Study plan

Name of study plan: BS jaderné inženýrství B

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Nuclear Engineering

Garantor of the study branch: doc. Ing. Martin Kropík, CSc.

Program of study: Applications of Natural Sciences

Type of study: Bachelor full-time

Required credits: 166
Elective courses credits: 14
Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 166

The role of the block: PO

Code of the group: BSJIBPP1

Name of the group: BSJIB - povinné p edm ty 1. ro ník

Requirement credits in the group: In this group you have to gain at least 53 credits

Requirement courses in the group: In this group you have to complete at least 15 courses

Credits in the group: 53 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)	Completion	Credits	Scope	Semester	Role
02ELMA	Tutors, authors and guarantors (gar.) Electricity and Magnetism Goce Chadzitaskos, Josef Schmidt, Ji í Hrivnák, David Be Ji í Hrivnák (Gar.)	Z,ZK	6	4+2	L	РО
02EXF1	Experimental Physics 1 Katarína K ížková Gajdošová Katarína K ížková Gajdošová (Gar.)	Z	2	2+0	L	РО
01LALB	Linear Algebra B 1, Examination Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková Petr Ambrož (Gar.)	ZK	3	-		РО
01LAB2	Linear Algebra B2 Petr Ambrož Petr Ambrož (Gar.)	Z,ZK	4	1+2	L	РО
01LAL	Linear Algebra 1 Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		РО
01LNA1	Linear Algebra 1 Lubomíra Dvo áková	Z	2	2+2		РО
01LAZ	Linear Algebra 1, Examination Lubomíra Dvo áková	ZK	2	-	Z	РО
01MA	Calculus 1	KZ	6	2+4		РО
01MANB	Calculus B 1, Examination Mat j Tušek	ZK	4	-		РО
01MAB2	Calculus B2 Severin Pošta, Edita Pelantová Severin Pošta (Gar.)	Z,ZK	7	2+4	L	РО
01MA1	Calculus 1	Z	4	4+4	Z	РО
01MAN	Calculus 1 Severin Pošta, Edita Pelantová Severin Pošta (Sar.)	Z	4	4+4		РО
01MAZ	Calculus 1, Examination Mat j Tušek	ZK	4	-	Z	РО
02MECH	Mechanics David Be, Antonín Hoskovec David Be (Gar.)	Z	4	4+2	Z	РО
D2MECHZ	Mechanics - Examination Goce Chadzitaskos, David Be, Antonín Hoskovec, Filip Petrásek, Stanislav Skoupý Antonín Hoskovec David Be (Gar.)	ZK	2	-	Z	РО
15CH1	General Chemistry 1 Alois Motl, Petr Distler, Václav uba Petr Distler Alois Motl (Gar.)	Z	3	2+1	Z	РО
15CH2	General Chemistry 2 Alois Motl, Petr Distler, Václav uba Petr Distler Alois Motl (Gar.)	Z,ZK	3	2+1	L	РО
00PT	Preparatory Week Michal Beneš Michal Beneš (Gar.)	Z	2	týden	Z	РО

	Iomas Bily, Jan Frybort, Petr Hauslid, Radek Musalek					
18ZPRO	Basics of Programming Vladimír Jarý, Zden k ulík, Miroslav Virius, Lucie Roškotová, Aleš Suchomel, František Vold ich, Jan Thiele Miroslav Virius	Z	4	2P+2C	Z	РО
Characteristics	of the courses of this group of Study Plan: Code=BSJIBPP1 Name=I	BSJIB - povi	nné p ed	dm ty 1. r	o ník	
02ELMA	Electricity and Magnetism		•		,ZK	6
-	ulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectric	cs. Electric currer	nt and circu			-
•	mic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. E				•	•
02EXF1	Experimental Physics 1			Ti T	Z	2
-	an introductory course in experimental physics. Students will learn methods of measurement of	basic physical gr	uantities an	d methods of	1	
01LALB	Linear Algebra B 1, Examination				ZK	3
01LAB2					Z,ZK	4
	Linear Algebra B2	or spaces with a	scalar prod			-
01LAL	Linear Algebra 1				Z	2
01LNA1	Linear Algebra 1				Z	2
-	rizes the most important notions and theorems related to the study of vector spaces.			1	_	_
01LAZ	Linear Algebra 1, Examination				ZK	2
-	subject is the exam in Linear Algebra 1.			1 '		2
01MA	Calculus 1				KZ	6
	and set theory basics, mapping and its properties, set of real and complex numbers, sequences	of real and com	nlev numbe	1	- 1	_
· ·	is, real function of one real variable, limit of function, derivative, Cauchy and Lagrange mean val		•	,		ivergent and
		de trieorems, fui	iction grapi			
01MANB	Calculus B 1, Examination				ZK	4
	wledge about stuff lectured in the 01MAN course.				714	
01MAB2	Calculus B2			2	,ZK	7
	analysis, indefinite and definite integrals and series).					
01MA1	Calculus 1				Z	4
	I analysis (functions of one real variable, differential calculus).					
01MAN	Calculus 1				Z	4
Basic calculus (real	analysis, functions of one real variable, differential calculus).					
01MAZ	Calculus 1, Examination				ZK	4
02MECH	Mechanics				Z	4
ntroduction to physi	cs, physical quantities and units. Particle kinematics, basic types of motion and their superposition	on. Particle dynar	nics, one-d	imensional e	quations of i	notion, moti
in central force field	, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem	n, collisions. Mec	hanics ofrig	id body, rotat	tion. Fundan	nentals of
continuum mechani	ics, elasticity, hydrodynamics. Sound.					
02MECHZ	Mechanics - Examination				ZK	2
				'	· ·	
The content of the s	subject is the examination according to the plan of studies.					
	· · · · · · · · · · · · · · · · · · ·				Z	3
15CH1	subject is the examination according to the plan of studies. General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist	ry I. Their signific	ance and p	ractical use a		-
15CH1	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist	ry I. Their signific	ance and p	ractical use a		-
15CH1 The most important solved in exercises.	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist	ry I. Their signific	ance and p		are illustrate	-
15CH1 The most important solved in exercises. 15CH2	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2			Z	are illustrate	d by exampl
15CH1 The most important solved in exercises. 15CH2 The subject is the c	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles general chemistry I.	overning chemica	al processe	Z s. Using vario	are illustrate	d by example 3 s, the fact the
15CH1 The most important solved in exercises. 15CH2 The subject is the country the state of these	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2	overning chemica	al processe	Z s. Using vario	are illustrate	d by example 3 s, the fact the
15CH1 The most important solved in exercises. 15CH2 The subject is the che validity of these n exercises.	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles graphinciples is not restricted only to chemical processes is documented. The significance and pra	overning chemica	al processe	Z s. Using vario	are illustrate	d by exampl 3 s, the fact the
15CH1 The most important solved in exercises. 15CH2 The subject is the che validity of these n exercises.	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles grantiniciples is not restricted only to chemical processes is documented. The significance and pra Preparatory Week	overning chemica	al processe	Z s. Using vario iples are illus	Z,ZK bus example trated by ex	3 s, the fact the amples solved
15CH1 The most important solved in exercises. 15CH2 The subject is the country the validity of these in exercises. 00PT 17UINZ	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles grantiniciples is not restricted only to chemical processes is documented. The significance and pra Preparatory Week Introduction to Engineering	overning chemica	al processe ained princ	Z s. Using vario iples are illus	Z,ZK bus example trated by ex	3 s, the fact the amples solve 2 3
15CH1 The most important solved in exercises. 15CH2 The subject is the count the validity of these in exercises. 00PT 17UINZ The course is devoted.	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles grantiniciples is not restricted only to chemical processes is documented. The significance and pra Preparatory Week	overning chemica ctical use of expl	al processe ained princ	z. Using various iples are illus	ZZK pus example trated by ex	3 s, the fact the amples solv 2 3 n overview o
15CH1 The most important solved in exercises. 15CH2 The subject is the c the validity of these in exercises. 00PT 17UINZ The course is devot the basics of selecters	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles granting principles is not restricted only to chemical processes is documented. The significance and pra Preparatory Week Introduction to Engineering ted to an introduction to the engineering profession. Students will gradually learn the characteris	overning chemical citical use of explications of explications and special countries and control and co	al processe ained princ ies of engin d assuranc	z. Using various iples are illus	ZZK pus example trated by ex	3 s, the fact the amples solve 2 3 n overview o
15CH1 The most important solved in exercises. 15CH2 The subject is the count the validity of these in exercises. 00PT 17UINZ The course is devoto the basics of select focus on some issue.	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles graphiciples is not restricted only to chemical processes is documented. The significance and pra Preparatory Week Introduction to Engineering ted to an introduction to the engineering profession. Students will gradually learn the characterised engineering disciplines, such as the basics of materials science, manufacturing technology, ces of R&D activities organization and on selected parts of technical drawings and the work	overning chemical citical use of explications of explications and special countries and control and co	al processe ained princ ies of engin d assuranc	z. Using various iples are illus	ZZK pus example trated by ex cycle including ar y, Further, the	3 s, the fact the amples solve 2 3 n overview one course with
15CH1 The most important solved in exercises. 15CH2 The subject is the count the validity of these in exercises. 00PT 17UINZ The course is devote the basics of select focus on some issue 18ZPRO	General Chemistry 1 concepts, quantities and units used in chemistry are introduced in the course General Chemist General Chemistry 2 ontinuation of the course General chemistry I. The main attention is paid to general principles granting principles is not restricted only to chemical processes is documented. The significance and pra Preparatory Week Introduction to Engineering ted to an introduction to the engineering profession. Students will gradually learn the characterised engineering disciplines, such as the basics of materials science, manufacturing technology, or service of the course General Chemistry Introduction to the engineering profession. Students will gradually learn the characterised engineering disciplines, such as the basics of materials science, manufacturing technology, or service of the course General Chemistry Introduction to the engineering profession.	overning chemical citical use of explications and special citics and	al processe ained princ les of engin d assuranc ode.	zs. Using various pless are illus zeering work, e and ecolog	ZZK pus example trated by ex pus example trated by expectation by expectation by example trategies and the push of the push	3 s, the fact the amples solv 2 3 n overview one course with

Z,ZK

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РО

Code of the group: BSJIBPP2

Name of the group: BSJIB - povinné p edm ty 2. ro ník

Requirement credits in the group: In this group you have to gain at least 55 credits

Introduction to Engineering Tomáš Bílý, Jan Frýbort, Petr Haušild, Radek Mušálek

Requirement courses in the group: In this group you have to complete at least 14 courses

Credits in the group: 55

Note on the group:

17UINZ

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
17EXK	Excursion Dušan Kobylka Dušan Kobylka (Gar.)	Z	1	1t	L	РО
17JARE	Nuclear Reactors Tomáš Bílý, Pavel Suk, Ond ej Novák, Bed ich He manský Bed ich He manský (Gar.)	ZK	2	2	L	РО

01MAB3	Calculus B3 Milan Krbálek Milan Krbálek (Gar.)	Z,ZK	7	2+4	Z	PO
01MAB4	Calculus B4 Milan Krbálek, Václav Klika Milan Krbálek (Gar.)	Z,ZK	7	2+4	L	PO
14NMA	Materials Science Petr Haušild, Jaroslav ech Petr Haušild (Gar.)	KZ	3	2+1	5	PO
12NME1	Numerical Methods 1 Pavel Váchal, Ji í Limpouch Ji í Limpouch (Gar.)	Z,ZK	4	2+2	L	РО
02TEF1	Theoretical Physics 1 Petr Novotný Igor Jex (Gar.)	Z,ZK	4	2+2	Z	PO
02TEF2	Theoretical Physics 2 Petr Novotný, Igor Jex Jan Vysoký Igor Jex (Gar.)	Z,ZK	4	2+2	L	РО
02TSFA	Thermodynamics and Statistical Physics Jaroslav Novotný, Igor Jex Igor Jex (Gar.)	Z,ZK	4	2+2	L	РО
17THNJ1	Thermohydraulics Design of Nuclear Devices 1 Dušan Kobylka Dušan Kobylka (Gar.)	Z	2	2+0	Z	PO
17THNJ2	Thermohydraulics Design of Nuclear Devices 2 Dušan Kobylka Dušan Kobylka (Gar.)	Z,ZK	3	2+1	L	PO
02VOAF	Waves, Optics and Atomic Physics Josef Schmidt Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	PO
01VYMA	Selected Topics in Mathematics Ji í Mikyška Ji í Mikyška (Gar.)	Z,ZK	4	2+2	L	PO
17ZAF1	Introduction to Nuclear Reactor Physics 1 Milan Štefánik Milan Štefánik (Gar.)	KZ	4	3+1	Z	PO

Characteristics of the courses of this group of Study Plan: Code=BSJIBPP2 Name=BSJIB - povinné p edm ty 2. ro ník 17EXK Excursion This course - excursion - has to provide the basic ideas about various nuclear devices of various parts of fuel cycle, their production and operations. There are several research centers, nuclear facilities, machine works, etc., that students visit during one week of their examination period. The works we visit usually are: NRI - ež, plc., (reactors LR-0 a LVR-15), Škoda JS plc.. (reactor hall, test loop of control drive mechanism, production of control drive mechanism), radioactive wastes storage Richard, uranium mining (Dolní Rožínka or Mine of chemical mining in Stráž pod Ralskem), Nuclear power plant Temelín, etc. 17.IARF **Nuclear Reactors** Introduction. World power issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety systems, containment. Classification of reactors into IV generations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. Pressurized water reactors (PWR). Western-type PWR (Westinghouse, KWU, Framatom). VVER-type reactors , Temelín nuclear power plant. Boiling water reactors. Heavy water reactors, fast breeder reactors, high-temperature gas cooled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF and INPRO initiatives. Evaluation and selection of proposed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role of nuclear power in long-term outlook 01MAB3 Z,ZKCalculus B3 The course is devoted to functional sequences and series, theory of ordinary differential equations, theory of quadratic forms and surfaces, and general theory of metric spaces, normed and prehilbert?s spaces 01MAB4 Calculus B4 Z,ZK 7 The course is devoted properties of functions of several variables, differential and integral calculus. Furthermore, the measure theory and theory of Lebesgue integral is studied. 14NMA ΚZ 3 Materials Science Introduction to the Materials Science 12NME1 Numerical Methods 1 Z.ZK There are explained the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Methods for solution of tasks very important for physicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computational environment MATLAB is used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory. Theoretical Physics 1 02TFF1 The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of theLagrange formalism. The efficiency of this method is illustrated on elementary examples like the two-bodyproblem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the coursecover differential and integral principles of mechanics. The subject is the first part of the course of classicaltheoretical physics (02TEF1, 02TEF2). Theoretical Physics 2 The Hamilton formalism. The special theory of relativity: relativistic mechanics and classical field theory in the Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipole approximation. Thermodynamics and Statistical Physics 02TSFA 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. 17THNJ1 Thermohydraulics Design of Nuclear Devices 1 With this course, students are introduced into the problem of thermal calculation and design of nuclear devices thermodynamic diagrams. Step by step they will learn more about basic quantities and terms in technical thermodynamic, basic reversible and non-reversible thermodynamic changes and cycles with ideal gas. The main focus of course is in thermodynamic of steam: basic reversible and non-reversible thermodynamic changes with steam and Rankine-Clausius cycle. In detail are analyed miscellaneous methods of thermal efficiency increasing of Rankine-Clausius cycle. Course closure is dedicated to thermodynamic of gas mixtures and humid air. Thermohydraulics Design of Nuclear Devices 2 17THNJ2 Z,ZK With this course, students are introduced into problem of thermohydraulic calculations. Step by step they will learn more about fluid mechanics. The most important part dedicated to fundamentals: description of flow, definition of quantities and equations, pressure drops, 1D description of flow, turbulence and its influences on the flow characteristics, boundary layers and centrifugal pumps. That way students obtain knowledge which are necessary for insight into convection as well as into fundamental principles of devices in nuclear power plants. 02VOAF Waves, Optics and Atomic Physics Z.ZK

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.

01VYMA | Selected Topics in Mathematics | Z,ZK | 4
Fourier series: complete orthogonal systems, expansion of functions into Fourier series, trigonometric Fourier series and their convergence. Complex analysis: derivative of holomorphic

17ZAF1 Introduction to Nuclear Reactor Physics 1 KZ 4

The lectures start with a description of the microworld structure at the level of electrons, protons and neutrons. A description of radioactivity and nuclear reactions follows subsequently. Great focus is given to neutron interactions with matter. The probability of nuclear reactions is described by introducing of cross-sections in dependence on the neutron energy. Fission of heavy atoms is the important process for the operation of nuclear reactors. The students will get familiar with issue of nuclear chain reaction, energy released from fission reaction, and issue of neutron balance. Then the most important reactor types are described including the complete scheme of nuclear power plant with the light water reactor. The analysis of diffusion environments is based on the application of the diffusion equation obtained from Fick's law. Students will be able to determine the neutron flux distribution in various diffusion environments with the point source, planar source, and linear source.

Code of the group: BSJIBPP3

Name of the group: BSJIB - povinné p edm ty 3. ro ník

functions, integral, Cauchy's theorem, Cauchy's integral formula, singularities, Laurent series, residue theorem.

