1 The seminar is devoted Mechanics. The proble 02YKM2 Abstract: The lecture eterminology and methof formulations of quantum 12LAS Pulsed solid state nand and raman lasers. Sem	Indite Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Caparorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy individual sequence of the continuation of the cauchy individual sequence of the cauchy of interesting physical problems. It should help students to deeper understanding of fundamentals of physical sequence of the continuation of the cauchy of the students themselves, with the possibility to use PC and physical laboratory equinal Quantum Mechanics 2 I Quantum Mechanics 2 I Quantum Mechanics 2 I Quantum theory, approximate methods and pads used in various applications of quantum mechanics and prepares the students for an effective scientific research and further in field theory. I Laser Systems I Laser Systems I Laser Systems I Laser Systems and Lasers Fusion. Diode-pumped solid state lasers. Tunable lasers. Inconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultra of the contraction of the contraction of the cauchy of the	z cs presented in the ipments. Z,ZK th integral. It sum restudy, in particular	eorem, Morera's nt series, residue 2 e course of 6 marizes the ar, of the modern 3 ic generators

The course introduces th	Essentials of High School Math Course 2 ne fundamental areas of mathematics essential for university studies and practical applications. It covers sets, logic, proofs, to inatorics, and probability, with emphasis on understanding principles, rigor, and problem solving.	Z functions, derivativ	1 ves, integrals,
Become acquainted with	Microprocessor Laboratory 1 a development board based on PIC16F873A and PIC16F877A microcontrollers, development environment MPLAB X IDE, bugger. Programming in assembly and C language for microcontrollers. Basic operations with microcontroller modules.	KZ PRESTO progran	4 nmer, ASIX UP
Learning to use more Pludevice), serial communic	Microprocessor Laboratory 2 C16F877A internal modules on PVK40 development board: PWM module (Capture/Compare), parallel communication interface usation interface usation interface usation interface usation.	for microcontrolle	rs.
Microprocessor and micro	Microprocessors 1 recomputer, microprocessor types, memory types CPU, memory, Input output. Code and data, addressing modes(direct, inc., IO devices - program control, interrupt. Microprocessor Microchip PIC16F877A, Instruction codes- Assembler and Macroassiples	-	
12MPR2	Microprocessors 2 types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assembler. description	ZK	2
	Molecular Physics of molecules and molecular matter, and on structure-to-physical properties relationship. Methods of molecular structure determined to the structure dete	ZK rmination.	2
Lectures will introduce si different technologies (M nanostructure preparatio	Nanotechnology tudents mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Phys IBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technology. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for he did as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric later encasement.	ogies which are su eterostructure and	ubstantial for nanostructure
The course is devoted to boundary-value problem	Numerical Methods 2 numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equations.	uations.	
The most important cond solved in exercises.	General Chemistry 1 cepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practic		
The subject is the contin	General Chemistry 2 uation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Usi ciples is not restricted only to chemical processes is documented. The significance and practical use of explained principles is not restricted only to chemical processes is documented.	-	
Operating systems kerne	Operating Systems I, memory management, process, multitasking, interprocess communication, input/output, drivers, queues, client-server, interprocess communication, input/output, drivers, queues, client-server, interprocess, system security, open systems.	ZK net communication	3 n, Multilanguage
Practically oriented intro	Computer Algebra Systems duction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is rekills with CAS by solving relatively simple and basic tasks from mathematics and physics.	Z ealized in compute	2 er classrooms:
It is a basic course of prodefinition. The notions as	Probability and Statistics babability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition are a random variable, distribution function of random variable and characteristics of random variable are treated and basic limit but the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are expected.	theorems are stat	- 1
l I	Programming in C++ 1 ly the C programming language and non-object oriented features of the C++ language.	Z	4
	Programming in C++ 2 bject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template	KZ E Library.	4
The lecture addresses the devoted to computer mod	Control Systems and Sensors le theory, analysis, and implementation of linear analog and digital control systems, as well as sensors for various physical of leling and simulation using MATLAB, along with practical measurements conducted by the students on a continuous system with a continuous system with discrete control (temperature control using a thermoelectric cooler module).	-	
TV-1	Physical Education	Z	1
	Physical Education	Z	1
	Physical education	Z	1
	Physical education Creating Electronic Documents	Z Z	2
	and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, present	_	_
11UFP	Introduction to Solid State Physics	ZK	3
01UP1 1.Random trial with finite 4.Conditional probability,	fundamentals of diffraction stress analysis with a strong emphasis on the illustrations of the capability of X-ray diffraction to Introduction to Probability 1 e set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and	Z,ZK geometry, Bertran	3 ds paradox
One-dimensional cont measure theory. 4. Nume	Introduction to Probability 2 inuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction erical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics ag pseudorandom numbers from the selected distribution.		

12YUNXAP Introduction to UNIX	Z	2
Computer and operating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard	disk, network interface. Hardware an	d software.
Principles of operating systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, f	ile atributes, working with files. Text e	editors: vi, emacs.
Command interpreter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process	s priorities. Standard tools. Computer	r networks. Local
computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a computer. Network	services: hardware sharing, mail, scp	, etc. Network
applications		
12YUVP Introduction to Scientific Computing	Z	2
Practically oriented Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Studen	s get acquinted with some basic too	1
and technicval computing, data analysis, data visualisation and algorithm development.		
12YVKT Vacuum Technology	KZ	4
Rarefied gasses: basic concepts and relations; diffusion, flow of rarefied gases. Flow and current of gas, conductivity. Interaction	l l	
transport through solid matter; evaporation, condensation; Vacuum generation: Pumping proces, Ultimative pressure, Pumping sp	= :	
pumps: Diaphragm, Sliding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cry		•
NEG pumps, lon getter pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow,		
and seals.Practical exercises.		
12VTV Scientific and Technical Computing	Z	2
The students get familiar with methods of solving of computational problems in the scientific and technical practice, and with me		1
mainly to programming in the Fortran language.	alous of their programming. The cou	ise is offerfied
12YVPMF Selected Topics in Modern Physics	Z	3
The aim of this course is to improve students knowledge in modern parts of physics (such as measuring of gravitational waves,	• • • •	
emitting diodes,) with a partial help of computer algebra systems (e.g. Maple). Apart from the other courses related to modern		
not deal with detailed mathematical formalism of studied phenomena. Therefore, the secondary aim is the increase of students mention in the control of the c	notivation for deeper understanding o	of modern physics
and its laws in their following study		1
12VFT High Frequency and Impulse Circuitry	Z,ZK	2
The goals of course is to collect advanced knowledge in high frequency technics and high speed events. The course is focused	on Maxwell equation solution, Gunn's	s diodes, high
requency technics, microwaves guidelines, striplines, oscillators, amplifiers and pulse generators.		
12EPR1 Basic Electronics Practicum 1	KZ	3
The aim of the practicum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of	a task and formulation of the results.	The practicum
consists of blocks lasting 4 hours.		
12EPR2 Basic Electronics Practicum 2	KZ	3
The aim of the practicum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of	a task and formulation of the results.	The practicum
consists of blocks lasting 4 hours.		·
18YZALG Basics of Algorithmization	Z,ZK	4
This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the	1 .	1
12ZEL1 Basic Electronics 1	Z,ZK	3
	1 '	_
The subject provides primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harm-		
circuits include symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deal		_
12ZEL2 Basic Electronics 2	Z,ZK	3
The subject follows up with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final properties are explained.		
02YZM1 Foundations of Physical Measurements 1	ZK	2
The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear en	gineering), however, it can be attend	ed by students of
other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and eval	uation of acquired data on a PC. Stu	dents learn the
pasic habits of work in a physics lab.		
D2YZM2 Foundations of Physical Measurements 2	KZ	4
The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear en	·	ed by students of
other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and eval	uation of acquired data on a PC. Stu	dents learn the
basic habits of work in a physics lab.	-	
12YZFP Principles of Plasma Physics	Z,ZK	4
Basic physics of high temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and		1
and propagation of electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, s	-	-
It comprises brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plas	= · · ·	oc are explained.
12ZFD Physical Data Visualization	KZ	2

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

Vector graphics basics, scientific plots, dala visualization basics, measurements results presentation

Credits in the group: 0 Note on the group:

Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) **English for Intermediate Students M1** 04XAM1 Ζ 0+2 Ζ ٧ Jana Ková ová Jana Ková ová (Gar.) **English for Intermediate Students M2** 04XAM2 Ζ 2 L 0+2 ٧ Jana Ková ová Jana Ková ová (Gar.) **English for Intermediate Students M3** Ζ 2 Ζ 04XAM3 0+2 Jana Ková ová Jana Ková ová (Gar.)