Requirement credits in the group: In this group you have to gain at least 58 credits

Requirement courses in the group: In this group you have to complete at least 15 courses

Credits in the group: 58 Note on the group:

17BPJR1

Bachelor Thesis 1

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
17BPJR1	Bachelor Thesis 1 Dušan Kobylka Dušan Kobylka (Gar.)	Z	5	0+5	Z	РО
17BPJR2	Bachelor Thesis 2 Dušan Kobylka Dušan Kobylka (Gar.)	Z	10	0+10	L	РО
17BES	Control Systems of Nuclear Reactors Martin Kropik Martin Kropik (Gar.)	Z,ZK	2	2+0	L	РО
15CHB	Chemistry Barbora Drtinová Barbora Drtinová (Gar.)	Z,ZK	4	3+1	L	РО
17DEZ	Detection of radiation Marcel Miglierini, Miloš Tichý Tomáš Bílý	Z,ZK	3	2+1	Z	РО
17ENF	Experimental Neutron Physics Jan Rataj Jan Rataj (Gar.)	KZ	2	2+1	L	РО
02KF	Quantum Physics Filip Petrásek Libor Šnobl (Gar.)	Z,ZK	3	2P+1C	Z	РО
01NME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	РО
01RMF	The Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	6	4+2	Z	РО
14TM	Engineering Mechanics Ji í Kunz, Jan Ondrá ek Ji í Kunz (Gar.)	Z,ZK	4	2+2	3	РО
17THNJ3	Thermohydraulics Design of Nuclear Devices 3 Dušan Kobylka Dušan Kobylka Dušan Kobylka (Gar.)	Z,ZK	3	2+1	Z	РО
17URO	Introduction to Radiation Protection of Nuclear Facilities Radovan Starý Radovan Starý (Gar.)	KZ	2	2+0	L	РО
17ZEL	Basics of Electronics Martin Kropík Martin Kropík (Gar.)	KZ	3	2+2	Z	РО
17ZAF2	Introduction to Nuclear Reactor Physics 2 Jan Frýbort, Lenka Frýbortová Dušan Kobylka Lenka Frýbortová (Gar.)	Z,ZK	3	2+1	L	РО
02ZJF	Nuclear Physics Vladimír Wagner (Gar.)	Z,ZK	6	3+2	Z	РО

Characteristics of the courses of this group of Study Plan: Code=BSJIBPP3 Name=BSJIB - povinné p edm ty 3. ro ník

1.75.0	Bacheler medic 1	_	•				
Subject deals with prob	ematic of officially given theme of bachelor thesis and its defense during state examination that is necessary for completion	of bachelor study.	The guarantor				
of the given theme is an advisor that defines literature, checks the progress and ability of work defense, and operatively solves problems of the work. Student individually or with a little							
help of guarantor or cor	help of guarantor or consultant solves given problem. Theme of work is generally selected from the list and is approved by the head of department and the faculty dean. The work is						
evaluated by one oppor	ent. Contact hours relate to cooperation with the supervisor and are solved according to work needs. The subject is therefore n	ot included in the	faculty timetable.				
17BPJR2	Bachelor Thesis 2	Z	10				
Subject deals with prob	ematic of officially given theme of bachelor thesis and its defense during state examination that is necessary for completion	of bachelor study.	The guarantor				
of the given theme is ar	advisor that defines literature, checks the progress and ability of work defense, and operatively solves problems of the work.	Student individua	ally or with a little				
help of guarantor or cor	nsultant solves given problem. Theme of work is generally selected from the list and is approved by the head of department a	nd the faculty dea	n. The work is				
evaluated by one oppor	ent. Contact hours relate to cooperation with the supervisor and are solved according to work needs. The subject is therefore n	ot included in the	faculty timetable.				
17BES	Control Systems of Nuclear Reactors	Z,ZK	2				
Matter of the subject is	Matter of the subject is concentrated on categorization of systems in nuclear power plant according to importance to nuclear safety; next on requirements of different categories of						

Matter of the subject is concentrated on categorization of systems in nuclear power plant according to importance to nuclear safety; next on requirements of different categories of systems and typical instrumentation of research nuclear facilities and nuclear power plants. Attention is given to definition of nuclear safety, single failure criterion and redundancy, common cause failures, independence and diversity; furthermore to qualification of safety systems. At the end, lectures deal with control and safety systems of systems research nuclear facilities. The lectures are completed with visit of the training reactor VR 1 with demonstration of its safety and control system.

15CHB | Chemistry | Z,ZK | 4 | At first, the principles of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are discussed. The main attention is paid to the individual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioactive media encountered in NPP. The technological operations used to the treatment of wastes and the corrosion problems of the construction materials are discussed in detail, too.

17DEZ Detection of radiation The course provides basic information on detection of ionizing radiation. Summary of basic knowledge of nuclear physics necessary to understand derived from parallel course 02ZJF is the content of the first lecture. The main part of the course contain information on sources of radiation and methods of radiation detection of neutrons. Spectroscopy is lectured similarly: all kinds of ionizing radiation with a special lecture on neutron spectroscopy. Emphasis is given on physical principles of detection and spectroscopy but appropriate detection

technique and its set-up is provided in an appropriate detail. Last lecture as an introduction to laboratory exercises is devoted to theory of probability and mathematical statistics with emphasis on processing of experimental data because the course on theory of probability and mathematical statistics is no more in CV of nuclear engineering. Basics of writing of scientific article is provided also to make easier writing a laboratory protocol as first student scientific text. Laboratory exercise are rather important part of the course amounting about 2/3 of the time (5-6 tasks). Students are given a problem with prepared short description and task to measure some quantity(ies) and write a protocol as scientific text (an article).

Exercise is carried out in groups of maximum 3 students; protocol is written individually.

Experimental Neutron Physics

The lectures are mainly focused on detailed characterisation of neutron properties, characteristics of neutron (reactor and non reactor) sources, properties of prompt and delayed neutrons, neutron detection methods, neutron induced nuclear reactions, modification and adjustment of neutron field, science and industry neutron applications. Last lecture deals with experimental data processing and analysis. The lectures are supplemented with experimental practices in the field of neutron detection, determination of delayed neutron properties, study of neutron diffusion in various materials, preparation and characterisation of photo-neutron source and neutron source calibration. Experimental practices will be running at training reactor VR-1 and in the neutron laboratory.

02KF Quantum Physics

State description, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heisenberg uncertainty principle, quantization of angular momentum, solution of simple systems, hydrogen atom.

01NME2 Numerical Methods 2 ΚZ

2

The course is devoted to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations. It explains methods converting boundary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equations

01RMF The Equations of Mathematical Physics Z,ZK

6

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

14TM Engineering Mechanics Z,ZK

The course represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with the stress and strain analysis of real structure parts.

17THNJ3 Thermohydraulics Design of Nuclear Devices 3

With this course, students are introduced into problem of thermohydraulic calculations. Step by step they will learn more about fundamentals chapters of heat transfer. Are discussed all types basic modes of heat transfer (conduction, convection a radiation). The lectures are focused to fields which are necessary for designs of nuclear reactors as well as others

17URO Introduction to Radiation Protection of Nuclear Facilities

The course is focused on introduction to the problems of radiation protection at nuclear facilities; the legislative context; the utilization of radiation sources in controlled and monitored areas; practical activities to monitor and measure radiation situation, the protection of public and workers against ionizing radiation.

17ZEL **Basics of Electronics**

devices in nuclear power plants.

ΚZ

Lectures provide basic information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and solution of electrical circuits with them. Next, lectures deal with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor components with more layers (thyristors and triacs). Lectures continue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/digital converters. Lectures are completed with electronic laboratory exercises.

Introduction to Nuclear Reactor Physics 2 17ZAF2

Z,ZK

3

Lectures follow up 17ZAF1 and expands application of diffusion theory derived based on Fick's low for diffusion in gases. Analysis of bare homogeneous reactor and homogeneous reactor with reflector is main part of lectures. Three basic geometry are considered in derivation - slab, sphere, cylinder. Students learn to determine spatial distribution of neutron flux for each part (reactor core and reflector) and individual energetic groups, based on critical equation they learn how to calculate critical amount of fissile material or critical dimensions. Possible use of diffusion theory is discussed also for fast reactor and differences between thermal and fast reactors are stressed. Part is addicted to reactor regulation and analysis of control rods. There are also summarized differences between homogeneous and heterogeneous reactors.

02ZJF **Nuclear Physics** Z,ZK

6

This scientific field presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic domain, where much of our classical intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.

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: BSJAZYKY Name of the group: BS - jazyky Requirement credits in the group:

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

Credits in the group: 0

Note on the group.

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Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04AMZK	English for Intermediate Students Examination Hana ápová, Jana Ková ová Jana Ková ová Hana ápová (Gar.)	ZK	4		Z	PV
04APZK	English for Advanced Students Examination Kevin Patrick Joseph Glanville, Beatriz Vadillo Gonzalo	ZK	5		Z	PV
04CESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV

04CESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	5	Z	PV
04FMZK	French for Intermediate Students Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4	Z	PV
04FPZK	French for Intermediate Students Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	5	Z	PV
04FZZK	French for Beginners Examination V ra Šlechtová V ra Šlechtová (Gar.)	ZK	3	L	PV
04NMZK	German for Intermediate Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	4	Z	PV
04NPZK	German for Advanced Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	5	Z	PV
04RMZK	Russian for Intermediate Students Examination Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4	Z	PV
04RPZK	Russian for Intermediate Students Examination Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	5	Z	PV
04RZZK	Russian for Beginners Examination Zhanna Isaeva	ZK	3	L	PV
04SMZK	Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	4	Z	PV
04SPZK	Spanish for Advanced Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	5	Z	PV
04SZZK	Spanish for Beginners Examination Jana Ková ová, Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	3	L	PV
01	(0) 0 0 0 0 0	DO : 1		-	'
	e courses of this group of Study Plan: Code=BSJAZYKY Name	=BS - jazyky		71/	
1	nglish for Intermediate Students Examination	d 04AM2 sources	and consists	ZK	(100 min) and
	examination as given by the study plan. The examination covers the 04AM1, 04AM2, ar ent is expected to master the AM syllabus and demonstrate the ability to apply their kno			•	(100 min) and
		wiedge gained in	the three Engli		
	nglish for Advanced Students Examination			ZK	5
	examination as given by the study plan. The student is supposed to demonstrate maste	•			•
	courses. The examination consists of 2 parts - written (110 min) and oral (30 min) and	includes also oral	presentation of	of a topic from the stu	ident's field of
study.					
04CESMZK C	zech for Intermediate Students Examination			ZK	4
1	examination as given by the study plan. The examination consisting of a written and oral	part covers all the	e topics of the	1	es and can only
	ompletion of the 3 courses. Detailed information is to be obtained from the teacher.	F			
	<u>'</u>			71/	
	zech for Foreign Students - Advanced Examination			ZK	. 5
	examination as given by the study plan. The examination consisting of a written and ora	part covers all th	e topics of the	04CESP1,2,3 course	es and can only
	ompletion of the 3 courses. Detailed information is to be obtained from the teacher.				
	rench for Intermediate Students Examination			ZK	4
The content is the examina	ation as given by the study programme. The whole French programme is ended with an	examination cove	ring the conter	nts of FM1-FM3. The	examination
consists of a written and or	al part and is organized according to Examination Instructions, a document available o	n the web.			
04FPZK F	rench for Intermediate Students Examination			ZK	5
	is ended with an examination covering the contents of FP1-FP3. The examination con-	sists of a written a	ind/or an oral n		_
	a document available on the web. Assessment of the presentation is included into the ex			dit and is organized	according to
		Ramination grading	y	716	
04FZZK F	rench for Beginners Examination			ZK	3
The content is the examina	ation as given by the study plan. The course is terminated with an examination consisting	g of oral and writt	en part. The ex	camination is ruled by	the document
Instruction for examination	. Its content covers the levels FZ1 - FZ5.				
04NMZK G	erman for Intermediate Students Examination			ZK	4
The course content is the e	examination as given by the study plan. The whole German for Intermediate Students Co	urse is completed	by an examina	ation consisting of two	parts - writter
and oral, which cover the co	ourses 04NM1 - 04NM3. The oral part follows after passing the written part successfully a	and after obtaining	the 04NM3 as	sessment. More detail	iled information
is to be obtained from the t		, and a second			
04NPZK G	erman for Advanced Students Examination			ZK	5
	examination as given by the study plan. The whole German for Advanced Students Cou	rse is completed l	ov an examinat	1	_
	ourses 04NM1 - 04NM3. The oral part follows after passing the written part successfully	-	-	_	-
information is to be obtained		and obtain	U II U U		
				71/	A
I I	ussian for Intermediate Students Examination	l orol overe!+!	tooting the L	ZK	4
	examination as given by the study plan. The course is completed by taking a written and		-	-	-
	e for the oral examination only after a prior pass in RM3 and a successful written exam	nation. Students a	are given instru		
1	ussian for Intermediate Students Examination			ZK	5
	examination as given by the study plan. The course is completed by taking a written and		-	-	-
	e for the oral examination only after a prior pass in RP3 and a successful written examination	nation. Students a	re given instru	ctions by the teacher.	
04RZZK R	ussian for Beginners Examination			ZK	3
The course content is the	examination as given by the study plan. The course is completed by taking a written and	d oral examination	testing the known	owledge and skills ac	quired in RZ1
	e for the oral examination only after a prior pass in RZ5 and a successful written examin		-	-	-
	panish for Intermediate Students Examination		-	ZK	4
1	•	itten and oral: to h	e eligible for th	1 1	
	examination as given by the study plan. 04SMZK examination consists of two parts - wr	men and oral, to t	e endinie ioi tu	ie wiitteii part, Studel	no will Have
	ssment for course 04SM3.Oral examination follows the written part.				
	panish for Advanced Students Examination			ZK	5
	examination as given by the study plan. Examination 04SPZK consists of two parts, nar	-			o oral part is
having passed the written	test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an in	dividual study pla	n of the studer	nt.	
04SZZK S	panish for Beginners Examination			ZK	3
1	examination as given by the study plan. Examination consists of two parts - written and	oral. Student can	register for ora	1 1	_
passed the written examina			5	,	
r Jood o million onailling					

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

The role of the block: V

Code of the group: BSVOLPREDM

Name of the group: BS - volitelné p edm ty

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

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
12AUX	Administration of UNIX System Milan Ši or Milan Ši or (Gar.)	KZ	2	2+0	L	V
01ALG	Algebra Pavel Š oví ek	ZK	4	4+0	Z	V
01ALGE	Algebra Zuzana Masáková Zuzana Masáková (Gar.)	Z,ZK	6	4+1		V
11ANEL	Linear Circuit Analysis Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	4	4	Z	V
15CHEM	Analytical Calculations and Chemometry Principals Ji i Zima Ji i Zima (Gar.)	ZK	2	2+0	Z	V
04ABZK	English - State Examination Hana ápová, Jana Ková ová, Dunstan Clarke, Irena Dvo áková, Eliška Rafajová Jana Ková ová Eliška Rafajová (Gar.)	ZK	5	2	L	V
04AM1	English for Intermediate Students M1 Jana Ková ová Hana ápová (Gar.)	Z	1	0+2	Z	V
04AM2	English for Intermediate Students M2 Jana Ková ová Hana ápová (Gar.)	Z	1	0+2	L	V
04AM3	English for Intermediate Students M3 Jana Ková ová Hana ápová (Gar.)	Z	1	0+2	Z	V
04AP1	English for Advanced Students P1	Z	1	0+2	Z	V
04AP2	English for Advanced Students P2 Dunstan Clarke (Gar.)	Z	1	0+2	L	V
04AP3	English for Advanced Students P3	Z	1	0+2	Z	V
16APLB	Application of Ionizing Radiation in Analytical Methods Radek Fu ik	ZK	5	4+0	L	V
12APL	Application of Lasers Helena Jelínková, Alexandr Jan árek Helena Jelínková (Gar.)	Z,ZK	2	2+0	Z	V
11APLG	Applications of Group Theory in Solid State Physics Zden k Pot ek Zden k Pot ek (Gar.)	ZK	2	2	Z	V
02AMS	Atomic and Molecular Spectroscopy Svatopluk Civiš Svatopluk Civiš Svatopluk Civiš (Gar.)	Z,ZK	4	2+2	Z	V
04CESM1	Czech for foreigners - Intermediate Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	Z	V
04CESM2	Intermediate Czech 2 Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
04CESM3	Intermediate Czech 3 Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	Z	V
04CESP1	Czech for Foreign Students - Advanced Examination Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	Z	V
04CESP2	Czech for Foreigners - Advanced Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
04CESP3	Czech for Foreigners - Advanced Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	Z	V
15DALCH	History of Alchemy and Chemistry Vladimír Karpenko Vladimír Karpenko (Gar.)	ZK	2	2+0	Z	V
02DEF1	Igor Jex, Miroslav Myška Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	Z	V
02DEF2	History of Physics 2 Igor Jex Igor Jex (Gar.)	Z	2	2+0	L	V
01DEM	History of Mathematics Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	1	0+2	L	V
02DRG	Differential Equations, Symmetries and Groups Libor Šnobl Jan epila Libor Šnobl (Gar.)	Z	4	2+2	Z	V
01DIM1	Discrete Mathematics 1 Zuzana Masáková Zuzana Masáková (Gar.)	Z	2	2+0	Z	V

01DIM2	Discrete Mathematics 2 Zuzana Masáková Zuzana Masáková (Gar.)	Z	2	2+0	L	V
01DIM3	Discrete Mathematics 3	Z	2	2+0	Z	V
00EKOT	Lubomíra Dvo áková Lubomíra Dvo áková Lubomíra Dvo áková (Gar.) Economy in Technology	Z	1	2+0		V
11ELEA	Jana Ková ová Instrumentation and Measurement	Z,ZK	2	2	L	V
14ELMI	Pavel Jiroušek Pavel Jiroušek (Gar.) Electron Microscopy	Z,ZK	3	2+0		V
	Miroslav Karlík, Petr Kop iva Miroslav Karlík Miroslav Karlík (Gar.) English Graduate Standard 1	·				•
12EGS1	Ivan Procházka	KZ	4	0+4	L	V
18ESPG1	European Computer Driving Licence 1 Zuzana Pet í ková, Jaromír Kukal, Lucie Tylová	Z	2	0+2	Z	V
18ESPG2	European Computer Driving Licence 2 Zuzana Pet í ková	Z	2	0+2	L	V
16EPAM	Exact Methods in Research of Historic Monuments Ladislav Musílek Ladislav Musílek (Gar.)	ZK	2	2+0	Z	٧
02EXF1	Experimental Physics 1 Katarína K ížková Gajdošová Katarína K ížková Gajdošová (Gar.)	Z	2	2+0	L	V
02EXF2	Experimental Physics 2 Katarína K ížková Gajdošová, Jaroslava Óbertová, Petr Chaloupka Jaroslava Óbertová Vojt ch Petrá ek (Gar.)	ZK	2	2+0	Z	V
17ENF	Experimental Neutron Physics Jan Rataj Jan Rataj (Gar.)	KZ	2	2+1	L	V
04FM1	French for Intermediate Students M1 V ra Šlechtová (Gar.)	Z	1	0+2	Z	V
04FM2	French for Intermediate Students M2 V ra Šlechtová (Gar.)	Z	1	0+2	L	V
04FM3	French for Intermediate Students M3 V ra Šlechtová (Gar.)	Z	1	0+2	Z	V
04FP1	French for Advanced Students P1 V ra Šlechtová (Gar.)	Z	1	0+2	Z	V
04FP2	French for Advanced Students P2 V ra Šlechtová (Gar.)	Z	1	0+2	L	V
04FP3	French for Advanded Students P3 V ra Šlechtová (Gar.)	Z	1	0+2	Z	V
04FZ1	French for Beginners Z1 V ra Šlechtová (Gar.)	Z	1	0+4	L	V
04FZ2	French for Beginners Z2 V ra Šlechtová (Gar.)	Z	1	0+4	Z	٧
04FZ3	French for Beginners Z3 V ra Šlechtová (Gar.)	Z	1	0+4	L	٧
04FZ4	French for Beginners Z4 V ra Šlechtová (Gar.)	Z	1	0+4	Z	V
04FZ5	French for Beginners Z5 V ra Šlechtová (Gar.)	Z	1	0+4	L	٧
01FKP	Functions of Complex Variable	ZK	2	2+0	Z	V
01FKPB	Functions of Complex Variable B	Z	2	2+0	Z	V
01FAN1	Functional Analysis 1 Pavel Š oví ek Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	4	2+2		V
01FA1	Functional Analysis 1 Pavel Š oví ek	Z,ZK	3	2+1	Z	V
01FA2	Functional Analysis 2 Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	4	2+2	L	V
02PRA1	Experimental Laboratory 1 Katarína K ížková Gajdošová, Libor Škoda, Barbara Antonina Trzeciak, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	Z	V
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslava Óbertová Jaroslav Biel ík (Gar.)	KZ	6	0+4	L	V
02FYS1	Physical Seminar 1 Vojt ch Svoboda (Gar.)	Z	2	0+2	Z	V
02FYS2	Physical Seminar 2	Z	2	0+2	L	V
01GTDR	Geometric Theory of Ordinary Differential Equations Michal Beneš Michal Beneš (Gar.)	Z	2	0+2	Z	٧
12INS1	Information Systems 1 Antonín Novotný Antonín Novotný (Gar.)	Z,ZK	2	2	Z	V
12INS2	Information Systems 2 Antonín Novotný Antonín Novotný (Gar.)	Z,ZK	2	2	L	V
16ZJTB	Nuclear Energy Facilities and Accelerators Tomáš echák, Kamil Augsten Tomáš echák (Gar.)	ZK	2	2+0	Z	V
17JARE	Nuclear Reactors Tomáš Bílý, Pavel Suk, Ond ej Novák, Bed ich He manský Bed ich He manský (Gar.)	ZK	2	2	L	V

01JEPR	Simple Compilers Zden k ulík Zden k ulík (Gar.)	Z	2	2	L	V
16KPR	Clinical Propaedeutic	ZK	2	2+0	Z	V
04AKS	Jana Votrubová Jana Votrubová Jana Votrubová (Gar.) English Conversation	Z	1	0+2	L	V
02KF	Jana Ková ová Jana Ková ová (Gar.) Quantum Physics	Z,ZK	3	2P+1C	Z	V
	Filip Petrásek Libor Šnobl (Gar.) Experimental Laboratory 1					-
02LCF1	Jaroslav Biel ík Jaroslav Biel ík (Gar.)	Z	2	0+2	Z	V
02LCF2	Experimental Laboratory 2 Jaroslav Biel ik Jaroslav Biel ik (Gar.)	Z	2	0+2	L	V
12LT1	Laser Technique 1 Helena Jelínková Helena Jelínková (Gar.)	Z,ZK	3	2+1	Z	V
12LT2	Laser Technique 2 Václav Kube ek, Jan Šulc Václav Kube ek (Gar.)	Z,ZK	2	2+0	L	V
12LAS	Laser Systems Václav Kube ek Václav Kube ek (Gar.)	Z,ZK	3	2+1	L	V
01LIP	Linear Programming estmír Burdík estmír Burdík (Gar.)	Z,ZK	3	2+1	L	V
18MAK1	Macroeconomics 1	Z,ZK	4	2+2	Z	V
18MAK2	Quang Van Tran, Adam Borovi ka Quang Van Tran Macroeconomics 2	Z,ZK	4	2+2	L	V
	Adam Borovi ka Quang Van Tran Markov processes		-			-
01MAPR	Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	4	2+2	-	V
18EKO1 18EKO2	Mathematical Economics 1	Z,ZK Z,ZK	5	2+2 2+2	Z L	V
01MASC	Mathematical Economics 2 Mathematical Statistics - Seminar	Z,ZR	2	0+2		V
	Tomáš Hobza Tomáš Hobza Tomáš Hobza (Gar.) Essentials of High School Course 1					-
00MAM1	David B e Jan epila	Z	1	0+1		V
00MAM2	Essentials of High School Math Course 2 Mathematical Models of Groundwater Flow	Z	1	0+1		V
01MMPV	Ji í Mikyška Ji í Mikyška (Gar.)	KZ	2	2+0	L	V
01MMF	Methods of Mathematical Physics	Z,ZK	6	4+2	L -	V
18MIK1 18MIK2	Microeconomics 1	Z,ZK	5	2+2	Z	V
	Microeconomics 2 Logical Circuits and Microprocessors	Z,ZK	5	2+2	L	V
11MIK	Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	4	4	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 Jan Proška (Gar.)	ZK	2	2+0	L	V
12NT	Nanotechnology Jan Proška, Eduard Hulicius Eduard Hulicius (Gar.)	ZK	2	2+0	Z	V
02NSAD	Simulations and Data Analysis Tools Jan epila	Z	2	2+0		٧
04NM1	German for Intermediate Students M1 Miloslava echová (Gar.)	Z	1	0+2	Z	V
04NM2	German for Intermediate Students M2 Ivana Pavlíková (Gar.)	Z	1	0+2	L	V
04NM3	German for Intermediate Students M2 Miloslava echová (Gar.)	Z	1	0+2	Z	V
04NP1	German for Advanced Students P1 Miloslava echová (Gar.)	Z	1	0+2	Z	V
04NP2	German for Advanced Students P2 Miloslava echová (Gar.)	Z	1	0+2	L	V
04NP3	German for Advanced Students P3 Miloslava echová (Gar.)	Z	1	0+2	Z	V
01NME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	V
15CH1	General Chemistry 1 Alois Motl, Petr Distler, Václav uba Petr Distler Alois Motl (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Alois Motl, Petr Distler, Václav uba Petr Distler Alois Motl (Gar.)	Z,ZK	3	2+1	L	V
02OR	General Relativity Old ich Semerák Old ich Semerák (Gar.)	ZK	3	3+0	L	V
01POPJ1	Computers and Natural Language 1	Z	2	0+2	Z	V
01POPJ2	Computers and Natural Language 2	Z	2	0+2	L	V

12POAL	Computer Algebra Richard Liska Richard Liska (Gar.)	KZ	2	2	Z	V
01POGR1	Computer Graphics 1 Pavel Strachota Pavel Strachota (Gar.)	Z	2	2	Z	V
01POGR2	Computer Graphics 2 Pavel Strachota Tomáš Oberhuber (Gar.)	Z	2	2	L	٧
01SITE1	Computer Networks 1 Miroslav Minárik Miroslav Minárik (Gar.)	Z	2	1+1	Z	V
01SITE2	Computer Networks 2 Miroslav Minárik Miroslav Minárik (Gar.)	Z	2	1+1	L	V
01POPR	Advanced Probability Tomáš Hobza	Z	2	2+0		V
12PEL1	Practical Electronics 1	Z,ZK	2	2+0	L	V
12PEL2	Practical Electronics 2	Z,ZK	2	2+0	Z	V
12PIN1	Practical Informatics for Technics 1 Richard Liska Richard Liska (Gar.)	Z	2	1+1	L	V
12PIN2	Practical Informatics for Technics 2 Milan Ši or Milan Ši or (Gar.)	Z	2	1+1	Z	V
12PIN3	Practical Informatics for Technics 3 Milan Ši or Milan Ši or (Gar.)	Z	2	1+1	L	V
12EPR1	Electronics Practicum 1	KZ	3	0+2	Z	V
12EPR2	Ivan Procházka, Jaroslav Pavel Ivan Procházka (Gar.) Electronics Practicum 2	KZ	3	0+2	L	V
	Ivan Procházka Ivan Procházka (Gar.)			_		
15INPR	Laboratory Practice in Instrumental Methods	KZ	4	0+4	L	V
01PRA1	Probability and Mathematical Statistics 1	Z,ZK	6	4+2	Z	V
01PRA2	Probability and Mathematical Statistics 2	ZK	2	2+0	L	V
01PRST	Probability and Statistics Tomáš Hobza Tomáš Hobza (Gar.)	Z,ZK	4	3+1	Z	V
01PRSTB	Probability and Statistics B Tomáš Hobza Tomáš Hobza (Gar.)	KZ	4	3+1	Z	V
16UAZB	Principles of Ionizing-Radiation Applications Ladislav Musílek Radek Fu ík Ladislav Musílek (Gar.)	ZK	2	2+0	Z	V
16FNZB	Problems of Non-ionizing Radiation Lenka Thinová Radek Fu ík Lenka Thinová (Gar.)	ZK	2	2+0	Z	V
12PSEM	Problem Seminary	Z	2	0+4	L	V
01PROP	Programmer's Practicum Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	0+2	Z	٧
01PERI	Programming of Peripherals Devices Zden k ulik (Gar.)	Z	2	2+0	Z	V
01PW	Windows Programming Zden k ulík Zden k ulík (Gar.)	Z	2	2+0	Z	٧
18PRC1	Programming in C++ 1 Vladimír Jarý, Miroslav Virius Miroslav Virius (Gar.)	Z	4	2+2	Z	٧
18PRC2	Programming in C++ 2 Vladimír Jarv, Miroslav Virius	KZ	4	2+2	L	V
18PJ	Programming in Java Miroslav Virius Miroslav Virius	Z,ZK	5	2+2	Z	V
18MTL	Programming in MATLAB Jaromír Kukal	Z,ZK	5	2+2	Z	٧
18MPT	Programming in MATLAB Jaromír Kukal, Quang Van Tran Quang Van Tran	KZ	5	0+4	Z	٧
18PAS	Pascal Programming Miroslav Virius	Z	4	2+2	L	V
12PDR1	Data Communication and Interfaces 1 Josef Blažej Josef Blažej (Gar.)	Z	2	2+0	Z	٧
12PDR2	Data Communication and Interfaces 2 Josef Blažej Josef Blažej (Gar.)	Z	2	2+0	L	٧
01PSL	LaTeX - Publication Instrument Petr Ambrož Petr Ambrož (Gar.)	Z	2	0+2	L	٧
00RET	Rhetoric Jana Ková ová Jana Ková ová	Z	1	0+2		٧
01RMF	The Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	6	4+2	Z	٧
02RQGP1	Seminar on Quark-Gluon Plasma 1 Jaroslav Biel ik	Z	1	2+0		٧
02RQGP2	Seminar on Quark-Gluon Plasma 2 Jaroslav Biel ík	Z	1	2+0		V
04RM1	Russian for Intermediate Students M1 Zhanna Isaeva (Gar.)	Z	1	0+2	Z	٧
04RM2	Russian for Intermediate Students M2 Zhanna Isaeva (Gar.)	Z	1	0+2	L	V

04RM3	Russian for Intermediate Students M3 Zhanna Isaeva (Gar.)	Z	1	0+2	Z	V
04RP1	Russian for Advanced Students P1 Zhanna Isaeva (Gar.)	Z	1	0+2	Z	V
04RP2	Russian for Advanced Students P2 Zhanna Isaeva (Gar.)	Z	1	0+2	L	V
04RP3	Russian for Advanced Students P3 Zhanna Isaeva (Gar.)	Z	1	0+2	Z	V
04RZ1	Russian for Beginners Z1 Zhanna Isaeva (Gar.)	Z	1	0+4	L	V
04RZ2	Russian for Beginners Z2 Zhanna Isaeva (Gar.)	Z	1	0+4	Z	V
04RZ3	Russian for Beginners Z3 Zhanna Isaeva (Gar.)	Z	1	0+4	L	V
04RZ4	Russian for Beginners Z4 Zhanna Isaeva (Gar.)	Z	1	0+4	Z	V
04RZ5	Russian for Beginners Z5 Zhanna Isaeva (Gar.)	Z	1	0+4	L	V
01RSWP	Project Management of Software Projects	KZ	2	0+2	Z	V
02SMF	Seminar of Mathematical Physics	Z	2	0+2	Z	V
01SSM1	Ladislav Hlavatý (Gar.) Seminar of Contemporary Mathematics 1 Edita Pelantová (Gar.)	Z	2	0+2	Z	V
01SSM2	Seminar of Contemporary Mathematics 2 Edita Pelantová, Václav Klika Edita Pelantová (Gar.)	Z	2	0+2	L	V
16SED1	Dosimetry Seminar 1 Kate ina Pila ová Kamila Johnová (Gar.)	Z	2	0+2		V
16SED2	Dosimetry Seminar 2 Kate ina Pila ová Kate ina Pila ová (Gar.)	Z	2	0+2		V
01SMB1	Seminar on Calculus B1 Milan Krbálek Milan Krbálek (Gar.)	Z	2	0+2	Z	V
01SMB2	Seminar on Calculus B2 Milan Krbálek Milan Krbálek (Gar.)	Z	2	0+2	L	V
01SOS1	Software Seminar 1 Zden k ulík Zden k ulík (Gar.)	Z	2	0+2	Z	V
01SOS2	Software Seminar 2 Zden k ulík Zden k ulík (Gar.)	Z	2	0+2	L	V
02SPRA1	Special Practicum 1 Jan epila Jan epila (Gar.)	KZ	6	0+4	Z	V
02SPRA2	Special Practicum 2 Jan epila Jan epila (Gar.)	KZ	6	0+4	L	V
01STR	Statistical Decision Theory Václav K s Václav K s (Gar.)	ZK	2	2+0	L	V
11SFBM	Structure and Function of Biomolecules Petr Kolenko Petr Kolenko Petr Kolenko (Gar.)	Z,ZK	3	2+1	Z	V
04SM1	Spanish for Intermediate Students M1 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2	Z	V
04SM2	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2	L	V
04SM3	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2	Z	V
04SP1	Spanish for Advanced Students P1 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2	Z	V
04SP2	Spanish for Advanced Students P2 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2	L	V
04SP3	Spanish for Advanced Students P3 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2	Z	V
04SZ1	Spanish for Beginners Z1 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+4	L	V
04SZ2	Spanish for Beginners Students Z2 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+4	Z	V
04SZ3	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+4	L	V
04SZ4	Spanish for Beginners Z3 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+4	Z	V
04SZ5	Spanish for Beginners Z5 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+4	L	V
14TM	Engineering Mechanics Ji í Kunz, Jan Ondrá ek Ji í Kunz (Gar.)	Z,ZK	4	2+2	3	V
14TEM	Engineering Mechanics Ji í Kunz, Jan Ondrá ek Ji í Kunz (Gar.)	Z,ZK	6	4	5	V
12TAIS	Ion Beam Techniques and Applications. Michaela Martínková, Jaroslav Král Jaroslav Král (Gar.)	ZK	3	3+0	L	V
TV-1	Physical Education	Z	1		Z	V