04XAP1	English for Advanced Students P1 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	Z	V
04XAP2	English for Advanced Students P2 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	Z	V
04XCESZ1	Czech for Foreigners - Beginners 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESZ2	Czech for Foreigners - Beginners 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESZ3	Czech for Foreigners - Beginners 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	2S	Z	V
04XCESM1	Czech for Foreigners - Intermediate 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESM2	Czech for Foreigners - Intermediate 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESM3	Czech for Foreigners - Intermediate 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP1	Czech for Foreign Students - Advanced 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP2	Czech for Foreigners - Advanced 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESP3	Czech for Foreigners - Advanced 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XFM1	French for Intermediate Students M1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFM2	French for Intermediate Students M2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFM3	French for Intermediate Students M3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP1	French for Advanced Students P1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP2	French for Advanced Students P2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFP3	French for Advanded Students P3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFZ1	French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ3	French for Beginners Z3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ4	French for Beginners Z4 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XRM1	Russian for Intermediate Students M1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRM2	Russian for Intermediate Students M2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRM3	Russian for Intermediate Students M3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP1	Russian for Advanced Students P1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP2	Russian for Advanced Students P2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRP3	Russian for Advanced Students P3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRZ1	Russian for Beginners Z1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ2	Russian for Beginners Z2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ3	Russian for Beginners Z3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V

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

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

04XAM1 English for Intermediate Students M1

Ζ 2

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 of Reference for Languages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of professional oral and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical interest. Attention is also paid to extending the knowledge of grammar issues used in EAP.

04XAM2 English for Intermediate Students M2

The AM2 course expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more on specific grammar, functions, and lexical items typical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided writing. If necessary, grammar revision is included.

04XAM3 English for Intermediate Students M3

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.

04XAP1 English for Advanced Students P1

The course is at the level of advanced English, designed for students who have successfully completed the full secondary school English language course (at least to the B1 level of the Common European Framework of Reference for Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), providing insights into the fundamentals of vocabulary, grammar, and the purpose and style which is typical of academic and professional oral and written communication situations concerning science, technology, engineering and mathematics (STEM) contexts. There is an emphasis on reading material and discussing ideas with colleagues prior to participating in plenary sessions. Full and active participation is a basic expectation.

04XAP2 English for Advanced Students P2

The course is designed for students who have successfully completed AP1 and is a continuation of the Advanced English course. The AP2 course builds on content covered in AP1, thus extending the students skills for working with texts relating to science, technology, engineering and mathematics (STEM), and honing spoken and written communication in STEM contexts. The course extends the students academic vocabulary, through exposure to a wide variety of diverse texts and broadens knowledge of key aspects of grammar (referred to as Language Topics), pertinent to effective academic discourse and communication. There is a specific emphasis on responding to graphic data and the synthesizing of comprehensive and nuanced interpretations of such data. There is a focus on formal conventions in written communication including sentence and paragraph structure, discourse marking and cohesion. As in AP1, considerations of the purpose and concomitant style which is typical of academic and professional oral and written communication is explored through sample materials. And once again, students are expected to discuss ideas with colleagues prior to participating in plenary sessions. Full and active participation is a basic expectation.

04XAP3 English for Advanced Students P3

The AP3 course is designed for students who have successfully completed AP2 and is a continuation of the Advanced English course leading to a zápo et and a final graded examination. The AP3 course builds on content covered in both AP1 and AP2 and in terms of the final examinations, provides a summative assessment of the knowledge and skills acquired over the course of the three semesters. The AP3 course places greater emphasis on student participation, training oral communication skills, particularly when expressing an opinion, agreement, and objections in formal discussions. There is also focus on professional written communication in the context of applying for work placements and opportunities for further study. For most students this is their third year of studying for their bachelors degree and so there is a commitment to honing efficient and effective language skills with a view to enabling successful communication in English both in the academic context and in the wider world. Collaborating with colleagues to enable deeper understanding of complex ideas is a key goal.

04XCESZ1 Czech for Foreigners - Beginners 1

The course is designed for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and grammar features) and they will acquire basic language and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication in the most common everyday situations. The course covers roughly lessons 1-3 of eština Express (Czech Express) by L. Holá and P. Bo ilová.

04XCESZ2 Czech for Foreigners - Beginners 2

The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and conjugation system and practise basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo illová.

04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
	lops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses or ion and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produ		- 1
•	ie. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roug	•	
1.			
	Czech for Foreigners - Intermediate 1	Z	2
The course is focused or social situations.	n correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending th	e student s vocab	ulary for various
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	1	
•	on abbreviations, abbreviated words, and mathematical terms and formulas.	J	
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 especi	ally focused on s	tylistics and
	pping the student's writing skills.	-	
04XCESP1	Czech for Foreign Students - Advanced 1 ourse is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common Eu	Z	2 rk of Poforonco
	vision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of s		
· · ·	e of engineering and professional communication, both in spoken and written form. The topics include University Studies and		- 1
includes communication	with teachers and faculty administrators.		
	Czech for Foreigners - Advanced 2	Z	2
	student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical ar	nd specialist texts	placing greater
emphasis on individual v		7	
04XCESP3	Czech for Foreigners - Advanced 3 estudent's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation	Z n_and_finally_pre	2 esentation of the
· · · · · · · · · · · · · · · · · · ·	g skills necessary for professional communication are trained.	ii, ana, iiiaiiy, pre	Scritation of the
<u> </u>	French for Intermediate Students M1	Z	2
French - intermediate F	M The objective of this three-semester course is to improve and further develop communication in the French language in bot	h written and ora	I form. Students
	cate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tra-	-	
	problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, sy	•	
	study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, per ture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work		
	French for Intermediate Students M2	7	2
	M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science to	exts, features typ	_
and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French sciences, power engineering, environment, Internet, success of French sciences.	nce and technolo	gy, French
	chitects. Description of an object, device, shapes, dimensions, material.		_
	French for Intermediate Students M3 n improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (s	Z	2
	rmprovement and further development or linguistic competence acquired during the follow-up courses. Syntactic structures (s npound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cla		
	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w		
and one's own knowledg	ge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and c	oherence.	
04XFP1	French for Advanced Students P1	Z	2
	e objective of this three-semester course is to improve and further develop communication in the French language in both writing and in a selection of the second in the s		
	in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit gene The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are re		
•	it, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactiona		
request, answer to an ad	lvert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topic	cs of specialization	n: mathematics,
	stry. Reading of technical and popular science texts, further work with these texts and interpretation.		
	French for Advanced Students P2	. Z [2
	ents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication or communication are stressed (passive voice, nominalization, word formation).	given topics. Fe	atures typical of
	French for Advanded Students P3	Z	2
	n systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in		
	ter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cov		
· · · · · · · · · · · · · · · · · · ·	k compiled from 3 French sources. Preparation of several set topics for oral examination.		
	French for Beginners Z1	Z	2
=	e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in s		·
	nch for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdo		- 1
	te ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions,		٠
giving the directions, sim	nple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciati	on and grammar.	
	French for Beginners Z2	Z	2
<u>- :</u>	with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the delitional topics and skills are filled in from the textbook Engage 1. E (introductions invitation, welcoming agreement		
-	dditional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreeme of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication is practiced.	_	
	vork? A few expressions concerning the study. Name of University and Faculty.	oation. opeom	
	French for Beginners Z3	Z	2
	Z2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - P	ravdová: French f	or Beginners.
•	uations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for in	formation and lou	d as part of
pronunciation practice. F	Reading covers short adapted texts of general interest first, and later popular science texts.		