TV-2	Physical Education	Z	1		L	V
TV-3	Physical education	Z	1	0+2	Z	V
TV-4	Physical education	Z	1	0+2	L	V
02TEF1	Theoretical Physics 1 Petr Novotný Igor Jex (Gar.)	Z,ZK	4	2+2	z	V
02TEF2	Theoretical Physics 2 Petr Novotný, Igor Jex Jan Vysoký Igor Jex (Gar.)	Z,ZK	4	2+2	L	V
01DYSY	Theory of Dynamic Systems Branislav Rehák Branislav Rehák (Gar.)	ZK	3	3+0	L	V
01TKO	Theory of Codes Edita Pelantová, Jan Volec Jan Volec (Gar.)	ZK	2	2	L	V
02TER	Heat and Molecular Physics Petr Jizba Petr Jizba (Gar.)	Z,ZK	4	2+2	L	V
02TSFA	Thermodynamics and Statistical Physics Jaroslav Novotný, Igor Jex Igor Jex (Gar.)	Z,ZK	4	2+2	L	V
01TOP	Topology estmír Burdík estmír Burdík (Gar.)	ZK	2	2+0	Z	V
16MCRB	Transport of Ionizing Radiation and Monte Carlo Method Tomáš Urban, Jaroslav Kluso Tomáš Urban Tomáš Urban (Gar.)	Z,ZK	4	2+2	L	V
18INTA	Generation of Internet Applications Dana Majerová	KZ	4	2+2	L	V
01DYK	Introduction to Continuum Dynamics Pavel Strachota Pavel Strachota (Gar.)	Z	2	0+2		V
16ZIVB	Introduction to Ecology Lenka Thinová, Hana Pr šová Radek Fu ík Lenka Thinová (Gar.)	KZ	2	2+0	Z	V
02UFEC	Introduction to Elementary Particle Physics Jaroslav Biel ik Jaroslav Biel ik Jaroslav Biel ik (Gar.)	Z	2	2+0	Z	V
11UFPLN	Introduction to Solid State Physics Petr Kolenko, Ivo Kraus Petr Kolenko Ivo Kraus (Gar.)	ZK	2	2+0	L	V
17UINZ	Introduction to Engineering Tomáš Bílý, Jan Frýbort, Petr Haušild, Radek Mušálek	Z,ZK	3	2+1	Z	V
02UKP	Introduction to Curves and Surfaces	Z	2	1+1	L	V
12ULT	Introduction to Laser Technique Helena Jelínková, Jan Šulc Jan Šulc (Gar.)	Z,ZK	3	2+1	Z	V
12UMF	Introduction to Modern Physics Jan Pšikal Jan Pšikal (Gar.)	Z	3	2+1	L	V
18UOA	Introduction into Object Oriented Architecture Rudolf Pecinovský Rudolf Pecinovský	Z,ZK	4	2+2	Z	V
00UPRA	Introduction to Law Jana Ková ová, Miloslava echová, Martin ech Jana Ková ová	Z	1	0+2		V
00UPSY	Introduction to Psychology Jana Ková ová, Miloslava echová, Jakub Hají ek Jana Ková ová	Z	1	0+2		V
01UTIZ	Introduction to Theoretical Informatics Petr Ambrož	ZK	2	2+0		V
11UVOD	Introduction to Specialization	Z	2	0+2	Z	V
12VAK	Vacuum Physics and Technology Jaroslav Král, Richard Švejkar Jaroslav Král (Gar.)	KZ	4	2+2	Z	V
12PYTH	Scientific Programming in Python Pavel Váchal, Jakub Urban Pavel Váchal Pavel Váchal (Gar.)	Z	2	0+2	Z	V
12VTV	Scientific and Technical Computing Ivan Procházka Ivan Procházka (Gar.)	Z	2	1+1	L	V
12VFT	High Frequency and Impulse Circuitry Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	2	2+0	L	V
17VYR	Research Reactors	ZK	2	2	L	V
12ZPLT	Basic Laser Technique Laboratory Václav Kube ek, Josef Blažej Václav Kube ek (Gar.)	KZ	6	0+4	L	V
12ZPOP	Basic Optical Laboratory Alexandr Jan árek Alexandr Jan árek (Gar.)	KZ	6	0+4	L	V
18ZALG	Basics of Algorithmization Zden k ulík, Miroslav Virius, Tomáš Oberhuber	Z,ZK	4	2+2	L	V
16AMMB	Fundamentals of Analytical Measurement Methods Hana Pr šová Radek Fu ík Hana Pr šová (Gar.)	ZK	2	2+0	L	V
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1 Alena Doubková, Šimon Vaculín, Zde ka Polívková, Josef Stingl Alena Doubková (Gar.)	Z,ZK	4	2+2	Z	V
16ZBAF2	Fundamentals of Human Biology, Anatomy and Physiology 2 Alena Doubková, Šimon Vaculín, Josef Stingl Alena Doubková (Gar.)	Z,ZK	4	2+2	L	V
16ZDOZ1	Fundamentals of Radiation Dosimetry 1 Tomáš Trojek Tomáš Trojek (Gar.)	Z,ZK	4	2+2		V
16ZDOZ2	Fundamentals of Radiation Dosimetry 2 Tomáš Trojek Tomáš Trojek (Gar.)	ZK	2	2+0	L	V

17ZEH	Basics of Economic Assessment Radovan Starý Radovan Starý (Gar.)	ZK	2	2+0	Z	V
17ZEL	Basics of Electronics Martin Kropík Martin Kropík (Gar.)	KZ	3	2+2	Z	V
12ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
12ZEL2	Basic Electronics 2 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	L	V
02ZFM1	Foundations of Physical Measurements 1 Petr Chaloupka Petr Chaloupka (Gar.)	Z	2	2+0	Z	V
02ZFM2	Foundations of Physical Measurements 2	Z	2	0+2	L	V
11ZFPL	Basic to Solid State Physics Ivo Kraus, Jaroslava Jakoubková, František Hájek Jaroslava Jakoubková Ivo Kraus (Gar.)	KZ	2	2	Z	V
12ZFP	Principles of Plasma Physics Ji í Limpouch Ji í Limpouch (Gar.)	Z,ZK	4	3+1	L	V
02ZJF	Nuclear Physics Vladimír Wagner Vladimír Wagner (Gar.)	Z,ZK	6	3+2	Z	V
02ZJFB	Nuclear Physics B Vladimír Wagner Vladimír Wagner (Gar.)	KZ	3	3+0	Z	V
15ZKJE	Nuclear Power Plants Design and Operation Tomáš Bílý, Lenka Frýbortová, ubomír Sklenka Tomáš Bílý (Gar.)	ZK	3	2+0	L	V
16MEZB	Fundamentals of lonizing-Radiation Metrology Pavel Novotný Radek Fu ík Tomáš echák (Gar.)	Z,ZK	4	2+1	Z	V
01ZOS	Introduction to Operating Systems Zden k ulík Zden k ulík (Gar.)	Z	2	2+0	L	V
12ZAOP	Fundamentals of Optics Ivan Richter, Pavel Kwiecien Ivan Richter (Gar.)	Z,ZK	2	2+0	Z	V
01ZPB1	Introduction to Computer Security 1 Petr Voká Petr Voká Petr Voká (Gar.)	Z	2	1+1		V
16ZPSP	Basic Work with PC Tereza Hanušová Tomáš Vrba (Gar.)	Z	2	0+2	1	V
18ZPRO	Basics of Programming Vladimír Jarý, Zden k ulík, Miroslav Virius, Lucie Roškotová, Aleš Suchomel, František Vold ich, Jan Thiele Miroslav Virius	Z	4	2P+2C	Z	V
16ZRAO	Basics of Radiation Protection Tomáš Vrba Tomáš Vrba (Gar.)	Z	2	2+0		V
02ZSM	Introduction to the Standard Model Zden k Hubá ek Jan epila Zden k Hubá ek (Gar.)	ZK	2	2+0		V
16ZEDB	Basics of Experimantal Data Processing Kate ina Pila ová Kate ina Pila ová (Gar.)	ZK	2	2+0	Z	V
14ZZKS	Testing and Processing of Metals and Alloys Hynek Lauschmann Hynek Lauschmann (Gar.)	KZ	4	4	6	V
12ZDP	Data Processing for Publishing Antonín Novotný Antonín Novotný (Gar.)	Z	2	2	Z	V
12ZMD	Measurement and Data Processing Ivan Procházka Ivan Procházka (Gar.)	KZ	2	1+1	Z	V
Characteristics of the	e courses of this group of Study Plan: Code=BSVOLPREDM Na	me=BS - vol	litelné p	edm ty		
	operimental Physics 1				Z	2
·	ductory course in experimental physics. Students will learn methods of measurement of	basic physical q	uantities ar			ent evaluatio
15CH1 G	eneral Chemistry 1				7	3

	of the courses of this group of Study Plan: Code=BSVOLPREDM Name=BS - volitelne p edi		
02EXF1	Experimental Physics 1	Z	2
Lecture represents a	in introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and m	ethods of measure	ment evaluation
15CH1	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 pract	tical use are illustra	ited by example
solved in exercises.			
15CH2	General Chemistry 2	Z,ZK	3
The subject is the co	ontinuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. U	sing various examp	oles, the fact that
the validity of these	principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles	s are illustrated by	examples solve
in exercises.			
17UINZ	Introduction to Engineering	Z,ZK	3
The course is devote	ed to an introduction to the engineering profession. Students will gradually learn the characteristics and specialties of engineeri	ing work, including	an overview of
the basics of selecte	d engineering disciplines, such as the basics of materials science, manufacturing technology, quality control and assurance ar	nd ecology. Further,	, the course will
focus on some issue	s of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code.		
focus on some issue	s of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code. Basics of Programming	Z	4
18ZPRO		Z ming and with the C	
18ZPRO	Basics of Programming	Z ming and with the C	
18ZPRO This lecture is intend	Basics of Programming	Z ming and with the C	
18ZPRO This lecture is intend language. 17JARE	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in programming.	ZK	C++programmin
18ZPRO This lecture is intend language. 17JARE Introduction. World p	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in programming. Nuclear Reactors	ZK systems, containme	2 ent. Classificatio
18ZPRO This lecture is intend language. 17JARE Introduction. World pof reactors into IV ge	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program Nuclear Reactors ower issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety s	ZK systems, containme Pressurized water	C++programmin 2 ent. Classificatio
18ZPRO This lecture is intend language. 17JARE Introduction. World p of reactors into IV ge Western-type PWR	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program Nuclear Reactors ower issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety sinerations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives.	ZK systems, containme Pressurized water ttors, fast breeder r	2 ent. Classificatio reactors (PWR)
18ZPRO This lecture is intend language. 17JARE Introduction. World pof reactors into IV get Western-type PWR high-temperature ga	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in programming. Nuclear Reactors Nuclear Reactors ower issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety sinerations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. (Westinghouse, KWU, Framatom). VVER-type reactors, Temelín nuclear power plant. Boiling water reactors. Heavy water reactors.	ZK systems, containme Pressurized water ctors, fast breeder r and INPRO initiativ	2 ent. Classification reactors (PWR)
18ZPRO This lecture is intend language. 17JARE Introduction. World pof reactors into IV get Western-type PWR high-temperature ga	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in programming. Nuclear Reactors Nuclear Reactors ower issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety somerations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. (Westinghouse, KWU, Framatom). VVER-type reactors, Temelin nuclear power plant. Boiling water reactors. Heavy water reacts socioled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF is	ZK systems, containme Pressurized water ctors, fast breeder r and INPRO initiativ	2 ent. Classificatio reactors (PWR)
18ZPRO This lecture is intend language. 17JARE Introduction. World pof reactors into IV ge Western-type PWR high-temperature ga and selection of prof 02TEF1	Basics of Programming ed mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in programs Nuclear Reactors	ZK systems, containme Pressurized water stors, fast breeder re and INPRO initiative butlook Z,ZK	c++programmir 2 ent. Classification reactors (PWR eactors, ves. Evaluation

principles of mechanics. The subject is the first part of the course of classicaltheoretical physics (02TEF1, 02TEF2).

02TEF2	Theoretical Physics 2	Z,ZK	4
	. The special theory of relativity: relativistic mechanics and classical field theory in the Minkowski space-time. Classical electr	odynamics: Maxw	ell's equations
	time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipole approximation.	7 71/	4
02TSFA	Thermodynamics and Statistical Physics	Z,ZK	4
=	namics and statistical physics.Thermodynamic potential, the Joule Thomson effect,conditions of equilibrium, the Braun-Le Ch scriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canon		
	s body radiation). The Boltzmann equation is usedto discusses simple transport phenomena.	ioar orioorribio, i o	Tim gao, modolo
17ENF	Experimental Neutron Physics	KZ	2
	focused on detailed characterisation of neutron properties, characteristics of neutron (reactor and non reactor) sources, pro	perties of prompt	and delayed
neutrons, neutron detec	tion methods, neutron induced nuclear reactions, modification and adjustment of neutron field, science and industry neutron	applications. Last	t lecture deals
	processing and analysis. The lectures are supplemented with experimental practices in the field of neutron detection, determina		
study of neutron diffusion reactor VR-1 and in the	n in various materials, preparation and characterisation of photo-neutron source and neutron source calibration. Experimental	practices will be ru	inning at training
02KF	Quantum Physics	Z,ZK	3
-	function, postulates of quantum mechanics, Born is statistical interpretation, expectation values, Schrödinger equation, Heis		
•	momentum, solution of simple systems, hydrogen atom.	criberg uncertaint	ly principie,
01NME2	Numerical Methods 2	KZ	2
	numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equation		
boundary-value problem	ns to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equality	uations.	
01RMF	The Equations of Mathematical Physics	Z,ZK	6
	se is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integr	al transformations	, and solution of
	ions (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).		
14TM	Engineering Mechanics	Z,ZK	4
· · · · · · · · · · · · · · · · · · ·	a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with the stress and strain and		
17ZEL	Basics of Electronics	KZ	3
•	nformation of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and al with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor compo		
	ntinue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/c		
completed with electron		g	
02ZJF	Nuclear Physics	Z,ZK	6
This scientific field prese	ents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic do	main, where much	n of our classical
intuition regarding the b	ehaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.		
12AUX	Administration of UNIX System	KZ	2
	ed administration of Unix operating system		
01ALG	Algebra	ZK	4
After an introduction into	o the set theory standard algebraic structures are dealt with: groups, rings, fields, modules, linear algebras, lattices, Boolean a	alaehras rinas of r	oolvnomials over I
		ilgobias, ririgs or p	,
commutative fields.			
commutative fields.	Algebra	Z,ZK	6
commutative fields. 01ALGE Firstly, the Peano axiom	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, t	Z,ZK he axiom of choice	6 e and equivalent
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of	Algebra	Z,ZK he axiom of choice	6 e and equivalent
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of fields, lattices. Independ	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, to ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral delent chapters are devoted to divisibility in integral domains and to finite fields.	Z,ZK he axiom of choice omains, principal	6 e and equivalent
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of fields, lattices. Independent 11ANEL	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, tordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral descriptions.	Z,ZK he axiom of choice omains, principal	6 e and equivalent ideal domains,
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of fields, lattices. Independent 11ANEL The course is the introd	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, to ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral delet chapters are devoted to divisibility in integral domains and to finite fields. Linear Circuit Analysis	Z,ZK he axiom of choice omains, principal	6 e and equivalent ideal domains,
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of fields, lattices. Independent 11ANEL The course is the introd	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, to ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral delent chapters are devoted to divisibility in integral domains and to finite fields. Linear Circuit Analysis uction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especial	Z,ZK he axiom of choice omains, principal	6 e and equivalent ideal domains,
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of fields, lattices. Independ 11ANEL The course is the introd of the computer method 15CHEM Lecture deals with basic	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, to ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral delet chapters are devoted to divisibility in integral domains and to finite fields. Linear Circuit Analysis uction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especials of analysis. The second part gives a short list of most commonly used circuits in experimental equipment. Analytical Calculations and Chemometry Principals c principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, but	Z,ZK he axiom of choice omains, principal Z,ZK lly oriented to the ZK asic data distributi	6 e and equivalent ideal domains, 4 understanding 2 ons, one- and
commutative fields. 01ALGE Firstly, the Peano axiom statements, definition of fields, lattices. Independ 11ANEL The course is the introd of the computer method 15CHEM Lecture deals with basic two-tailed significance to	Algebra s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, to ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral delet chapters are devoted to divisibility in integral domains and to finite fields. Linear Circuit Analysis uction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especial sof analysis. The second part gives a short list of most commonly used circuits in experimental equipment. Analytical Calculations and Chemometry Principals or principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, be esting, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, seed to the content of the cont	Z,ZK he axiom of choice omains, principal Z,ZK lly oriented to the ZK asic data distributiveminar part consi	6 e and equivalent ideal domains, 4 understanding 2 ons, one- and sts of equation
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04AP2 English for Advanced Students P2	Z	1
The 04AP2 course is based on 04AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of our texts of the students' possed it appears to be an extended to the students' possed it appears to be an extended to the students' possed it appears to be an extended to the students' possed it appears to be an extended to the students' possed it appears to be an extended to the students' possed it appears to be an extended to the students' possed it appears to be a students' possed to the students' possed it appears to be a students' possed it appears to		=
to the students' needs it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical types of descriptions, and, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading		. •
materials. The course extends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focus		-
sentence and paragraph structure, linking, cohesion and coherence in texts.		_
04AP3 English for Advanced Students P3	Z	1
The 04AP3 course is based on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpr		-
written communication skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summ possible, also preparing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal ar		•
written communication.	id illioittiai laliguage b	our in oral and
16APLB Application of Ionizing Radiation in Analytical Methods	ZK	5
Subject The application of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing	1 1	_
of technological processes.		
12APL Application of Lasers	Z,ZK	2
Application of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and other bran		
11APLG Applications of Group Theory in Solid State Physics	ZK	2
Consideration of atomic system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy st and transitions between them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the info		
alone will provide. The application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field en	-	
vibrations, and selection rules for optical absorption transitions.	,	
02AMS Atomic and Molecular Spectroscopy	Z,ZK	4
The lecture is devoted to atomic and molecular spectroscopy.		
04CESM1 Czech for foreigners - Intermediate	Z	1
The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extendi	ng the student's vocab	oulary for various
social situations. 04CESM2 Intermediate Czech 2	7	4
04CESM2 Intermediate Czech 2 The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, an	Z d reading skills and tra	1 sine the student
in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.	a reading skills and the	ans the student
04CESM3 Intermediate Czech 3	Z	1
The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is e	specially focused on s	tylistics and
lexicology and on developing the student's writing skills.		
04CESP1 Czech for Foreign Students - Advanced Examination	Z	1
The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Communicative competences at level B2 of the Communicative competences at level B2 of the Communicative competences at level B2	•	
It is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies		_
includes communication with teachers and faculty administrators.	and Student Life. Will	tteri practice
04CESP2 Czech for Foreigners - Advanced	Z	1
This course extends the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with techni	cal and specialist texts	s placing greater
emphasis on individual work.		
04CESP3 Czech for Foreigners - Advanced	Z	1
The course develops the student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and present the student's project Metrics and appropriate project of the student's proj	ntation, and, finally, pre	esentation of the
student's project. Writing skills necessary for professional communication are trained.	71/	2
15DALCH History of Alchemy and Chemistry This course provides the overview of crafts with chemical and/or metallurgical basis. Development of alchemy from ancient times in China, India	ZK and Hellenistic world	2 Lis discussed
The last part of course is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approximation and the course is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approximation and the course is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approximation and the course is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemy in Latin Europe.		
advancement is illustrated.	·	
02DEF1	Z	2
Physics and its place in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek nature		-
Helenistic period, Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Gr	alileo, Huygens. The b	irth of physics
as experimental science. Newton and his work.	7	2
02DEF2 History of Physics 2 Development of classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach	Z Z	2 netism -
electrostatics, galvanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltz		
and relativistic physics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nucleus		
standard model. The concept of Nature and Universe of today.	3,7	
01DEM History of Mathematics	Z	1
The subject has the form of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the	field - give their talks	on varoius topics
from the history of mathematics.		_
02DRG Differential Equations, Symmetries and Groups	Z	4
The purpose of the lecture is to teach students computation of symmetries of the differential equations. O1DIM1 Discrete Mathematics 1	Z	2
The seminar is devoted to elementary number theory and applications. It includes individual problem solving.	!	2
(01DIM2 Discrete Mathematics 2	7	2
01DIM2 Discrete Mathematics 2 The seminar is devoted to recurrence relations. It includes individual problem solving.	Z	2
	z z	2
The seminar is devoted to recurrence relations. It includes individual problem solving.	Z	2
The seminar is devoted to recurrence relations. It includes individual problem solving. 01DIM3 Discrete Mathematics 3 The subject is devoted to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the sem solution chosen from the given literature.	Z Z	2 a problem with
The seminar is devoted to recurrence relations. It includes individual problem solving. 01DIM3 Discrete Mathematics 3 The subject is devoted to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the sensolution chosen from the given literature. 00EKOT Economy in Technology	Z	2
The seminar is devoted to recurrence relations. It includes individual problem solving. 01DIM3 Discrete Mathematics 3 The subject is devoted to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the sem solution chosen from the given literature.	Z Z	2 a problem with

14ELMI	Electron Microscopy	Z,ZK	3
	nts are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The int		
0, 0	ctron microscopy and to various types of microscopes. An important part of the course is given to the interaction of different toons and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and c		
	on and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques in	-	
12EGS1	English Graduate Standard 1	KZ	4
	pe in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr	1	· .
18ESPG1	European Computer Driving Licence 1	Z	2
	s are an important tool, especially for students and graduates in Software engineering in economics. The winter semester intro	I	!
office tools. The accent	is put on advanced functions of MS Excel (names, functions and expressions, pivot table and graph). Next, the VBA languag	e will be introduce	ed and macros
and user functions will I	pe addressed.		
18ESPG2	European Computer Driving Licence 2	Z	2
	s are an important tool, especially for students and graduates in Software engineering in economics. Summer semester follows		
	es (charts, objects, graphical user interface, add-ins programming) and introduces some applications in economics, mathema	atics, operational r	esearch, and
computer science.	Event Methode in Decearch of Historia Manumenta	71/	
16EPAM	Exact Methods in Research of Historic Monuments toric monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further rac	ZK	2 endrochronology
	nalytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence		
photogrammetry.		analysis and sure	
02EXF2	Experimental Physics 2	ZK	2
-	ntroductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and me	I	l I
04FM1	French for Intermediate Students M1	Z	1
French - intermediate F	M The objective of this three-semester course is to improve and further develop communication in the French language in bo	oth written and ora	al form. Students
	cate in social interaction and in academic, scientific and professional environment. They will be able to use the language to to		
	problems. 04FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises,		
- '	study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, pe		
	Iture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work	based on these t	exis.
04FM2	French for Intermediate Students M2	toyta faaturaa tur	ion for toobnical
	M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French sci		
	rchitects. Description of an object, device, shapes, dimensions, material.	51.00 and 100	9,,
04FM3	French for Intermediate Students M3	Z	1
The course is focused of	in improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures	। (subordinate and i	nfinitive clauses,
participle structures, co	mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-c	lass. The paper is	linked to the
	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w	· ·	n French articles
and one's own knowled	lge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and	coherence.	n French articles
and one's own knowled	ge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and French for Advanced Students P1	coherence.	1
and one's own knowled 04FP1 04FP advanced course	Ige/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and French for Advanced Students P1 The objective of this three-semester course is to improve and further develop communication in the French language in both	coherence. Z written and oral f	1 form. Students
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and one's own knowled 04FP1 04FP advanced course will be able to communiand to solve problems. subjonctif, passé compostatement, request, ans mathematics, internet, 104FP2 With the link to P1 control of the part of the par	French for Advanced Students P1 The objective of this three-semester course is to improve and further develop communication in the French language in both cate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit 04FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topi psé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of the work to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture obysics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation. French for Advanced Students P2 ents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication of the course further develops language skills.	written and oral f general and technics are repeated a ransactional letter ure, Paris. Topics o	1 orm. Students nical information and expanded: rs, CV, personal of specialization:
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04FZ5	French for Beginners Z5	Z	1
	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. In science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cl		
subjunctive clauses, ger		auses, typical col	ijurictions,
01FKP	Functions of Complex Variable	ZK	2
	vanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings,		l
•	ies of complex functions of several complex variables together with improper line integrals and its applications are presented		
01FKPB	Functions of Complex Variable B	Z	2
The course develops ad	vanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings,		nd meromorphic
functions. Basic propert	ies of complex functions of several complex variables together with improper line integrals and its applications are presented		
01FAN1	Functional Analysis 1	Z,ZK	4
	s are addressed concerning successively topological spaces, metric spaces, topological vector spaces, normed and Banach		
01FA1	Functional Analysis 1	Z,ZK	3
_	athematical analysis and algebra introduction to the basics of functional analysis. There are the concepts that students need to	o understand the	various physical
and technical disciplines		7 71/	4
01FA2	Functional Analysis 2	Z,ZK	4
· ·	sent selected fundamental results from functional analysis including basic theorems of the theory of Banach spaces, closed ors, spectral decomposition of bounded self-adjoint operators.	operators and the	ii speciium,
02PRA1	Experimental Laboratory 1	KZ	6
	ecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclean		-
-	erested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with		
-	quire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation		-
practically extendthe kn	owledge gained in lectures on physics.		
02PRA2	Experimental Laboratory 2	KZ	6
Lecture is intended espe	ecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear	Engineering). Bu	it it can be also
<u>-</u>	erested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with	•	•
· ·	equire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation of the records of the record	uation of results. A	At the same time
	owledge gained in lectures on physics.	-	
02FYS1	Physical Seminar 1	Z	2
	to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic as are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equ	-	e course or
02FYS2	Physical Seminar 2	Z	2
	to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic	_	l
	m. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physical	-	
01GTDR	Geometric Theory of Ordinary Differential Equations	Z	2
	the qualitative theory of ODEs dealing with the geometric and topological properties of the solution. In this context, we mention	n suitably formula	l
of the existence and uni	queness, continuous dependence on parameters and initial conditions. Main part is devoted to the autonomous systems.		
12INS1	Information Systems 1	Z,ZK	2
Information technology,	architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to	solve task of info	rmation systems
12INS2	Information Systems 2	Z,ZK	2
	on systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud approximation to the databases of the database of the data	plication Google,	Microsoft,
	nt, aproaches to solve task of information systems		Γ
16ZJTB	Nuclear Energy Facilities and Accelerators	ZK	2
	r reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most i	•	• •
accelerators, targets.	rs, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons	s, electron and loi	n sources for
01JEPR	Simple Compilers	Z	2
	ysis, code generation, simple optimizations, development environments, reflection.	_	_
16KPR	Clinical Propaedeutic	ZK	2
	r with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemi		l
04AKS	English Conversation	Z	1
	the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral commun	_	ent will develop
	ous communication situations and will master their communication strategy. They will also practise their listening skills in order		-
in discussions. The stud	ent will be trained to express their ideas clearly and according to current English usage, and become a more confident spea	ker.	
02LCF1	Experimental Laboratory 1	Z	2
Cavendish experiment.	Elasticity.Thermal capacities. Electric measurements, Acoustic. Oscillations.		
02LCF2	Experimental Laboratory 2	Z	2
Electric and magnetic fi	eld, microwaves, Xray and gamma rays, geometric optics		
12LT1	Laser Technique 1	Z,ZK	3
	ity. Transverse and Longitudinal Modes. Elements of Open Resonators. Threshold of laser oscillations. Gausian beam as an a	* *	
	optical radiation propagation in resonant medium. Two-level approximation. Equations for polarisation and inversion, dispersion	n, saturation. Col	nerent and
	pagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optical resonator.	7 71/	
12LT2	Laser Technique 2	Z,ZK	2
12LAS	equation, the laser amplifier, Q-switching, mode-locking	Z,ZK	3
	Laser Systems second lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers.		_
	conductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultr		_
	s. Infrared high power lasers. Submillimeter lasers. Lasers with high degree of coherence. Free electron lasers.		,
01LIP	Linear Programming	Z,ZK	3
	ms about constrained extremum problems for multivariable functions (the function is linear and the constraint equations are gi	,	_
inequalities).		•	

18MAK1	Macroeconomics 1	Z,ZK	4
· ·	ides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroecono		=
	rium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic tions for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic phe		
	e them under the conditions of modern economic life.		
18MAK2	Macroeconomics 2	Z,ZK	4
	ends theoretical knowledge acquired from Macroeconomics I of its students with the latest knowledge of contemporary macro	=	
	cially those with an emphasis on the role of human capital and technological progress. Furthermore, it introduces students to		
of labor market modelin	onomic models derived from microeconomic behavior of subjects and economics and their rational expectations. It also provide a.	s students with mo	adern knowledge
01MAPR	Markov processes	Z,ZK	4
18EKO1	Mathematical Economics 1	Z,ZK	5
	rselected models and methods for economic decision making. The main attention is given to optimization models of linear proc		lities of their real
	olving by means of the current software products.		
18EKO2	Mathematical Economics 2	Z,ZK	5
	selected models and methods for economic decision making. The main attention is given to optimization models in graphs, p ministic and stochastic demand, queuing theory and simulation models.	roject managemei	it, inventory
01MASC	Mathematical Statistics - Seminar	Z	2
	to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation	_	
	g unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihoo		ritical regions for
	g the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density estimation.		
00MAM1	Essentials of High School Course 1	Z	1
00MAM2 Review of basics of high	Essentials of High School Math Course 2	Z	1
01MMPV	Mathematical Models of Groundwater Flow	KZ	2
	overview of computational methods for selected groundwater flow problems. The first part of the course is devoted to mathe		
problems. The second p	part is aimed at selected numerical methods, emphasizing implementation issues related to these methods.		
01MMF	Methods of Mathematical Physics	Z,ZK	6
•	introduction to the theory of distributions with applications to solutions of partial differential equations with constant coefficier		
	ise of a continuous kernel on a compact set as well as Sturm-Liouville operators on bounded intervals, and applications of the boundary value problems and mixed problems.	ie separation of va	iriables method
18MIK1	Microeconomics 1	Z,ZK	5
_	t of theories, which help us to understand processes by which the scarce resources are allocated among alternative uses. M		_
·	nese processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introdu	uction in Microeco	nomics and
Consumer Theory.	Missassassiss 0	7.71/	
18MIK2	Microeconomics 2 t of theories, helping us to understand process by which scarce resources are allocated among alternative uses. Microecono	Z,ZK	5 ole of prices and
	and make clear economic agents behaviour. The lectures of Microeconomics II are oriented on Theory of Firm and Industria	•	ole of prices and
11MIK	Logical Circuits and Microprocessors	Z,ZK	4
	uction to the digital electronics for physicists. It describes the function principles of combination circuits, simple sequential circuits	cuits and complex	circuits like
	nicrocomputer architecture and principles of interfacing is shown.	714	
	Microprocessors 1 crocomputer, microprocessor types, memory types CPU, memory, Input output. Code and data, addressing modes(direct, in-	ZK	4
	s, IO devices - program control, interrupt. Microprocessor Microchip PIC16F877A, Instruction codes- Assembler and Macroas	-	
RISC processors - princ	ciples		
12MPR2	Microprocessors 2	ZK	2
	a types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assembler. description		
12MOF	Molecular Physics	ZK	2
12NT	omic molecules and molecular matter, and on structure-to-physical properties relations. Methods of molecular structure deter Nanotechnology	ZK	2
	rivariotecrifiology students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Phys	l	
	MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technol		
	on. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for he		
-	ed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric la	yer preparation w	II be mentioned
as well as soldering and 02NSAD	Simulations and Data Analysis Tools	Z	2
	lations of high energy elementary particle collisions. ROOT and Pythia programs.	_	2
04NM1	German for Intermediate Students M1	Z	1
The objective of the cou	irse is to level off the students´ skills in the German language. The course focuses on revision of more difficult phenomena an	d structures (e.g.	the passive) and
	es (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repul	-	
	gether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicis communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	is, and the fundar	nentals of 11
04NM2	German for Intermediate Students M2	Z	1
	other more complex grammatical structures and their application in communication based on technical texts, such as the relatio	l	· ·
_	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 or professional discourse (narticiples, relative clauses)	matically revises o	ner grammatical
04NM3	or professional discourse (participles, relative clauses). German for Intermediate Students M2	Z	1
	ther more complex grammatical structures and their application in communication based on technical texts, such as the relation	_	•
the world at the beginni	ng of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and	d car technology e	tc. Students
	rnation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	matically revises o	ther grammatical
prienomena important f	or professional discourse (participles, relative clauses).		