04XFZ4	French for Beginners Z4	Z	2
· · · · · · · · · · · · · · · · · · ·	n FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The court basic linguistic knowledge and skills are further developed. Oral communication and reading is developed from the least the last the		
	xtbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lec ourse covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, sho _l		
	now to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.	oping, weather, di	iivorsity iii oui
04XFZ5	French for Beginners Z5	Z	2
	n FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. The		
•	ered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.		
	ch science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cla	auses, typical cor	junctions,
subjunctive clauses, ge		7	
04XNM2	German for Intermediate Students M2 other more complex grammatical structures and their application in communication based on technical texts, such as the relation	Z	2
	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
•	mation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	• • • • • • • • • • • • • • • • • • • •	
phenomena important f	or professional discourse (participles, relative clauses).		
04XNM1	German for Intermediate Students M1	Z	2
	irse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and	· -	
•	es (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Reput gether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicist	· ·	
	communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	o, and the fundam	incritais of 11
04XNM3	German for Intermediate Students M3	Z	2
The course introduces of	ther more complex grammatical structures and their application in communication based on technical texts, such as the relation	n between techno	logy and society,
-	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
-	rnation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	natically revises of	ther grammatical
04XNP1	or professional discourse (participles, relative clauses).	7	2
•	German for Advanced Students P1 od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be lev	Z velled off at the be	
	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for		
	tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on	•	
i.e., telephoning.			
04XNP2	German for Advanced Students P2	Z	2
•	e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend Enduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and		
· -	V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).	i practising tormat	Communication,
04XNP3	German for Advanced Students P3	Z	2
	3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a va	riety of less com	mon situations
	r accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vertical accidents are considered as a constant of the constant		
·	ing, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used	-	
practice to and from Ge	rrocess information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. Th	ie course also inc	ludes translation
04XRM1	Russian for Intermediate Students M1	Z	2
-	for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphab		
basic vocabulary for cor	mmunication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, aski	ng the way and g	iving directions),
,	nmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement	level of the RZ2	course. The
	he course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.		
04XRM2	Russian for Intermediate Students M2 the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.	Z	2
04XRM3	Russian for Intermediate Students M3	Z	2
	e knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, he		
in the timetable.		,	
04XRP1	Russian for Advanced Students P1	Z	2
•	ent for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, pra	acticing more diffi	cult grammar
	ng the fundamentals of technical language and training writing skills.		
04XRP2	Russian for Advanced Students P2	Z	2
	RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, it on independent oral and written communication.	verb aspects, spe	cific syntactic
04XRP3	Russian for Advanced Students P3	Z	2
	RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphras		
courses require good pr	revious knowledge of general language at secondary level (listening, reading, correct communication in everyday situations).	The courses deve	elop and expand
	dy is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and	-	
develop their subtechnic technical topics.	cal vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write a	accurately and wit	in confidence on
04XRZ1	Russian for Beginners Z1	Z	2
	ا المحافظة ا The first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russ		=
· · · · · · · · · · · · · · · · · · ·	or both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speak	_	- 1
	stress, understand its contents and summarize it.		
04XRZ2	Russian for Beginners Z2	Z	2
	f the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short suring short contained and appropriate structures, and read aloud with confidence a short text without marked stress. They will		
	sing short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will ical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.	aiso uevelop trieli	vocabulary and
	, as a second of the second of		

04XRZ3	Russian for Beginners Z3	Z	2
The course is based of	on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for train	ning various forms	of reading skills
and listening) and intr	oduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will b	e able to respond	so as to be
understood, and to ex	press their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4	Russian for Beginners Z4	Z	2
	on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with		•
	ation in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular ver		-
= -	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.	.g., Siberia), learn	how to fill in
	prmation from the timetable, learn about Russian holidays and typical meals.		
04XRZ5	Russian for Beginners Z5	Z	2
•	ne student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understa	-	
•	ecialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. C		
	ying grammar is based on professional and technical texts and only includes items typically used in professional communication	` '	es, participies,
•	nts develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite reque	· · · · · · · · · · · · · · · · · · ·	
04XSM1	Spanish for Intermediate Students M1	Z	2
-	ed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-seme		-
	attention to further grammar topics, to written and oral communication on a given everyday or easy subtechnical topic, for which	tne students are tr	ained by reading
texts or listening to the		7	
04XSM2	Spanish for Intermediate Students M3	<u>Z</u>	2
•	the students' knowledge from the previous course (XSM1). Students are gradually acquainted with fundamentals of Spanish for	or specific purpose	es in order to be
	cialized texts on the Internet.		
04XSM3	Spanish for Intermediate Students M3	Z	2
	supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acad		-
	ernet in Spanish and search for information of their specialization or field of interest. Students will use the information to write s	short articles and	summaries. The
•	·	onioni di noioo dina	
final part of the progra	amme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.		
final part of the progra	amme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination. Spanish for Advanced Students P1	Z	2
final part of the progra 04XSP1 Course concentrates	amme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.	Z	2
final part of the progra 04XSP1 Course concentrates of CEFR.	amme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination. Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicat	Z tion. Course prerec	2 quisites: level B2
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for Spanish for Advanced Students P2 Spanish for Advanced Students P2	Z tion. Course prered	2 quisites: level B2
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the s	Spanish for Advanced Students P1 Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicat Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and states and spanish courses are specific purposes topics.	Z tion. Course prered	2 quisites: level B2
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the s written communication	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and son.	Z tion. Course prerect Z yntax and focuses	2 quisites: level B2 2 on independen
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the s written communication 04XSP3	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicat Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and s n. Spanish for Advanced Students P3	Z ion. Course prerect Z yntax and focuses	2 quisites: level Bi 2 on independen
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the swritten communication 04XSP3 Course XSP3 is the file	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicate Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and some Spanish for Advanced Students P3 Is Spanish for Advanced Students P3 Is Spanish for Advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is	Z ion. Course prerect Z yntax and focuses	2 quisites: level B2 2 on independen 2
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the swritten communication 04XSP3 Course XSP3 is the file based on what studen	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicated. Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and son. Spanish for Advanced Students P3 nal part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is not swill need in their career.	Z ion. Course prerect Z yntax and focuses Z focused on writter	2 quisites: level B: 2 on independer 2 n communication
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the swritten communication 04XSP3 Course XSP3 is the file based on what studen 04XSZ1	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicated. Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and some Spanish for Advanced Students P3 Spanish for Advanced Students P3 nal part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is will need in their career. Spanish for Beginners Z1	Z Z yntax and focuses Z focused on writter	2 quisites: level B2 2 on independen 2 n communication 2
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the swritten communication 04XSP3 Course XSP3 is the file based on what studer 04XSZ1 Course XSZ1 is the file	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicated. Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and single. Spanish for Advanced Students P3 nal part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is will need in their career. Spanish for Beginners Z1 rst stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functions.	Z ion. Course prerect Z yntax and focuses Z focused on writter Z damental grammal	2 quisites: level B2 2 on independen 2 n communication 2 structures and
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the swritten communication 04XSP3 Course XSP3 is the final based on what studer 04XSZ1 Course XSZ1 is the final based to communication 04XSZ1 Course XSZ1 is the final based to communication	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicated. Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sign. Spanish for Advanced Students P3 nal part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is will need in their career. Spanish for Beginners Z1 rst stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish	Z ition. Course prerect Z yntax and focuses Z focused on writter Z damental grammal sh and will develo	2 on independen 2 n communication 2 structures and p it.
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the swritten communication 04XSP3 Course XSP3 is the fin based on what studer 04XSZ1 Course XSZ1 is the fin will be able to communication 04XSZ2	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicated. Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and single. Spanish for Advanced Students P3 and part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is will need in their career. Spanish for Beginners Z1 rest stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spani Spanish for Beginners Students Z2	Z yntax and focuses Z yntax and focuses Z focused on writter Z damental grammal sh and will develo	2 on independen 2 n communication 2 r structures and p it.
final part of the progra 04XSP1 Course concentrates of CEFR. 04XSP2 Course XSP2 is the significant of the program of the p	Spanish for Advanced Students P1 on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicated. Spanish for Advanced Students P2 econd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and since. Spanish for Advanced Students P3 nal part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is will need in their career. Spanish for Beginners Z1 rst stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and functionate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2 d on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures	Z yntax and focuses Z yntax and focuses Z focused on writter Z damental grammal grammal sh and will develo Z and lexis will be c	2 on independer 2 n communication 2 structures and p it. 2 hosen so as to
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List of courses of this pass:

Code	Name of the course	Completion	Credits
00YMAM1	Essentials of High School Course 1	Z	1
	Students are introduced to mathematical concepts and methods used in the introductory physics course.		ı
00YMAM2	Essentials of High School Math Course 2	Z	1
The course introd	uces the fundamental areas of mathematics essential for university studies and practical applications. It covers sets, logic, proofs, fur	nctions, derivatives	, integrals,
	analytic geometry, combinatorics, and probability, with emphasis on understanding principles, rigor, and problem solving.		
00YPT	Orientation Week	Z	2
The preparatory we	eek is intended for incoming bachelor's students. It includes an introduction to the organizational requirements of university studies a	nd introductory lec	tures for the
	first samastar		

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	• •	
4.Conditional proba	ibility, 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	value 6.Problems ii	nvolving the
01UP2	Introduction to Probability 2	Z,ZK	3
	I continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction of		
	Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics. 6.		
	estimations. 7. Generating pseudorandom numbers from the selected distribution.		
01YANB3	Calculus B 3	Z,ZK	8
	juences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional		
	r's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separatior equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coe		١ ١
•	tial equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and		٠ ا
	s of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier		- 1
series and their co	nvergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total of	derivatives and tang	gent plane,
	Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations		
01YANB4	Calculus B 4	Z,ZK	6
	o et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] F kartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstr		I
	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.		
01YFKO	Functions of Complex Variable	Z,ZK	3
	om outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable are ex	-	
	on and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Cauch	-	
ineorem, roots or a r	holomorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy esti theorem.	mates, Laurent ser	ies, residue
01YLAL	Linear Algebra 1	Z	2
	Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of I	_	
	theorem.		
01YLAL2	Linear Algebra 2	Z,ZK	4
	se matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian an	•	
-	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 orthogonalit		
or actorninants.		y. Calculation of of	inogoniai
	complements. 6. Geometry exercises and examples. 7. Adjoint operators.		
01YLALZ	complements. 6. Geometry exercises and examples. 7. Adjoint operators. Linear Algebra 1, exam	ZK	2
01YLALZ 01YMAN	complements. 6. Geometry exercises and examples. 7. Adjoint operators. Linear Algebra 1, exam Calculus 1	ZK Z	2
	Linear Algebra 1, exam		
	Linear Algebra 1, exam Calculus 1		
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Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and classical field theory in the Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic indiation in the dipole proproximation. QYTER Heat and Molecular Physics Z,ZK	02YTFF2		7.7K	4
O2YTER Heat and Molecular Physics Thermol expansion of materials, heat transfer: stationary and non-stationary heat conduction, heat transfer and penetration: 1st and 2nd thermodynamic principle, ideal and read gas, entropy, non-thermical systems: dielectric and magnetic materials, Maxwell relations and thermodynamic potentials, the control of the mineral systems dielectric and magnetic materials, Maxwell relations and the modynamic potentials, the control of thermodynamics and statistical principle. Statistical principle, ideal and read gas, entropy, non-thermical systems: dielectric and magnetic materials, Maxwell relations and the modynamic potentials, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chateller principle. Statistical principle, Statistical Physics and developed description of the thermodynamics and statistical principle. Statistical Physics is made of use of crystals and the black body rediction, of view (classical regime with the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body rediction, of the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body rediction, of the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body rediction, darticular explaints in such discusses simple transport phenomena. 2YYOAF Wave phenomena in mechanics and electromagnetism; modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence, Geometrical optics, Introduction toquantum physics: black body madition, quantum of energy, photoeffect, the Compton effect, the de Broglie waves, the Schrödinger equation, stationary states and spectra of linite systems. 2YZM1 Foundations of Physical Specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of		•		1 -
OZYTER Heat and Molecular Physics Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynamic principle, ised and real gas, antiopy, non-chemical systems. dielectric and magnetic materials, Maxwell relations and thermodynamic potentials, therein theory, Maxwell's velocity distribution, equipartition theorem. OZYTER Thermodynamics and statistical physics. Thermodynamic potentials, the Journal of thermodynamic perinciple, its statistical physics. Thermodynamics and Statistical Physics of crystals and the black body radiation). The Boltzmann equation is used to discusses simple terprinciple. Statistical entropy, Basics of many body descriptoriform 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 troop rehomenes. OZYVOAF Wave phenomena in mechanics and electromagnetism modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction toquantum 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. OZYZM1 Foundations of Physical Specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of their branches. The goal of the lecture is to introduce the basics of physical measurements. In emethods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physical engineering, Nuclear engineering), however, it can be attended by students of Reference for Languages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP Language), however, it can be attended by students of	Minkowski space-tir	· · · · · · · · · · · · · · · · · · ·	nagnetic radiation	in the dipole
Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; stat and 2nd thermodynamic principle, ideal and real gas, neutropy, non-chemical systems; dielectric and magnetic materials; Mawuell relations and thermodynamic potentials; kinetic theory; Maxwell's velocity distribution, equipartition theorem. 02YTSFA Thermodynamics and Statistical physics. Thermodynamic potential, the Joulul Phomson effect, conditions of equilibrium, the Braun-Le Chatellee principle. Statistical entropy, accidence of crystals and statistical principle. Statistical point of view (classical entropy, accidence of the principle of the pri	00\/TED		7 71/	
entropy, non-chemical systems: delectric and magnetic materials, Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity distribution, equipartition theorem. 02YTSFA Thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy, Basics of many body description from a statistical principle. Statistical entropy, Basics of many body description from a statistical principle. Statistical entropy, Basics of many body description from a statistical principle. Statistical entropy, Basics of many body description from a statistical principle. Statistical entropy, Cary Statistical entr	l l	·		1
Tourndation 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 (lassical and quasicalisacial and quasicalisacialisacial and quasicalisaci	•			_
Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical rejime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Bottzmann equation is used to discusses simple transport phenomena. O2YVOAF Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction toquantum physics: black body radiation, quantum of energy, photoeffect,, the Compton effect, the de Broglie waves, the Schrödinger equation, stationary states and spectra of finite systems. O2YZM1 Foundations of Physical Measurements ZK 2 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physica language in the packet of the students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements 2 The electure is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. O4XAM1 English for Intermediate Students M1 English for Intermediate Students M1 English for Intermediate Students M2 English for Intermediate Students M2 English for Intermediate Students	02YTSFA	Thermodynamics and Statistical Physics	Z,ZK	4
O2YVOAF Waves, Optics and Atomic Physics 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 toquantum 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. 02YZM1 Foundations of Physical Measurements 1 ZK 2 102YZM1 Foundations of Physical Measurements 1 102YZM2 Foundations of Physical Measurements in the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 02YZM2 Foundations of Physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 02YZM2 Foundations of Physical measurements 2 Foundations of Physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 04XAM1 Fe goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 04XAM1 Fe goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 04XAM2 Fermional part of the common European Framework of Reference for Languages (CEFR), It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of professional oral and written communication situations. Thus it covers topics related to				
O2YVOAF Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence, Geometrical optics. Introduction toquantum 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. O2YZM1 Foundations of Physical Measurements 1 ZK 2 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. O2YZM2 Foundations of Physical Measurements 2 KZ 4 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements 2 KZ 4 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. O4XAM1 English for Intermediate Students M1 English for Intermediate Students M1 English for Intermediate Students M1 Q4XAM2 English for Intermediate Students M2 Q4XAM2 English for Intermediate Students M3 English for Intermediate Students M3 English for Intermediate Students	Basics of many boo		ensemble, Fermi	gas, models
coherence. Geometrical optics. Introduction toquantum 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. 02YZM1 Foundations of Physical Measurements 1 ZK 2 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. 7 Foundations of Physical Measurements 2 8 Foundations of Physical Measurements 2 8 Foundations of Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physical lengineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physical lengineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physical lengineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical engineering physical physical lengineering. Nuclear engineering,	02YVOAF		Z,ZK	6
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The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. O2YZM2 Foundations of Physical Measurements 2 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering), Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Students learn the basic habits of work in a physics lab. O4XAM1 English for Intermediate Students M1 English for Intermediate Students M1 English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of professional oral and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical interest. Attention is also paid to extending the knowledge of grammar issues used in EAP. O4XAM2 English for Intermediate Students M2 English for Intermediate Students M2 English for Intermediate Students M3 The AMZ course expects the student to have completed the AM1 course, it develops their skills for work with subtechnical texts, focusing also more on specific grammar, functions, and lexical items typical of ESP and EAP (e.g., definition, existence supplies of phenomena, object descriptions). Part of the course is also guided writing. If necessary, grammar revision is included. O4XAM3 English for Intermediate Students M3 English for Intermediate Students M3 English for Intermediate Students M3 English for Intermediate Students Students M3 English for Intermediate Students Students or preparing and giving a sho	02V7M1		7k	2
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technology, engineering and mathematics (STEM) contexts. There is an emphasis on reading material and discussing ideas with colleagues prior to participating in plenary sessions.	•			
Full and active participation is a basic expectation.				-
		Full and active participation is a basic expectation.		