04NP1	German for Advanced Students P1	Z	1
	od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be le en 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.			
04NP2	German for Advanced Students P2	Z	1
	estudents' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend Educes 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).	a practioning formal	communication,
04NP3	German for Advanced Students P3	Z	1
	B main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a value of the communicative situations are represented by the communicative situations.	-	
	r accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the ving, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used		
•	rocess information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. Th		
practice to and from Ge			
02OR	General Relativity	ZK	3
-	heory of relativity: principle of equivalence and principle of general covariance, parallel transport and geodesic equation, gra aw. Schwarzschild solution of the Einstein equations, homogeneous and isotropic cosmological models.	vitational redshift.	Curvature and
01POPJ1	Computers and Natural Language 1	Z	2
	ational processing and understanding of natural languages. Automatic methods of morphological and syntactic analysis inclu	I .	
of result disambiguation	$will \ be \ discussed. \ Two-level \ morphology, \ tagging \ and \ language \ models, \ Viterbii \ algorithm, \ grammars, \ chart \ parsing, \ probabil $	istic grammars.	
01POPJ2	Computers and Natural Language 2	Z	2
_	s to get acquainted with the broad topic of machine translation (MT). Machine translation is a challenging task that can serve as natural languages. We cover several rather different approaches to the task as well as issues related to automatic and ma		_
quality.	as natural languages. We cover several rather uniferent approaches to the task as well as issues related to automatic and ma	ilidal evaluation of	lialisialioli
12POAL	Computer Algebra	KZ	2
• • •	asic objects (integers, rational and algebraic numbers, polynomials, rational functions, radicals, algebraic functions), arithmetic		
	tion, series summation, integration, ordinary differential equations, factorization, equations solving, quantifier elimination, subgraphics. Marks, detailed introduction and solving of practical examples, applications, examples, applications, examples, and interest of a practical examples, applications, examples, the state of the service of the serv	· · · · · · · · · · · · · · · · · · ·	_
01POGR1	graphics, Maple - detailed introduction and solving of practical examples, applications, overview of other systems (Axiom, Mac Computer Graphics 1	Zsyma, Mathemati Z	2
	semester "Computer Graphics" course is devoted to the specifics of digital display devices spanning from history up to the sta	_	-
a survey of fundamental	problems in 2D computer graphics is given together with their solutions. Focus is put on mathematical description of problems an	d explanation of th	e corresponding
-	edge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of co	omputer graphics	approaches in
01POGR2	g scientific documents and presentations. Computer Graphics 2	Z	2
	wo-semester "Computer Graphics" course begins with a brief introduction to signal theory in the context of aliasing - a pheno		
•	structured survey of fundamental problems in 3D computer graphics is given together with their solutions, from the descripti	•	
	on mathematical description of problems and explanation of the corresponding algorithms using knowledge previously obtained	-	=
-	n implementation aspect such as data structures design etc. is also a matter of concern. In the last lecture, a number of theoi source 3D modeling and rendering software instrument.	retical concepts a	re demonstrated
01SITE1	Computer Networks 1	Z	2
	ry and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network		
TCP/IP communications	. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification a	uthorities, public k	ey infrastructure
· ,	etwork security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the si		
01SITE2	Computer Networks 2 ry and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network	Drotocols practic	2 al exercises with
-	. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification a	-	
(PKI). Use in practice. N	etwork security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises.	erial control lines,	modems)
01POPR	Advanced Probability	7	2
The subject is devoted		Z	
characteristics of rando	o advanced Theory of probability and statistics on measure-theoretic level for general distributions of random variables. We compare the convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametric	deal with sample a	-
	m variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametri	deal with sample a	tric cases.
12PEL1		deal with sample a c and nonparame Z,ZK	tric cases.
12PEL1 Recapitulation of basics	m variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametri Practical Electronics 1	deal with sample a c and nonparame Z,ZK logue to digital col	tric cases.
12PEL1 Recapitulation of basics digital signal processing 12PEL2	rn variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametrical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analyse is Eurotion of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2	deal with sample a c and nonparame Z,ZK	tric cases.
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analy, Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design.	deal with sample at a cand nonparame Z,ZK logue to digital co	tric cases. 2 nverters and 2
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analyse in Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1	deal with sample at a cand nonparame Z,ZK logue to digital con Z,ZK	tric cases. 2 nverters and 2
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analy, Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design.	deal with sample at a cand nonparame Z,ZK logue to digital con Z,ZK	tric cases. 2 nverters and 2 2 software.
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating principles of operating so File system, file atributes	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analy, Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfarystems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor.	deal with sample as a cand nonparame Z,ZK logue to digital con Z,ZK	tric cases. 2 nverters and 2 2 software. Documentation. status, computer
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operatin Principles of operating s File system, file atribute load a process priorities	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analytical Electronics 2 electronics 2 enics, low noise electronics 5 practical Electronics 2 enics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaces Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer networks.	deal with sample as a cand nonparame Z,ZK logue to digital con Z,ZK	tric cases. 2 nverters and 2 2 software. Documentation. status, computer
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating Principles of operating sile system, file atribute load a process priorities protocols TCP/IP. Netwo	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analytical Electronics 2 practical Electronics 2 practical Electronics 2 practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaces, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor, set configurations of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications	deal with sample as a cand nonparame Z,ZK logue to digital con Z,ZK z,ZK z,ZK z,ZK z,ZK z,ZK z,ZK z,ZK	tric cases. 2 nverters and 2 2 software. Documentation. status, computer esses and
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating Principles of operating signal File system, file atribute load a process priorities protocols TCP/IP. Network 12PIN2	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analytical Electronics 2 electronics 2 enics, low noise electronics 5 practical Electronics 2 enics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaces Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer networks.	deal with sample as a cand nonparame Z,ZK logue to digital color. Z,ZK Z Cee. Hardware and el, kernel services. coesses, process srks: Internet. Addr	tric cases. 2 nverters and 2 2 software. Documentation. status, computer resses and 2
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating Principles of operating signal File system, file atribute load a process priorities protocols TCP/IP. Network 12PIN2 Practically oriented three in computer classrooms	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Anal. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface ystems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor, standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer network configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications Practical Informatics for Technics 2 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative countries. The second part of the course is "Introduction to computer algebra systems?.	deal with sample as a cand nonparame Z,ZK logue to digital cooling Z,ZK loce. Hardware and el, kernel services. coesses, processes rks: Internet. Addr	tric cases. 2 nverters and 2 2 software. Documentation. status, computer resses and 2 part is realized
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating signal process priorities protocols TCP/IP. Network 12PIN2 Practically oriented three in computer classrooms 12PIN3	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Anal. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 gystems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processors and tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer network configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications Practical Informatics for Technics 2 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative country. The second part of the course is "Introduction to computer algebra systems?. Practical Informatics for Technics 3	deal with sample as a cand nonparame Z,ZK logue to digital cooling Z,ZK z Z loce. Hardware and el, kernel services. cresses, processes rks: Internet. Addresses. Constituent Z	tric cases. 2 nverters and 2 2 software. Documentation. status, computer resses and 2 part is realized
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating Principles of operating signature in Earlie Street, file attribute load a process priorities protocols TCP/IP. Network 12PIN2 Practically oriented three in computer classrooms 12PIN3 Practically oriented three in the signature	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Anal. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor, standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer network configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications Practical Informatics for Technics 2 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative country. The second part of the course is "Introduction to computer algebra systems?. Practical Informatics for Technics 3 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative countr	deal with sample as a cand nonparame Z,ZK logue to digital cooling Z,ZK z Z loce. Hardware and el, kernel services. cresses, processes rks: Internet. Addresses. Constituent Z	tric cases. 2 nverters and 2 2 software. Documentation. status, computer resses and 2 part is realized
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating signal process priorities protocols TCP/IP. Network 12PIN2 Practically oriented three in computer classrooms 12PIN3 Practically oriented three in computer classrooms 12PIN3	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Anal. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaces and systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor, the configuration of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications Practical Informatics for Technics 2 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative countries. The second part of the course is "Introduction to computer algebra systems?. Practical Informatics for Technics 3 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative countries. The third part of the course is "Introduction to scientific computing?.	deal with sample as a cand nonparame Z,ZK logue to digital cooling Z,ZK logue. Hardware and el, kernel services. coesses, process srks: Internet. Addraware. Constituent Z lourse. Constituent	tric cases. 2 nverters and 2 2 software. Documentation. status, computer resses and 2 part is realized 2 part is realized
12PEL1 Recapitulation of basics digital signal processing 12PEL2 Noise analyses in elect 12PIN1 Computer and operating Principles of operating sile system, file atribute load a process priorities protocols TCP/IP. Netwo	Practical Electronics 1 electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Anal. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 onics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design. Practical Informatics for Technics 1 g systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor, standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer network configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications Practical Informatics for Technics 2 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative country. The second part of the course is "Introduction to computer algebra systems?. Practical Informatics for Technics 3 e semester course of basics and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative country and applications of informatics for science and engineering included as obligatory alternative countr	deal with sample as a cand nonparame Z,ZK logue to digital cooling and a cand nonparame Z,ZK logue to digital cooling and a cand and a cand a	tric cases. 2 nverters and 2 2 software. Documentation. status, computer resses and 2 part is realized 2 part is realized

12EPR2	Electronics Practicum 2	KZ	3
The aim of the practicul consists of blocks lastin	m is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and for	on of the results. T	he practicum
15INPR	Laboratory Practice in Instrumental Methods	KZ	4
	dents in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical and of	I .	
_	atories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of Nuclear	· · · · · · · · · · · · · · · · · · ·	
01PRA1	Probability and Mathematical Statistics 1	Z,ZK	6
-	to the introduction to Theory of probability and statistics on measure-theoretic level for discrete models, continuous distribution	-	
	leal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). This kn	owledge is further	applied to the
	observations and statistical parametric model estimation.	71/	
01PRA2	Probability and Mathematical Statistics 2 o the statistical techniques for estimation and testing within parametric and nonparametric models such as Maximum likelihood	ZK principle Uniform	2
=	ess tests of models, confidence regions, etc. We focus on real practical applications of these statistical techniques in frame of	-	
01PRST	Probability and Statistics	Z,ZK	4
	robability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition ar	· · · · · · · · · · · · · · · · · · ·	e Kolmogorov
	as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit		ed and proved.
	ory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are exp		
01PRSTB	Probability and Statistics B	KZ	4
	robability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition ar as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit	-	-
	ory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are exp		ed and proved.
16UAZB	Principles of Ionizing-Radiation Applications	ZK	2
	lications, review of interaction of radiation with a matter, radiation sources, detectors and instrumentation, evaluation of radio		
penetration and scatter	ing of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the use	of ionizing radiation	on.
16FNZB	Problems of Non-ionizing Radiation	ZK	2
-	iological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and me	thods used in field	ds of magnetic
	and as applied in various types of technical or medical equipment are given as well.	7	
12PSEM	Problem Seminary	Z	2
01PROP	cs from the region of solid materials engineering, physical electronics, materials science, nuclear reactors, dosimetry and app	7	ng radiation.
	Programmer's Practicum Irse is to acquire good programming habits which will help in writing of clean code, i.e. such that is easy to comprehend by ot	⊢ ∠ hers and suitable	
	cific examples, the students get familiar with naming conventions, and continue through writing project documentation, princip		- 1
	ng object-oriented design, design patterns and refactoring.		
01PERI	Programming of Peripherals Devices	Z	2
Memory organization, in	nput and output ports, computer bus. Software libraries for computer peripherals, 3D graphic libraries. Principles of peripheral	ls device drivers.	
01PW	Windows Programming	Z	2
	ams for MS Windows. Basic editing controls. File input and output. User defined components, dynamic type identification and		
18PRC1	Programming in C++ 1	Z	4
18PRC2	nly the C programming language and non-object oriented features of the C++ language. Programming in C++ 2	KZ	4
	ן רוסקומוווווווווווון ווו פדד 2 object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template	I .	4
18PJ	Programming in Java	Z,ZK	5
	to the Java platform and to the development of the basic types of applications for this platform.	_,	
18MTL	Programming in MATLAB	Z,ZK	5
Introducing Matlab envi	ronment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic and	alysis, statistics, a	Igorithmization
and geometric represer			
18MPT	Programming in MATLAB	KZ	5
The subject acquaints s compared to classical la	students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in programment.	amming methodol	ogy in Matlab
18PAS	Pascal Programming	Z	4
	mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program	_	
programming language		J	
12PDR1	Data Communication and Interfaces 1	Z	2
Principles of computer	networks, networks architectures and data transfer. Specification of existing network architectures.		
12PDR2	Data Communication and Interfaces 2	Z	2
	tandards and basics of protocol suite TCP/IP.		
01PSL	LaTeX - Publication Instrument	Z	2
00RET	o the basics and facilities of computer typography, particularly to the system LaTeX	Z	1
	Rhetoric on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the		nublic speech
	pal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an	•	
02RQGP1	Seminar on Quark-Gluon Plasma 1	Z	1
The aim of the seminar	is discuss the selection of the most fundamental articles in heavy ion physics.	'	
02RQGP2	Seminar on Quark-Gluon Plasma 2	Z	1
The aim of the seminar	is discuss the selection of the most fundamental articles in heavy ion physics.		
04RM1	Russian for Intermediate Students M1	Z	. 1
•	for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphab		, ,
=	mmunication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, ask nmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement		- '
· ·	the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.		
04RM2	Russian for Intermediate Students M2	Z	1
The course is based on	the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.		

04RM3			
1	Russian for Intermediate Students M3 Rnowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, h	Z owever, for half of	1 the time allotted
in the timetable. 04RP1	Russian for Advanced Students P1	Z	1
1	ent for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, pr ng the fundamentals of technical language and training writing skills.	acticing more diffi	cult grammar
04RP2	Russian for Advanced Students P2	Z	1
	RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, it on independent oral and written communication.	verb aspects, spe	ecific syntactic
04RP3	Russian for Advanced Students P3	Z	1
	RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphras	-	
	revious knowledge of general language at secondary level (listening, reading, correct communication in everyday situations).		
	dy is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and	•	· '
· ·	cal vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write	accurately and wit	th confidence on
technical topics.			
04RZ1	Russian for Beginners Z1	Z	1
· ·	the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russ	_	- 1
	or both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speak	ting). Students will	I be able to read
a short text with marke	d stress, understand its contents and summarize it.		
04RZ2	Russian for Beginners Z2	Z	1
The second semester of	f the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short su	ubtechnical texts.	Students will be
able to communicate us	sing short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will	also develop their	r vocabulary and
master further gramma	tical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.		
04RZ3	Russian for Beginners Z3	Z	1
The course is based 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
	duces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will b	-	- 1
J	ress their opinion. Writing skills will be trained on guided writing tasks and note-taking.	·	
04RZ4	Russian for Beginners Z4	Z	1
	04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer text		
	ommunication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., iri		-
	odality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, fre	-	
⁻	on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical		
	information from the timetable, learn about Russian holidays and typical meals.	data (e.g., Olberia	j, learn now to
			4
04RZ5	Russian for Beginners Z5	Z	1 . 1
1	student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understal		- 1
	ialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Co		
' ' '	ng grammar is based on professional and technical texts and only includes items typically used in professional communicatio	ın (verbal adlective	es participies i
	a develor their technical and according and our bloom, and our plantacional in a consumption of all little (continue of the consumption of the con	· ·	oo, paraopioo,
	s develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite reque	est, etc.)	
01RSWP	Project Management of Software Projects	est, etc.)	2
01RSWP The course Project mar	Project Management of Software Projects agement of software projects is dedicated to an explanation of general ideas, rules and procedures which are common to many	est, etc.) KZ v projects of very d	2 iverse character.
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01STR	Statistical Decision Theory	ZK	2
	o the statistical techniques for general decision procedures based on optimization of suitable stochastic criterion, their mutual	comparisons with	n respect to their
properties and applicab 11SFBM	Structure and Function of Biomolecules	Z,ZK	3
	lecular structure is crucial for the understanding of its function. The subject is focused on the introduction to building blocks of		-
_	n relationship including macromolecular complexes.		
04SM1	Spanish for Intermediate Students M1	Z	1
<u> </u>	for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-seme		· ·
' '	ention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, nega		-
04SM2	and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts of Spanish for Intermediate Students M3	7	1
	e students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for	_	•
· ·	lized texts on the Internet.		
04SM3	Spanish for Intermediate Students M3	Z	1
	upplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acade		
	net in Spanish and search for information of their specialization or field of interest. Students will use the information to write s	hort articles and s	summaries. The
04SP1	me, general Spanish course based on course books, covers presentations and, finally, a written and oral examination. Spanish for Advanced Students P1	Z	1
	more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicati	_	uisites: level B2
of CEFR.		·	
04SP2	Spanish for Advanced Students P2	Z	1
	nd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syl	ntax and focuses	on independent
written communication.	0 117 41 107 1 7 70	-	
04SP3	Spanish for Advanced Students P3 al part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is	Z	1
	will need in their career.	locused on written	Communication
04SZ1	Spanish for Beginners Z1	Z	1
	st stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fund	damental gramma	r structures and
will be able to communi	cate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanis	sh and will develor	p it.
04SZ2	Spanish for Beginners Students Z2	Z	1
	on course 04SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structure:		
	stand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countr nish-speaking countries are also included.	ies and others su	cii as the Czech
04SZ3	Spanish for Beginners Z3	Z	1
	course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of	f the Snanish-sne	aking countries.
	course 322, and develops the student's vocabulary and grantinal structure. The course covers realia (history and culture) of	i tile opariisii spe	,
mainly of Spain. It pays	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative		
mainly of Spain. It pays communication on a giv	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative en general topic, for which the student is trained by reading texts or listening to them.	e). It includes writt	ten and oral
mainly of Spain. It pays communication on a giv 04SZ4	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative en general topic, for which the student is trained by reading texts or listening to them. Spanish for Beginners Z3	e). It includes writt	ten and oral
mainly of Spain. It pays communication on a giv 04SZ4 The course is based on	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative en general topic, for which the student is trained by reading texts or listening to them. Spanish for Beginners Z3 course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish	e). It includes writt Z sh speaking count	ten and oral 1 tries, mainly of
mainly of Spain. It pays communication on a given of the course is based on Spain. It pays attention to the course is based on spain. It pays attention to the course is based on spain.	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative en general topic, for which the student is trained by reading texts or listening to them. Spanish for Beginners Z3	e). It includes writt Z sh speaking count	ten and oral 1 tries, mainly of
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18INTA WWW principles (HTT	Generation of Internet Applications	KZ	4
WWW principles (HTT			
	P, URL, client-server, HTML, CSS), fundamentals of WWW pages generation, server technologies for internet applications, PHF	P - hypertext prepr	ocessor: syntax
variables, statements	user functions, arrays, regular expressions, working with files, working with database, working with objects, working with image	ges, e-mail, securi	ty, examples of
internet applications.			
01DYK	Introduction to Continuum Dynamics	Z	2
This course is an intro	uduction to the mathematical description of continuum dynamics. It summarizes the necessary mathematical apparatus with er	nphasis on vector	and tensor
calculus, differential for	orms, and integration on manifolds. It includes the basic concepts of continuum mechanics such as strain and stress tensors o	r substantial deriva	ative, by means
of which it is possible	to derive the fundamental laws of conservation of mass, momentum, angular momentum, and energy in integral and differential	form. In the last pa	art of the course
these conservation la	ws are adapted to the case of viscous and inviscid fluid and linear and nonlinear elastic body.		
16ZIVB	Introduction to Ecology	KZ	2
	out basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the er	1	
indicators and sustain			
02UFEC	Introduction to Elementary Particle Physics	Z	2
	an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject	1	2
11UFPLN	Introduction to Solid State Physics	ZK	2
_	cture is to introduce the undergraduate students to the study of the solid state physics.	ZIX	2
		7	0
02UKP	Introduction to Curves and Surfaces	Z	2
=	e is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts		
	explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential p	eart of the lecture a	ire the examples
calculated by students			_
12ULT	Introduction to Laser Technique	Z,ZK	3
	agnetic radiation sources; laser principle; classification of lasers; characterization and rough application of various types of lase	ers; laser safety pr	ecautions.
12UMF	Introduction to Modern Physics	Z	3
The course is intende	d to be a concise introduction to modern / nonclassical physics for students who have already had basic classical physics cours	se. A part of the co	urse is delivered
in a computational lab	oratory.		
18UOA	Introduction into Object Oriented Architecture	Z,ZK	4
00UPRA	Introduction to Law	Z	1
			1
00UPSY	Introduction to Psychology	Z	-
01UTIZ	Introduction to Theoretical Informatics	ZK	2
11UVOD	Introduction to Specialization	Z	2
The purpose of this le	cture is to introduce the undergraduate students to the physical master degree study programmes.		
12VAK	Vacuum Physics and Technology	KZ	4
Rarefied gasses: basi	c concepts and relations; flow of rarefied gas. Interaction of gas with surface of solid surface; sorption, desorption; evaporation	, condensation; ga	as transport
through solid matter; \	/acuum generation. Pumping process. Pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping	speed; gas flow, o	onductivity,
searching for leaks. M 12PYTH The aim of this course	/acuum generation. Pumping process. Pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping aterials and vacuum instalation parts. Practical exercises. Scientific Programming in Python	Z placed on effective	2 solutions to rea
searching for leaks. M 12PYTH The aim of this course problems. The course involved in ongoing re greater part of the course	aterials and vacuum instalation parts. Practical exercises. Scientific Programming in Python	Z placed on effective ent theses. Studer or functional progr	2 solutions to rea nts are also amming. The
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searching for leaks. M 12PYTH The aim of this course problems. The course involved in ongoing re greater part of the cou library. We show how 12VTV The students get family	aterials and vacuum instalation parts. Practical exercises. Scientific Programming in Python	Z placed on effective ent theses. Studer or functional progrey and the Matplo	2 solutions to rea ats are also amming. The tilib graphics
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16ZDOZ2			
	Fundamentals of Radiation Dosimetry 2	ZK	2
-	ical effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Princip	oles and methods	of measurements
17ZEH	tion of activity and neutron source emission. Measurements of absorbed dose and exposure.	71/	1 2
	Basics of Economic Assessment the economic evaluation of Nuclear power plants. Introductory lectures are concerned with an introduction to economy and the	ZK	ent parts of
	es continued with insight into the business and managerial economics, explanation of the concepts of incomes, expenses, etc	=	-
	ation. Second part of lectures is focused on evaluation of nuclear power plants - the fuel cycle and operations of NPP.	o. and thon applied	
12ZEL1	Basic Electronics 1	Z,ZK	3
	imary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Ci	1	_
circuits include symbolic	c and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effective complex method are explained.	ects inside linear o	circuits.
12ZEL2	Basic Electronics 2	Z,ZK	3
The subject follows up v	with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic	themes of logical	circuits field.
02ZFM1	Foundations of Physical Measurements 1	Z	2
The lecture is designed	for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however	, it can be attende	d by students of
-	al of the lecture is to introducethe basics of physical measurements, the methods of processing and evaluation of acquired of	data on a PC. Stud	dentslearn the
basic habits of work in a			
02ZFM2	Foundations of Physical Measurements 2	Z	2
	e is devoted to the essentials of measurements of the most important physical quantities. It is especially recommended to tho		
	ricula - Physical engineering and Nuclear engineering. Also the methods of evaluation of statistical data using PC and practic arn main rules connected with experimental work in physical laboratory.	cai work with meas	surement devices
		V7	
11ZFPL The purpose of this lect	Basic to Solid State Physics ure is to introduce the undergraduate students to the study of the physical properties of solid state.	KZ	2
12ZFP	Principles of Plasma Physics	Z.ZK	4
	∣ PTINCIPIES OF PIASMA PHYSICS mperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants	,	1
• • •	tromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and pa		= -
· · · =	uction into magnetohydrodynamics and nuclear fusion. Fokker-Planck collision term is derived. Basics of atomic physics od		· ·
introduced.			
02ZJFB	Nuclear Physics B	KZ	3
	ents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic do	1	ch of our classica
intuition regarding the b	ehaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.		
15ZKJE	Nuclear Power Plants Design and Operation	ZK	3
Target of lecture is to cre	ate basic knowledge of physics of nuclear reactors utilizing fission. Further explains arrangement of nuclear fuel, purpose, tech	nnological and ma	terial construction
of core. Function and co	onstruction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material sc	cience, chemistry,	heat transfer and
dosimetry. Creates know	wledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison wit	h other sources o	f energy, to
environment and to stra	tegic importancy of nuclear sources of energy. Gives basic knowledge of construction, operation and decommissioning of nu	clear nower statio	no Informa about
		cicai powci statio	iis. Iiiloiiiis abou
	e and spent fuel and their management.	olear power statio	ilis. Illioittis abou
16MEZB	Fundamentals of Ionizing-Radiation Metrology	Z,ZK	4
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12ZDP	Data Processing for Publishing	Z	2
Typography, computer c	omputer-assisted publishing, coding of text, OCR (optical code recognition), DTP (desk top publishing), programming langua	ages for typesettin	ıg (TeX, LaTeX,
HTML, XML,, publishi	ng into www pages, cloud computing,commonly used graphical formats, formatting of typical data (PDF, PS, DOC, DOCX, P	PS, PPSX, RFT, X	(LS, XLSX),
multimedial presentation	ns, multimedial formats.		
12ZMD	Measurement and Data Processing	KZ	2
Basic knowledge for the	measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propetic	es, data fitting, se	paration of the
signal from the noise.			