04XAP2 English for Advanced Students P2 The course is designed for students who have successfully completed AP1 and is a continuation of the Advanced English course. The AP2 course builds on content covered in AP1, thus extending the students skills for working with texts relating to science, technology, engineering and mathematics (STEM), and honing spoken and written communication in STEM contexts. The course extends the students academic vocabulary, through exposure to a wide variety of diverse texts and broadens knowledge of key aspects of grammar (referred to as Language Topics), pertinent to effective academic discourse and communication. There is a specific emphasis on responding to graphic data and the synthesizing of comprehensive and nuanced interpretations of such data. There is a focus on formal conventions in written communication including sentence and paragraph structure, discourse marking and cohesion. As in AP1, considerations of the purpose and concomitant style which is typical of academic and professional oral and written communication is explored through sample materials. And once again, students are expected to discuss ideas with colleagues prior to participating in plenary sessions. Full and active participation is a basic expectation. 04XAP3 English for Advanced Students P3 The AP3 course is designed for students who have successfully completed AP2 and is a continuation of the Advanced English course leading to a zápo et and a final graded examination. The AP3 course builds on content covered in both AP1 and AP2, and in terms of the final examinations, provides a summative assessment of the knowledge and skills acquired over the course of the three semesters. The AP3 course places greater emphasis on student participation, training oral communication skills, particularly when expressing an opinion, agreement, and objections in formal discussions. There is also focus on professional written communication in the context of applying for work placements and opportunities for further study. For most students this is their third year of studying for their bachelors degree and so there is a commitment to honing efficient and effective language skills with a view to enabling successful communication in English both in the academic context and in the wider world. Collaborating with colleagues to enable deeper understanding of complex ideas is a key goal. 04XAPZK 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 04XAP3 syllabus and the ability to apply their knowledge obtained in the three 04XAP courses. In addition to passing courses 04XAP1, 04XAP2, and 04XAP3, a prerequisite for taking the exam is a presentation on a specialized topic in the student's field. The examination consists of 2 parts - written and oral. 04XCESM1 Czech for Foreigners - Intermediate 1 The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the student's vocabulary for various social situations. 04XCESM2 Czech for Foreigners - Intermediate 2 Ζ 2 The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and reading skills and trains the student in understanding common abbreviations, abbreviated words, and mathematical terms and formulas. 04XCESM3 Czech for Foreigners - Intermediate 3 2 The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especially focused on stylistics and lexicology and on developing the student's writing skills. ZK 04XCESMZK Czech for Intermediate Students Examination 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. 04XCESP1 Czech for Foreign Students - Advanced 1 Ζ 2 The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common European Framework of Reference. It is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of science. Students are taught the basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies and Student Life. Written practice includes communication with teachers and faculty administrators. 04XCESP2 Czech for Foreigners - Advanced 2 This course extends the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and specialist texts placing greater emphasis on individual work. 04XCESP3 Czech for Foreigners - Advanced 3 Ζ 2 The course develops the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, and, finally, presentation of the student's project. Writing skills necessary for professional communication are trained. 04XCESPZK Czech for Foreign Students - Advanced Examination ZK 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. Czech for Foreigners - Beginners 1 04XCESZ1 2 The course is designed for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and grammar features) and they will acquire basic language and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication in the most common everyday situations. The course covers roughly lessons 1-3 of eština Express (Czech Express) by L. Holá and P. Bo ilová. 04XCESZ2 Czech for Foreigners - Beginners 2 2 The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and conjugation system and practise basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. 04XCESZ3 Czech for Foreigners - Beginners 3 The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on building up basic vocabulary, fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce simple texts and they practise frequent types of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly lessons 5-7 in estina expres 04XCESZZK Czech for Foreigners Beginners - 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 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. 04XFM1 French for Intermediate Students M1 French - intermediate FM 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 professional environment. They will be able to use the language to transmit general and technical 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 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.

04XFM3	French for Intermediate Students M3	Z	2
	sed on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (sub		
	res, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cla ture specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work		
	e's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesi	•	
04XFMZK	French for Intermediate Students Examination	ZK	4
	e examination as given by the study programme. The whole French programme is ended with an examination covering the contents o	l	1
	consists of a written and oral part and is organized according to Examination Instructions, a document available on the well	o.	
04XFP1	French for Advanced Students P1	Z	2
	se The objective of this three-semester course is to improve and further develop communication in the French language in both written		
	icate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general		
·	FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repe parfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional le	•	
	an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics	=	
. ,	internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation	-	,
04XFP2	French for Advanced Students P2	Z	2
With the link to P1	contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g	iven topics. Featu	res typical of
	technical and scientific communication are stressed (passive voice, nominalization, word formation).	r	
04XFP3	French for Advanded Students P3	Z	2
	sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in eng		
SKIII - translation o	f shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.	s a technicai /app	lied science
04XFPZK	French for Advanced Students Examination	ZK	4
	program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part a	l	1
	Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grant and a second	J	3
04XFZ1	French for Beginners Z1	Z	2
French for beginner	rs The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in soc	ializing and in prof	fessional life.
	es French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to		
	using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pra		- 1
	za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, pe directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronu		- 1
04XFZ2	French for Beginners Z2	7	2
-	ng up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the	textbook: Pravda	1 1
	iners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement		
thanking, travelling,	map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communication is practiced.	cation. Specific top	oics covered:
	How does the machine work? A few expressions concerning the study. Name of University and Faculty.		
04XFZ3	Franch for Paginnara 72		
	French for Beginners Z3	Z	2
The course builts	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pra	ı avdová: French for	Beginners.
The course builts	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pra and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf	ı avdová: French for	Beginners.
The course builts Topics, functions	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravand situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.	avdová: French for ormation and loud	Beginners. I as part of
The course builts Topics, functions 04XFZ4	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pra and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf	avdová: French for ormation and loud	Beginners. If as part of
The course builts Topics, functions 04XFZ4 The course builds	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravand situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. French for Beginners Z4	avdová: French for ormation and loud Z ntents is roughly c	Beginners. I as part of 2 overed with
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The course builts Topics, functions 04XFZ4 The course builds lessons 19 - 23 of th Students of FJFI.	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravand situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. French for Beginners Z4 up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The core textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lectur The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet	Z ntents is roughly ce notes French for ing, weather, univerted.	Beginners. I as part of 2 overed with Engineering ersity in our
The course builts Topics, functions 04XFZ4 The course builds lessons 19 - 23 of the Students of FJFI. 04XFZ5	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravand situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inference pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. French for Beginners Z4 up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The cone textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lectur. The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet French for Beginners Z5	Z ntents is roughly ce notes French for ing, weather, univert.	Beginners. I as part of 2 overed with Engineering ersity in our
The course builts Topics, functions 04XFZ4 The course builds lessons 19 - 23 of th Students of FJFI. 04XFZ5 All four skills acquir	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pravand situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inference pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. French for Beginners Z4 up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The cone textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lecture. The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They prepare to the contents of the textbook in the part of the textbook in the part of the second provided in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They prepare to the part of the textbook in the part of the pa	Z ntents is roughly ce notes French for ing, weather, univert. Z ntents it orally in the	Beginners. I as part of 2 overed with Engineering ersity in our 2 ne class. The
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The course builts Topics, functions 04XFZ4 The course builds lessons 19 - 23 of tf Students of FJFI. 04XFZ5 All four skills acquir general contents notes, success of 04XFZZK The content is the of 04XNM1 The objective of the word formation environmental iss 04XNM2 The course introduct the world at the be practise reading for 04XNM3 The course introduct the world at the be practise reading for 04XNMZK The course content	upon FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pra and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts. French for Beginners Z4 up on FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The core textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lecture for every generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp country and in France, how to write CV. application, topics in mathematics, reading physics - mechanics, informatics, interm French for Beginners Z5 ed in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They pi is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. To of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate classification as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination for examination of reading and the students skills in the German language. The course focuses on revision of more difficult phenomena and st processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repusues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicans, physicists terminology. It d	z ntents is roughly ceen notes French for ing, weather, univert. Z resent it orally in the pics: on physics frauses, typical conjustes, typical conjustes, and the fundamental and ability. Z ructures (e.g. the piblic and Germany, and the fundamental and ability. Z retween technology etc cally revises other Z retween technology etc cally revises other ZK consisting of two p	Beginners. I as part of 2 overed with Engineering ersity in our 2 ne class. The rom lecture junctions, 3 ne document 2 passive) and d, current entals of IT 2 d and society, decorated. Students grammatical 2 d and society, decorated. Students grammatical 4 parts - written

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 leve	_	- 1
course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for d more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on pra	•	- 1
i.e., telephoning.	clical everyday com	nunication,
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 general and s	ubtechnical
vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and provided in the control of the control	_	nunication,
both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indi	rect speech).	
04XNP3 German for Advanced Students P3 The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varie	ty of less common	2 situations
(traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocable of the control of the contr	=	
nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used.		
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	ZK	4
The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination of a content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination of a content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination of the study plan.		
and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded information is to be obtained from the teacher.	assessment. More	detalled
04XRM1 Russian for Intermediate Students M1	Z	2
The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet		
basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking		· ·
they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement	level of the RZ2 cou	ırse. The
contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetal	ole.	
04XRM2 Russian for Intermediate Students M2	Z	2
The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the		
04XRM3 Russian for Intermediate Students M3	Z	2
The course develops the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, howen in the timetable.	ever, for half of the ti	me allotted
04XRMZK Russian for Intermediate Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge.		-
- RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given inst	-	
04XRP1 Russian for Advanced Students P1	Z	2
The entrance requirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, practices are considered as a contract of the course in the course is revision of standard language structures, practices are contracted as a contract of the course in the course is revision of standard language structures, practices are contracted as a contract of the course in the course is revision of standard language structures, practices are contracted as a contract of the course in the course is revision of standard language structures, practices are contracted as a contract of the course in the course in the course is revision of standard language structures, practices are contracted as a contract of the course in the course	ticing more difficult	grammar
structures, understanding the fundamentals of technical language and training writing skills.		
04XRP2 Russian for Advanced Students P2	Z	2
The course is based on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, verbal adjectives).	erb aspects, specific	syntactic
structures). Stress is put on independent oral and written communication.	7	
04XRP3 Russian for Advanced Students P3 The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasin	Z g. translation) The l	2
courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The	,	
these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and w		
develop their subtechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write acc	urately and with cor	nfidence on
technical topics.		
04XRPZK Russian for Advanced Students Examination	ZK	4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled	-	
- RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructional control of the property of the pro	uctions by the teach	
04XRZ1 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 Russiar	Thus it begins with	2 mastering
the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking	-	- 1
a short text with marked stress, understand its contents and summarize it.	,	
04XRZ2 Russian for Beginners Z2	Z	2
The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subte	echnical texts. Stude	ents will be
able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will als	•	bulary and
master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in		
04XRZ3 Russian for Beginners Z3	Z	2
The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be		- 1
understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.	able to respond so	as to be
04XRZ4 Russian for Beginners Z4	Z	2
The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a contract of 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 contract of 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 contract of 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 contract of 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 contract of 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 contract of the course o	1	
words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs		
from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), a	-	
communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g.	., Siberia), learn ho	w to fill in
forms, look up the information from the timetable, learn about Russian holidays and typical meals. OAYP75 Pussian for Regioners 75	Z	2
04XRZ5 Russian for Beginners Z5 The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding		
information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Committing about the professional information obtained by reading the texts. Committee and the committee of the	-	- 1
everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication		
passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, po	olite request, etc.)	