List of courses of this pass:

Name of the course

Completion

Credits

Code

00EKOT			
	Economy in Technology	Z	1
0014014	The course introduces the basics of micro- and macroeconomics.	7	1 4
00MAM1	Essentials of High School Course 1	Z	1
00MAM2	Essentials of High School Math Course 2 Review of basics of high school mathematics.	Z	1
00PT	Preparatory Week	Z	2
00RET	Rhetoric	<u>Z</u>	1
	sed on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the		1
	nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an		
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	Z	1
01ALG	Algebra	ZK	4
After an introduction	n into the set theory standard algebraic structures are dealt with: groups, rings, fields, modules, linear algebras, lattices, Boolean algebras commutative fields.	oras, rings of poly	nomials ove
01ALGE	Algebra	Z,ZK	6
	kioms are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, the a	,	nd equivalen
statements, definit	ion of ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral dom	ains, principal ide	eal domains,
	fields, lattices. Independent chapters are devoted to divisibility in integral domains and to finite fields.		
01DEM	History of Mathematics	Z	1
he subject has the	form of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the field - gi from the history of mathematics.	ve their talks on v	aroius topic
01DIM1	Discrete Mathematics 1	Z	2
,	The seminar is devoted to elementary number theory and applications. It includes individual problem solving.	_	_
01DIM2	Discrete Mathematics 2	Z	2
'	The seminar is devoted to recurrence relations. It includes individual problem solving.		1
01DIM3	Discrete Mathematics 3	Z	2
The subject is devo	oted to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the seminar stu	dents present a	oroblem with
	solution chosen from the given literature.		
01DYK	Introduction to Continuum Dynamics	Z	2
This course is an	introduction to the mathematical description of continuum dynamics. It summarizes the necessary mathematical apparatus with empliforms, and integration on manifolds. It includes the basic concepts of continuum mechanics such as strain and stress tensors or sul	hasis on vector	and tanear
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calculus, differentia	e to derive the fundamental laws of conservation of mass, momentum, angular momentum, and energy in integral and differential form		e, by means
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functions. Basic properties of complex functions of several complex variables together with improper line integrals and its applications are presented.

01GTDR	Geometric Theory of Ordinary Differential Equations	Z	2
	sts of the qualitative theory of ODEs dealing with the geometric and topological properties of the solution. In this context, we mention su		basic results
	of the existence and uniqueness, continuous dependence on parameters and initial conditions. Main part is devoted to the autonomo		
01JEPR	Simple Compilers Lexical and syntax analysis, code generation, simple optimizations, development environments, reflection.	Z	2
01LAB2	Linear Algebra B2	Z,ZK	4
	immarizes the most important notions and theorems related to the matrix theory, to the study of vector spaces with a scalar product a	,	eometry.
01LAL	Linear Algebra 1	Z	2
01LALB	Linear Algebra B 1, Examination	ZK	3
01LAZ	Linear Algebra 1, Examination	ZK	2
012/12	The content of this subject is the exam in Linear Algebra 1.	2.1	_
01LIP	Linear Programming	Z,ZK	3
	roblems about constrained extremum problems for multivariable functions (the function is linear and the constraint equations are giver	'	_
	inequalities).		
01LNA1	Linear Algebra 1	Z	2
0.2	The subject summarizes the most important notions and theorems related to the study of vector spaces.	_	. –
01MA	Calculus 1	KZ	6
	c and set theory basics, mapping and its properties, set of real and complex numbers, sequences of real and complex numbers, limit		
	nt sequences, real function of one real variable, limit of function, derivative, Cauchy and Lagrange mean value theorems, function gra		
01MA1	Calculus 1	Z	4
	Basic course of real analysis (functions of one real variable, differential calculus).	_	
01MAB2	Calculus B2	Z,ZK	7
011111112	Basic calculus (real analysis, indefinite and definite integrals and series).	_,	
01MAB3	Calculus B3	Z,ZK	7
	ted to functional sequences and series, theory of ordinary differential equations, theory of quadratic forms and surfaces, and general th		1 -
	and prehilbert?s spaces.	,	,
01MAB4	Calculus B4	Z,ZK	7
	evoted properties of functions of several variables, differential and integral calculus. Furthermore, the measure theory and theory of L		1
01MAN	Calculus 1	Z	4
0111111111	Basic calculus (real analysis, functions of one real variable, differential calculus).	_	
01MANB	Calculus B 1, Examination	ZK	4
O TIVII (I VID	Examination of knowledge about stuff lectured in the 01MAN course.	210	, ,
01MAPR	Markov processes	Z,ZK	1
			4
01MASC	Mathematical Statistics - Seminar	Z	2
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01POPR	Advanced Dock at 186	7	
	Advanced Probability evoted to advanced Theory of probability and statistics on measure-theoretic level for general distributions of random variables. We d	Z eal with sample ar	2 nd integral
	of random variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametric		_
01PRA1	Probability and Mathematical Statistics 1	Z,ZK	6
	voted to the introduction to Theory of probability and statistics on measure-theoretic level for discrete models, continuous distribution	,	1
random variables.	We deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). This know	vledge is further ap	oplied to the
	statistical processing of observations and statistical parametric model estimation.		
01PRA2	Probability and Mathematical Statistics 2	ZK	2
	ted to the statistical techniques for estimation and testing within parametric and nonparametric models such as Maximum likelihood prin		-
	ess of fitness tests of models, confidence regions, etc. We focus on real practical applications of these statistical techniques in frame	of the specific exa	
01PROP	Programmer's Practicum	<u> </u>	2
	is course is to acquire good programming habits which will help in writing of clean code, i.e. such that is easy to comprehend by othe g specific examples, the students get familiar with naming conventions, and continue through writing project documentation, principle		•
ranononanty. Oshi	debugging, up to creating object-oriented design, design patterns and refactoring.	23 of defendive pre	grammig,
01PRST	Probability and Statistics	Z,ZK	4
	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and		1
	ons as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the	-	_
On the	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testi	ng are explained.	
01PRSTB	Probability and Statistics B	KZ	4
It is a basic course	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and	continuing till the	Kolmogorov
	ons as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the		and proved.
	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testi		
01PSL	LaTeX - Publication Instrument	Z	2
0.151::	The course is devoted to the basics and facilities of computer typography, particularly to the system LaTeX	_	
01PW	Windows Programming	Z	2
•	graphical programs for MS Windows. Basic editing controls. File input and output. User defined components, dynamic type identifica		
01RMF	The Equations of Mathematical Physics course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral tr	Z,ZK	6
The subject of this	partial differential equations (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).	iansionnalions, ai	ia solulion oi
01RSWP	Project Management of Software Projects	KZ	2
	management of software projects is dedicated to an explanation of general ideas, rules and procedures which are common to many pro	1	1
· · · · · · · · · · · · · · · · · · ·	re corresponds to a lifecycle of typical projects including many other aspects which have to be taken into account in the course of their r	-	
	is paid to software project management and to IT projects in general. Interdisciplinary view of project management is emphas	-	
01SITE1	Computer Networks 1	Z	2
Understanding the	history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network pro	tocols, practical e	xercises with
TCP/IP communica	ations. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification auth		
		orities, public key i	nfrastructure
	actice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the se		
(PKI). Use in pra	actice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises.	erial control lines,	modems)
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(PKI). Use in pra 01SITE2 Understanding the TCP/IP communica	actice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters) - firewa	erial control lines, Z tocols, practical exorities, public key i	modems) 2 xercises with nfrastructure
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02DEF1		Z	2
Physics and its pla	ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo	sophers, Aristotle.	Physics in
Helenistic period,	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, I	luygens. The birth	of physics
	as experimental science. Newton and his work.		
02DEF2	History of Physics 2	Z	2
	f classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E		1
•		-	
-	vanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann.		
and relativistic p	shysics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear er	nergy, Elementary	particles,
	standard model. The concept of Nature and Universe of today.		
02DRG	Differential Equations, Symmetries and Groups	Z	4
	The purpose of the lecture is to teach students computation of symmetries of the differential equations.		
02ELMA	Electricity and Magnetism	Z,ZK	6
	pulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectrics. Electric current and circuits, cond		he relativity
_	the Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. Electromagnetic waves, N	-	
02EXF1	Experimental Physics 1	Z	2
Lecture represents	an introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and method	ds of measuremen	t evaluation.
02EXF2	Experimental Physics 2	ZK	2
Lecture represents	an introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and method	ds of measuremen	t evaluation.
02FYS1	Physical Seminar 1	7	2
	devoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical	nresented in the	1
		•	course or
	anics. The problems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laborates.	atory equipments.	
02FYS2	Physical Seminar 2	Z	2
The seminar is of	devoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic:	s presented in the	course of
Electricity and	d Magnetism. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physica	al laboratory equip	ments.
02KF	Quantum Physics	Z,ZK	3
	n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heise	•	1
Otato accomption	quantization of angular momentum, solution of simple systems, hydrogen atom.	inderg uncertainty	principie,
001.054		-	
02LCF1	Experimental Laboratory 1	Z	2
	Cavendish experiment. Elasticity. Thermal capacities. Electric measurements, Acoustic. Oscillations.		
02LCF2	Experimental Laboratory 2	Z	2
'	Electric and magnetic field, microwaves, Xray and gamma rays, geometric optics	l	'
02MECH	Mechanics	Z	4
		_	
	ics, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimension	•	
in central force fi	eld, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics ofrigid bod	y, rotation. Fundan	nentals of
	continuum mechanics, elasticity, hydrodynamics. Sound.		
02MECHZ	Mechanics - Examination	ZK	2
'	The content of the subject is the examination according to the plan of studies.	l	'
02NSAD	Simulations and Data Analysis Tools	Z	2
OZINOND	Data analysis and simulations of high energy elementary particle collisions. ROOT and Pythia programs.	_	' -
2225		71.6	
02OR	General Relativity	ZK	3
Introduction to gen	neral theory of relativity: principle of equivalence and principle of general covariance, parallel transport and geodesic equation, gravita	tional redshift. Cu	rvature and
	Einstein's gravitational law. Schwarzschild solution of the Einstein equations, homogeneous and isotropic cosmological mode	els.	
02PRA1	Experimental Laboratory 1	KZ	6
	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E		1
	ts interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with th		
=			
or the measuremen	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	on or results. At the	same ume
	practically extendthe knowledge gained in lectures on physics.		1
02PRA2	Experimental Laboratory 2	KZ	6
Lecture is intended	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E	ngineering). But it	can be also
attended by student	ts interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with th	eliterature), the imp	olementation
of the measuremen	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluati	on of results. At the	e same time
	practically extendthe knowledge gained in lectures on physics.		
02RQGP1	Seminar on Quark-Gluon Plasma 1	Z	1
UZNQGFI			, ,
	The aim of the seminar is discuss the selection of the most fundamental articles in heavy ion physics.	_	
02RQGP2	Seminar on Quark-Gluon Plasma 2	Z	1
	The aim of the seminar is discuss the selection of the most fundamental articles in heavy ion physics.		
02SMF	Seminar of Mathematical Physics	Z	2
	ne seminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics departm		
24. 2000 01 11	concerning their scientific activities that could become the topics of the student?s bachelor theses in the next year	p. 000111 011	r 100.10
00000044		1/7	
02SPRA1	Special Practicum 1	KZ	6
Physics measurem	eent focused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chosen s	o that students car	n tamiliarize
	with advanced pats of experimental physics and metrology.		
02SPRA2	Special Practicum 2	KZ	6
	nent focused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chosen s		1
,	with advanced pats of experimental physics and metrology.		
007554		7 71/	
02TEF1	Theoretical Physics 1	Z,ZK	4
	ntroduction to analytical mechanics. The students acquire knowledge of the basic concepts of theLagrange formalism. The efficiency		
elementary exam	ples like the two-bodyproblem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course	cover differential a	nd integral
	principles of mechanics. The subject is the first part of the course of classicaltheoretical physics (02TEF1, 02TEF2).		