04XRZZK	Russian for Beginners Examination	ZK	3
The course conten	nt is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled	dge and skills acqu	ired in RZ1
- RZ5. Stud	ents are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instr	ructions by the tead	her.
04XSM1	Spanish for Intermediate Students M1	Z	2
	signed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semes	•	
vocabulary and pay	rs attention to further grammar topics, to written and oral communication on a given everyday or easy subtechnical topic, for which the	students are trained	d by reading
047010	texts or listening to them.	7	
04XSM2	Spanish for Intermediate Students M3	Z	2
i ne course develo	ps the students' knowledge from the previous course (XSM1). Students are gradually acquainted with fundamentals of Spanish for s able to work with specialized texts on the Internet.	pecific purposes in	order to be
04XSM3	Spanish for Intermediate Students M3	Z	2
	panish for intermediate Students wis are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academ		
	Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write sho	, ,	
onough to doo the	final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral ex		nanco. mo
04XSMZK	Spanish for Intermediate Students Examination	ZK	4
	ent is the examination as given by the study plan. XSMZK examination consists of two parts: written and oral; to be eligible for the wr		-
	obtained non-graded assessment for course XSM3. Oral examination follows the written part.	, ,	
04XSP1	Spanish for Advanced Students P1	Z	2
Course concentrate	es on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication.	Course prerequisit	es: level B2
	of CEFR.		
04XSP2	Spanish for Advanced Students P2	Z	2
Course XSP2 is the	e second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and synta	ax and focuses on i	ndependent
	written communication.		
04XSP3	Spanish for Advanced Students P3	Z	2
Course XSP3 is the	e final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focus	used on written com	nmunication
	based on what students will need in their career.		
04XSPZK	Spanish for Advanced Students Examination	ZK	4
	ent is the examination as given by the study plan. Examination XSPZK consists of two parts, namely oral and written. The prerequisite		oral part is
	ing passed the written test. Examination content is based on syllabi of courses XSP1, XSP2, and XSP3 or on an individual study plan		
04XSZ1	Spanish for Beginners Z1	Z	2
	e first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamentally properties and surface of programs of stage of the first stage of the students will master phonetics and fundamentally properties of spanish studies; during the first stage the students will master phonetics and fundamentally properties of spanish studies; during the first stage the students will master phonetics and fundamentally properties and surface of the first stage the students will master phonetics and fundamentally properties and surface of the first stage the students will master phonetics and fundamentally properties and surface of the first stage the students will master phonetics and fundamentally properties and surface of the first stage the students will master phonetics and fundamentally properties and surface of the first stage of the students will be supported by the first stage of the students will be supported by the stage of the students will be supported by the stage of	_	
	o communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spa	anish and will deve	-
04XSZ2	Spanish for Beginners Students Z2	ا کے ا	2
	ased on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures an nderstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries a		
enable them to un	iderstand short adapted written texts and speech. Attention is also paid to cultural differences between opanish-speaking countries a	and others such as	THE CZECTI
	Republic, Realia of Spanish-speaking countries are also included.		
04XS73	Republic. Realia of Spanish-speaking countries are also included. Spanish for Reginners 73	7	
04XSZ3 This course builds	Spanish for Beginners Z3	Z Z	2
This course builds	Spanish for Beginners Z3 upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes	es an introduction to	2 o the realia
This course builds and cultural contex	Spanish for Beginners Z3	es an introduction to the pretérito perfec	2 o the realia to, pretérito
This course builds and cultural contex	Spanish for Beginners Z3 upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including	es an introduction to the pretérito perfec	2 o the realia to, pretérito
This course builds and cultural contex	Spanish for Beginners Z3 supon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to f Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including or imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics.	es an introduction to the pretérito perfec	2 o the realia to, pretérito
This course builds and cultural contex indefinido, pretérite 04XSZ4 The course is base	Spanish for Beginners Z3 supon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including to imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. through targeted reading and listening activities. Spanish for Beginners Z4 and on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish	s an introduction to the pretérito perfec Students are prepa Z n speaking countrie	2 of the realianto, pretérito ared for this 2 s, mainly of
This course builds and cultural contex indefinido, pretérito 04XSZ4 The course is base Spain. It pays atter	Spanish for Beginners Z3 Expanish for Beginners Z3 Expanish for Beginners Z3 Expanish support the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including to imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. through targeted reading and listening activities. Spanish for Beginners Z4 End on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish intion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	s an introduction to the pretérito perfec Students are prepa Z n speaking countrie e imperative, and su	2 of the realianto, pretérito ared for this 2 s, mainly of
This course builds and cultural contex indefinido, pretérito 04XSZ4 The course is base Spain. It pays atter	Spanish for Beginners Z3 upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including of imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. through targeted reading and listening activities. Spanish for Beginners Z4 and on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish ntion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listeni	s an introduction to the pretérito perfec Students are prepa Z n speaking countrie e imperative, and su	2 o the realia tto, pretérito ared for this 2 s, mainly of abjunctive),
This course builds and cultural contex indefinido, pretérito 04XSZ4 The course is base Spain. It pays atter	Spanish for Beginners Z3 Eupon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including to imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. through targeted reading and listening activities. Spanish for Beginners Z4 and on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish thion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listeni Spanish for Beginners Z5	s an introduction to the pretérito perfect Students are prepared Z a speaking countrie e imperative, and sung to them.	2 to the realia tto, pretérito ared for this 2 s, mainly of abjunctive),
This course builds and cultural contex indefinido, pretérito 04XSZ4 The course is base Spain. It pays atter	Spanish for Beginners Z3 upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including of imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. Through targeted reading and listening activities. Spanish for Beginners Z4 and on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish notion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the towritten and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listenities of Spanish for Beginners Z5 are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for	s an introduction to the pretérito perfect Students are prepared Z a speaking countrie e imperative, and sung to them.	2 to the realia tto, pretérito ared for this 2 s, mainly of abjunctive),
This course builds and cultural contex indefinido, pretérito 04XSZ4 The course is base Spain. It pays atter 04XSZ5 The course books	Spanish for Beginners Z3 To upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes to of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including to imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. Through targeted reading and listening activities. Spanish for Beginners Z4 and on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish to further grammar topics (perifrasis verbales, future imperfecto, direct object and indirect object pronouns, negative form of the towritten and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listenity of the Spanish for Beginners Z5 are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for part, the general Spanish course based on the course book will end with a written and oral examination.	s an introduction to the preterito perfect Students are prepared in speaking countries imperative, and sung to them. Z or specific purposes	2 c) the realia tto, pretérito arred for this 2 s, mainly of abjunctive), 2 s. In its final
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12BPFI2	Bachelor Project 2	Z	10
The bachelor proje	ct is based on a topic approved by the administrators of the programme, department and by the dean. The student is guided by the proj	ect supervisor duri	ing common
	regular meetings and discussions.	T	
12EPR1	Basic Electronics Practicum 1	KZ	3
The aim of the pr	acticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation	of the results. The	practicum
	consists of blocks lasting 4 hours.		T
12EPR2	Basic Electronics Practicum 2	KZ	3
The aim of the pr	acticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation	of the results. The	practicum
	consists of blocks lasting 4 hours.		1
12LAS	Laser Systems	Z,ZK	3
	e nanosecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers. C		-
and raman lasers	Semiconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultravi power continuous lasers. Infrared high power lasers. Submilimeter lasers. Lasers with high degree of coherence. Free electron I	•	asers. High
401.704			
12LTB1	Laser Technique 1	Z,ZK	3
· ·	Stability. Transverse and Longitudinal Modes. Elements of Open Resonators. Threshold of laser oscillations. Gausian beam as an app		
	ethod. Optical radiation propagation in resonant medium. Two-level approximation. Equations for polarisation and inversion, dispersio non-coherent pulse propagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optica		erent and
12LTB2	Laser Technique 2		3
12L1D2	· ·	Z,ZK) 3
401405	Laser oscillator, the rate equation, the laser amplifier, Q-switching, mode-locking	71/	
12MOF	Molecular Physics	ZK	2
	deas on physics of molecules and molecular matter, and on structure-to-physical properties relationship. Methods of molecular struct		
12MPP1	Microprocessor Laboratory 1	KZ KZ	4
Become acquainte	ed with a development board based on PIC16F873A and PIC16F877A microcontrollers, development environment MPLAB X IDE, PR		er, ASIX UP
4014000	program, and PICkit3 debugger. Programming in assembly and C language for microcontrollers. Basic operations with microcontrolle		
12MPP2	Microprocessor Laboratory 2	KZ	4
_	nore PIC16F877A internal modules on PVK40 development board: PWM module (Capture/Compare), parallel communication interfac		
-	ial communication interface USART, serial communication interface I2C/SPI, microcontroller PIC18F45K20. Programming in C langua		
12MPR1	Microprocessors 1	ZK	4
	nd microcomputer, microprocessor types, memory types CPU, memory, Input output. Code and data, addressing modes(direct, indir		
memory, procedure	e calls, IO devices - program control, interrupt. Microprocessor Microchip PIC16F877A, Instruction codes- Assembler and Macroassem	ibier, programming	ianguages.
40MDD0	RISC processors - principles	71/	
12MPR2	Microprocessors 2	ZK	2
	rchitecture IA-32. Data types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assemble		
12NT	Nanotechnology	ZK	2
	duce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Physica		
	ogies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technolog paration. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for hetel	•	
· ·	cussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer		
growths will be dis	as well as soldering and encasement.	preparation will be	memoried
12OSY	Operating Systems	ZK	3
	kernel, memory management, process, multitasking, interprocess communication, input/output, drivers, queues, client-server, internet	1	_
3.,	environment, user interface, system security, open systems.	,	3
12UFN	Introduction to Photonics and Nanostructures	KZ	3
	tructures and nanotechnologies; quantum technologies; quantum nanostructures; photonic structures; nanophotonics and nanoplasm		1
	fibers; integrated photonics; computer simulations; technological realization; student presentations		
12VFT	High Frequency and Impulse Circuitry	Z,ZK	2
	rse is to collect advanced knowledge in high frequency technics and high speed events. The course is focused on Maxwell equation s		l .
3	frequency technics, microwaves guidelines, striplines, oscillators, amplifiers and pulse generators.	,	, J
12VTV	Scientific and Technical Computing	Z	2
	familiar with methods of solving of computational problems in the scientific and technical practice, and with methods of their program	1	I
	mainly to programming in the Fortran language.	J	
12YAPL	Application of Lasers	Z,ZK	2
	pplication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot		_
12YNME1	Numerical Methods 1	Z,ZK	4
	is the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Me		ı
· ·	icists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computat		-
	used as a demonstration tool. The seminars are held in computer laboratory.		
12YPAS	Computer Algebra Systems	Z	2
	d introduction to computer algebra systems (CAS): their main characteristics, ways and means of using them. Constituent part is real	lized in computer c	lassrooms:
	students acquire basic skills with CAS by solving relatively simple and basic tasks from mathematics and physics.		
12YRSEN	Control Systems and Sensors	Z,ZK	4
	esses the theory, analysis, and implementation of linear analog and digital control systems, as well as sensors for various physical qu	1	lecture is
devoted to compute	er modeling and simulation using MATLAB, along with practical measurements conducted by the students on a continuous system with ana	alog control (a servo	omechanism
	with an electric motor) or a continuous system with discrete control (temperature control using a thermoelectric cooler modul	le).	
12YULTB	Introduction to Laser Technique	KZ	3
Overview of electr	romagnetic radiation sources; laser principle; classification of lasers; characterization and rough application of various types of lasers;	, laser safety preca	utions. The
	laser amplifier, Q-switching, mode-locking.		
12YUNXAP	Introduction to UNIX	Z	2
	pperating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface		
	ting systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working wi		
Command interpre	eter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard to	ols. Computer netv	vorks. Local

computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a computer. Network services: hardware sharing, mail, scp, etc. Network applications
12YUVP Introduction to Scientific Computing Z 2
Practically oriented Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with some basic tools fort scientific and technicval computing, data analysis, data visualisation and algorithm development.
12YVKT Vacuum Technology KZ 4
Rarefied gasses: basic concepts and relations; diffusion, flow of rarefied gases. Flow and current of gas, conductivity. Interaction of gas with solid surface; sorption, desorption; gas
ransport through solid matter; evaporation, condensation; Vacuum generation: Pumping proces, Ultimative pressure, Pumping speedPumps and their properties:-Positive displacemen
pumps: Diaphragm, Sliding vane rotary, Diffusion, Molecular, Roots, Molecular and Turbomolecular pumps. Sorption pumps: Cryopumps, Cryo-Adsorption pumps, Sublimation and
NEG pumps, lon getter pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping speed; gas flow, search for leaks. Materials and vacuum components
and seals.Practical exercises.
12YVPMF Selected Topics in Modern Physics Z 3
The aim of this course is to improve students knowledge in modern parts of physics (such as measuring of gravitational waves, neutrinos, discovery of Higgs boson, principles of light
emitting diodes,) with a partial help of computer algebra systems (e.g. Maple). Apart from the other courses related to modern physics taught in this study program, this course does not deal with detailed mathematical formalism of studied phenomena. Therefore, the secondary aim is the increase of students motivation for deeper understanding of modern physics
and its laws in their following study
12YZAOP Fundamentals of Optics Z,ZK 2
The lecture covers the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and 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
vork. 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.
12YZELD Fundamentals of Electrodynamics Z,ZK 2
Subject starts by derivation of Maxwell-Lorentz microscopic equations followed by transition to Maxwell macroscopic theory. Using special theory of relativity formulae are found for
ransformation of field vectors between two inertial systems of coordinates with appropriate invariants. Wave and Helmholtz equations are derived. By expansion into plane monochromatic
waves methods of solving these equations are studied in homogeneous media with gradually increasing complexity: isotropic without losses, with absoption, with dispersion, and
non-isotropic. Finally, solution in weakly non-homogeneous madia is presented using the method of eiconal. Individual chapters are illustrated by appropriate examples.
12YZFP Principles of Plasma Physics Z,ZK 4 Basic physics of high temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants, linear theory of waves in plasmas
and propagation of electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and parametric instabilities are explained
It comprises brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas are introduced.
12YZFS Fundamentals of Photonic Structures Z,ZK 2
The lecture covers the basics of photonic structures, it classifies photonic structures compares them with the electronic structures, summarizes their preparation and characterization
Specifically, the lecture discusses the basic physics and technology of optical waveguides; it introduces basic linear, nonlinear, and active structures of integrated photonics for
applications in optical communications and sensors. Next, the attention is given to introduction of plasmonic structures and plasmonics, periodic structures and photonic crystals,
metamaterials, metasurfaces, and finally to photonic structures for quantum technologies. Finally, the lecture is closed with student presentations on selected relevant topics and
excursions to selected photonic laboratories.
12YZMDT Measurement and Data Processing Z,ZK 2
Basic knowledge for the measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propeties, data fitting, separation of the
signal from the noise.
12YZPLT Basic Laser Technique Laboratory KZ 6
asers, solid state Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmonic, He-Ne glow discharges, lase
diode, diode pumped Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto-optic modulators.
12YZPOP Basic Optical Laboratory KZ 6
The practical laboratories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated.
12ZEL1 Basic Electronics 1 Z,ZK 3
The subject provides primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circuit analysis methods for linear
circuits include symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effects inside linear circuits.
12ZEL2 Basic Electronics 2 Z,ZK 3
The subject follows up with the Basic Electronics 1. Semiconductor elements basic properties are explained. The course's final part deals with basic themes of logical circuits field.
12ZFD Physical Data Visualization KZ 2
Vector graphics basics, scientific plots, dala visualization basics, measurements results presentation
14YELM Electron Microscopy KZ 2
Abstract: In this course the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The introductory part is dedicated as the application of microscopic methods used for the characterization of materials, thin layers or nanoparticles. The introductory part is dedicated as the application of the process of the
o 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 nathematical 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.
14YTED Creating Electronic Documents Z 2
Basic skills for creating and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentations and entire documents in a
office suite.
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, the fact that
he validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are illustrated by examples solved
in exercises.
15YCH1 General Chemistry 1 Z 3
The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical use are illustrated by examples
solved in exercises.
18YPRC1 Programming in C++ 1 Z 4
18YPRC1 Programming in C++ 1 Z 4 This course covers mainly the C programming language and non-object oriented features of the C++ language.

18YPRC2	Programming in C++ 2	KZ	4		
This co	This course covers the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Library.				
18YZALG	Basics of Algorithmization	Z,ZK	4		
This course is	This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the algorithm complexity.				
18YZPRO	Basics of Programming	Z	4		
This course is intended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in programming and with the Python					
	programming language.				
TV-1	Physical Education	Z	1		
TV-2	Physical Education	Z	1		
TV-3	Physical education	Z	1		
TV-4	Physical education	Z	1		

For updated information see http://bilakniha.cvut.cz/en/FF.html Generated: day 2025-11-05, time 20:28.