02TEF2			
	Theoretical Physics 2	Z,ZK	4
	nalism. The special theory of relativity: relativistic mechanics and classical field theory in theMinkowski space-time. Classical electrod		equations
	in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipole approximation	=	- 1
02TER	Heat and Molecular Physics	Z,ZK	4
	n of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynami		
-			
	ical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity dis		
02TSFA	Thermodynamics and Statistical Physics	Z,ZK	4
	nodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatel		
Basics of many boo	dy descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical	ensemble, Fermi ga	as, models
	of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena.		
02UFEC	Introduction to Elementary Particle Physics	Z	2
The cours	se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the su	ubject are presented	
02UKP	Introduction to Curves and Surfaces	Z	2
	lecture is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts f	or the curves are int	
-	re explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential part		
	calculated by students		
02VOAF	Waves, Optics and Atomic Physics	Z,ZK	6
	ן waves, Optics and Atomic Engales a in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polariza		-
•			
conerence. Geo	metrical optics. Introduction toquantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Bro	iglie waves,the Schr	oainger
	equation, stationary states and spectra of finite systems.		_
02ZFM1	Foundations of Physical Measurements 1	Z	2
The lecture is designated	gned for students of physical specializations (Experimental particle physics, Physical engineering,Nuclear engineering), however, it c	an be attended by s	tudents of
other branches. T	he goal of the lecture is to introducethe basics of physical measurements, the methods of processing and evaluation of acquired dat	a on a PC. Students	learn the
	basic habits of work in a physics lab.		
02ZFM2	Foundations of Physical Measurements 2	Z	2
-	ourse is devoted to the essentials of measurements of the most important physical quantities. It is especially recommended to those s	ı —	
•	s curricula - Physical engineering and Nuclear engineering. Also the methods of evaluation of statistical data using PC and practical w	•	٠, ١
51.5 51 11.5 p.1.y 51.54.5	is involved. Students learn main rules connected with experimental work in physical laboratory.	on marmoadaronic	401.000
007.15		7 71/	
02ZJF	Nuclear Physics	Z,ZK	6
i nis scientific field	presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic domai		ir ciassicai
	intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic pl		
02ZJFB	Nuclear Physics B	KZ	3
This scientific field	presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic domai	n, where much of ou	ır classical
	intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic pl	hysics.	
02ZSM	Introduction to the Standard Model	ZK	2
	ı nadrons, baryons, mesons, symmetry, symmetry group, quarks, gluons, partons, standard model of electroweak and strong interactio		odynamics
	(QCD), cross section, scattering cross section.	, ,	,
04ABZK	English - State Examination		
		7K	5
The course center		ZK	5
	ent is the examination as given by the study plan. Student is eligible for the State language examination (level C1 or B2 of CEFR) only	if he/she has passo	ed all the
	ent is the examination as given by the study plan. Student is eligible for the State language examination (level C1 or B2 of CEFR) only and examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the APIN programme covers also exam	if he/she has passo	ed all the
respective courses	er tis the examination as given by the study plan. Student is eligible for the State language examination (level C1 or B2 of CEFR) only and examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the APIN programme covers also examination conditions comply with respective rules and regulations for state language examinations.	if he/she has passonination subjects. As	ed all the
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materials. The course extends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writing including the sentence and paragraph structure, linking, cohesion and coherence in texts. 04AP3 English for Advanced Students P3 7 The 04AP3 course is based on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It includes training oral and written communication skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing an abstract) and, if possible, also preparing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal language both in oral and written communication. 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 04AP3 syllabus and the ability to apply their knowledge obtained in the three 04AP courses. The examination consists of 2 parts - written (110 min) and oral (30 min) and includes also oral presentation of a topic from the student's field of study. 04CESM1 Czech for foreigners - Intermediate 7 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. Intermediate Czech 2 Ζ 1 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. 04CESM3 Intermediate Czech 3 7 1 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. 04CESMZK Czech for Intermediate Students Examination 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 04CESM1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. 04CESP1 Czech for Foreign Students - Advanced Examination 7 1 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. 04CESP2 Czech for Foreigners - Advanced Ζ 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. Czech for Foreigners - Advanced 1 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. 04CESPZK Czech for Foreign Students - Advanced Examination ZK 5 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 04CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. 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. 04FM1 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. 04FM3 French for Intermediate Students M3 The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and infinitive clauses, participle structures, compound tenses). Text summary. -Students prepare a written paper which will be delivered in form of an oral presentation in-class. The paper is linked to the field of students' future specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work compiled from French articles and one's own knowledge/experience. -Longer monologues on topics /situations set for the examination are prepared. Text structure, cohesion and coherence French for Intermediate Students Examination 04FM7K 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. 04FP1 French for Advanced Students P1 04FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general and technical information and to solve problems. 04FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repeated and expanded: subjonctif, passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics of specialization: mathematics, internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation. 04FP2 French for Advanced Students P2 1 With the link to P1 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on given topics. Features typical of technical and scientific communication are stressed (passive voice, nominalization, word formation). French for Advanded Students P3 04FP3 The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering environment. Special skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covers a technical /applied science topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination. 04FP7K French for Intermediate 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.

04FZ1	French for Beginners Z1	Z	1
•	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		
	s French for specific / technical communication and reading of popular science and scientific texts. 04FZ1 The objective is to be able Ising the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravo		- 1
	za ate ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, pe		
giving the d	directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronu	nciation and gramn	nar.
04FZ2	French for Beginners Z2	Z	1
	g up with 04FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the		
•	nners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreem map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communi	•	
thanking, travelling,	How does the machine work? A few expressions concerning the study. Name of University and Faculty.	sation. Opcome topi	os covereu.
04FZ3	French for Beginners Z3	Z	1
The course builts u	pon 04FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - P	ravdová: French for	Beginners.
Topics, functions	and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf	ormation and loud a	as part of
04574	pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.	7	
04FZ4	French for Beginners Z4 up on 04FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The co	Z Z	overed with
	ne textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lectur		
Students of FJFI.	The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp	_	rsity in our
	country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, intern		
04FZ5	French for Beginners Z5	Z	1
•	ed in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They p is covered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials. To	-	
_	of French science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cl		
	subjunctive clauses, gerund, passive.		
04FZZK	French for Beginners Examination	ZK	3
The content is the	examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examin	ation is ruled by the	document
04NM1	Instruction for examination. Its content covers the levels FZ1 - FZ5. German for Intermediate Students M1	Z	1
	e course is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and st	. – .	assive) and
	processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repu		
	sues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists		ntals of IT
	terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and unders		
04NM2	German for Intermediate Students M2 ces other more complex grammatical structures and their application in communication based on technical texts, such as the relation be	Z Z	1 and society
	beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		-
	information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematic		
	phenomena important for professional discourse (participles, relative clauses).		
04NM3	German for Intermediate Students M2	Z	1
	ces other more complex grammatical structures and their application in communication based on technical texts, such as the relation be beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and	•	
	information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati		
	phenomena important for professional discourse (participles, relative clauses).		
04NMZK	German for Intermediate Students Examination	ZK	4
	is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination of er the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessr		
and oral, which cove	is to be obtained from the teacher.	ient. More detailed	IIIIOIIIIalioii
04NP1	German for Advanced Students P1	Z	1
	es good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be leve	led off at the begin	ning of the
	te is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for d	•	
more difficult gramm	nar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on pra i.e., telephoning.	ctical everyday com	munication,
04NP2	German for Advanced Students P2	Z	1
	is the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending	1 1	
vocabulary range. It	t introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and produces mathematical expressions and texts of nuclear power engineering.	actising formal com	munication,
	oth written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indi	rect speech).	
04NP3	German for Advanced Students P3	Z	1
	sts of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a vari nd car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the voca	=	
	gineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used.		
students are trained	d to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The	ourse also includes	translation
0.41.15.71.4	practice to and from German.	71/	
04NPZK	German for Advanced Students Examination t is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination c	ZK Z	5 rts - written
	t is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination c er the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungrac		
.,	information is to be obtained from the teacher.		
04RM1	Russian for Intermediate Students M1	Z	1
_	ined for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet		
· · · · · · · · · · · · · · · · · · ·	r communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking sic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement		
they can use bas	contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetal		2130. THE

04RM2	Russian for Intermediate Students M2	Z timotable	1
	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		
04RM3 The course develop	Russian for Intermediate Students M3 bis the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, howe in the timetable.	Z ver, for half of the t	ime allotted
04RMZK	Russian for Intermediate Students Examination	ZK	4
	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled		- 1
	ents are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instr	-	
04RP1	Russian for Advanced Students P1	7	1
	uirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, prac	icing more difficult	- 1
	structures, understanding the fundamentals of technical language and training writing skills.	J	
04RP2	Russian for Advanced Students P2	Z	1
The course is bas	ed on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, ve	rb aspects, specific	syntactic
	structures). Stress is put on independent oral and written communication.		
04RP3	Russian for Advanced Students P3	Z	1
	ed on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing		
	od previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The		
	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and wr		
develop their subte	chnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accutechnical topics.	irately and with col	ntidence on
04RPZK	Russian for Intermediate Students Examination	ZK	5
	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled	ı ge and skills acqui	red in RP1
- RP3. Stude	ents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instr	uctions by the teac	her.
04RZ1	Russian for Beginners Z1	Z	1
The course represe	ents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian	Thus it begins with	n mastering
the Russian alphab	et (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking)	. Students will be a	able to read
	a short text with marked stress, understand its contents and summarize it.		
04RZ2	Russian for Beginners Z2	Z	1
	ter of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subte		
able to communicat	te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in	· ·	abulary and
04RZ3		7 Z	1
U4KZ3	Russian for Beginners Z3	_	
The course is based	d on R72 and includes further everyday tonics, develops understanding of short compact texts on new subtechnical tonics (for training	various forms of re	ading skills
	d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training distributions) distributed in the distribution patterns while listening to spoken language. They will be		- 1
	d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		- 1
	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking.		- 1
and listening) and	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be	able to respond so	as to be
and listening) and 04RZ4 The course is based	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4	able to respond so Z with a certain percent	as to be 1 entage of
04RZ4 The course is barunfamiliar words, contents from Cze	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts or or communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregrench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free	Z with a certain percular verbs, different time), and practice	as to be 1 entage of ces in verb e oral and
04RZ4 The course is barunfamiliar words, contents from Cze	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregrech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free atton on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data	Z with a certain percular verbs, different time), and practice	as to be 1 entage of ces in verb e oral and
04RZ4 The course is base unfamiliar words, of patterns from Cze written communications.	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts or communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreginated), imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals.	Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), le	1 entage of ces in verb e oral and arn how to
and listening) and 04RZ4 The course is base unfamiliar words, of patterns from Cze written communication 04RZ5	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts or all communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregination on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5	Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), les	1 entage of ces in verb e oral and arn how to
and listening) and 04RZ4 The course is base unfamiliar words, of patterns from Cze written communica 04RZ5 The course expects	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreguench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 si the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding	able to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), leading to the company of	1 entage of ces in verb e oral and arn how to
and listening) and 04RZ4 The course is base unfamiliar words, of patterns from Cze written communica 04RZ5 The course expects information from a second	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreguench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 si the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understandin specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication is provided in the student of the	able to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), leading to the company of	1 entage of ces in verb e oral and arn how to 1 ummarizing e trained on
and listening) and 04RZ4 The course is base unfamiliar words, of patterns from Cze written communica 04RZ5 The course expects information from a severyday topics. S	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreguench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 si the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding	able to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), leading to the company of	1 entage of ces in verb e oral and arn how to 1 ummarizing e trained on
and listening) and O4RZ4 The course is base unfamiliar words, or patterns from Cze written communication O4RZ5 The course expects information from a severyday topics. Severyday topics.	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts.). Students are trained to use grammar structures effectively (e.g., irreguench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 It the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understandin specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Commutudying grammar is based on professional and technical texts and only includes items typically used in professional communication (able to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), leading to the company of	1 entage of ces in verb e oral and arn how to 1 ummarizing e trained on
and listening) and 04RZ4 The course is base unfamiliar words, of patterns from Cze written communica 04RZ5 The course expects information from a severyday topics. Severyday topics. Severyday 04RZZK	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreguench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 In the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understandin specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Commutudying grammar is based on professional and technical texts and only includes items typically used in professional communication (revoice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, po	able to respond so Z with a certain percular verbs, difference time), and practice a (e.g., Siberia), leading to the control of the control	1 entage of ces in verb e oral and arn how to 1 ummarizing e trained on participles,
and listening) and 04RZ4 The course is base unfamiliar words, or patterns from Cze written communicate 04RZ5 The course expects information from a severyday topics. Sever	d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreguench, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 In the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understandin specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Commutudying grammar is based on professional and technical texts and only includes items typically used in professional communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, po	able to respond so Z with a certain percular verbs, difference time), and practice a (e.g., Siberia), leading a compart of the compart of t	1 entage of ces in verb e oral and arn how to 1 ummarizing e trained on participles, 3 red in RZ1
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04SP3	Spanish for Advanced Students P3	Z	1
Course 04SP3 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 focue based on what students will need in their career.	sed on written com	nmunication
04SPZK	Spanish for Advanced Students Examination	ZK	5
	t is the examination as given by the study plan. Examination 04SPZK consists of two parts, namely oral and written. The prerequisite		oral part is
	ving passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan o		
04SZ1	Spanish for Beginners Z1 e first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundam	Z	1
	e must stage of the live-semester programme of Spanish studies, during the list stage the students will master phonetics and fundam communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spa		
04SZ2	Spanish for Beginners Students Z2	7	1
	ased on course 04SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures a	_	•
	nderstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries		
	Republic. Realia of Spanish-speaking countries are also included.		
04SZ3	Spanish for Beginners Z3	Z	1
The course is based	d on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the	Spanish-speaking	g countries,
mainly of Spain. It	pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative) communication on a given general topic, for which the student is trained by reading texts or listening to them.	. It includes writter	n and oral
04SZ4	Spanish for Beginners Z3	Z	1
	d on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish	ا speaking countries	s, mainly of
Spain. It pays atten	tion to further grammar topics (perífrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	imperative, and su	ubjunctive),
1	o written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listenia		
04SZ5	Spanish for Beginners Z5	Z	1
The course books a	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish fo		s. In its final
0.40==	part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examina		
04SZZK	Spanish for Beginners Examination	ZK	3
The course conte	nt is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral ex	amination only if he	e/she has
44 4 11 11	passed the written examination test.	7 71/	4
11ANEL	Linear Circuit Analysis ntroduction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especially	Z,ZK	4
The course is the ii	of the computer methods of analysis. The second part gives a short list of most commonly used circuits in experimental equipr		erstanding
11APLG	Applications of Group Theory in Solid State Physics	ZK	2
	tomic system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy states the	ı	
	ween them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the information		
	he application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field environment		
	vibrations, and selection rules for optical absorption transitions.		
11ELEA	Instrumentation and Measurement	Z,ZK	2
44144	The course is the introduction to the instrumentation and measurement for physicists.	7 71/	4
11MIK	Logical Circuits and Microprocessors introduction to the digital electronics for physicists. It describes the function principles of combination circuits, simple sequential circuits.	Z,ZK	4 ircuite like
The course is the	microprocessors. The microcomputer architecture and principles of interfacing is shown.	ins and complex ci	iicuits like
11SFBM	Structure and Function of Biomolecules	Z,ZK	3
	omolecular structure is crucial for the understanding of its function. The subject is focused on the introduction to building blocks of mag	· !	_
	and its structure:function relationship including macromolecular complexes.	, , , , , , , , , , , , , , , , , , , ,	
11UFPLN	Introduction to Solid State Physics	ZK	2
'	The purpose of this lecture is to introduce the undergraduate students to the study of the solid state physics.	'	
11UVOD	Introduction to Specialization	Z	2
'	The purpose of this lecture is to introduce the undergraduate students to the physical master degree study programmes.	·!	
11ZFPL	Basic to Solid State Physics	KZ	2
'	The purpose of this lecture is to introduce the undergraduate students to the study of the physical properties of solid state	'	
12APL	Application of Lasers	Z,ZK	2
	olication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot	ner branches.	
12AUX	Administration of UNIX System	KZ	2
<u> </u>	Basic and more advanced administration of Unix operating system		
12EGS1	English Graduate Standard 1	KZ	4
Improving the kr	nowledge in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr		
12EPR1	Electronics Practicum 1	KZ	3
The aim of the pra	cticum 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
10====	consists of blocks lasting 4 hours.		
12EPR2	Electronics Practicum 2	KZ	.3
ine aim of the pra	cticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation	or the results. The	practicum
401004	consists of blocks lasting 4 hours.	7 71/	
12INS1	Information Systems 1	Z,ZK	2
	ngy, architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to so		
12INS2	Information Systems 2 ormation systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud ap	Z,ZK	2 Nicrosoft
Graduation of Int	ormation systems 1 is required. In more details: information technology, architecture of the databases, network databases, cloud application systems information managament, aproaches to solve task of information systems	meation Google, N	norosuit,
12LAS	Laser Systems	Z,ZK	3
	nanosecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers. C	<i>'</i>	
	Semiconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultravi		
	power continuous lasers. Infrared high power lasers. Submilimeter lasers. Lasers with high degree of coherence. Free electron la	-	· ·

12LT1	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, dispersion		erent and
	on-coherent pulse propagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optica	al resonator.	
12LT2	Laser Technique 2	Z,ZK	2
	Laser oscillator, the rate equation, the laser amplifier, Q-switching, mode-locking		
12MOF	Molecular Physics	ZK	2
Basic id	deas on multi-atomic molecules and molecular matter, and on structure-to-physical properties relations. Methods of molecular structu	ure determination.	
12MPR1	Microprocessors 1	ZK	4
Microprocessor ar	nd microcomputer, microprocessor types, memory types CPU, memory, Input output. Code and data, addressing modes(direct, indir	ect, register, relati	ve,, stack
memory, procedure	calls, IO devices - program control, interrupt. Microprocessor Microchip PIC16F877A, Instruction codes- Assembler and Macroassem	nbler, programming	g languages.
	RISC processors - principles		
12MPR2	Microprocessors 2	ZK	2
Ard	chitecture IA-32. Data types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assemble	r. description.	'
12NME1	Numerical Methods 1	Z,ZK	4
There are explained	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Me	thods for solution	of tasks very
important for physi	cists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computat	ional environment	MATLAB is
	used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.		
12NT	Nanotechnology	ZK	2
Lectures will introd	uce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Physica	l and chemical fur	ndaments of
different technolog	gies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technolog	jies which are sub	stantial for
nanostructure prep	paration. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for heter	rostructure and na	nostructure
growths will be disc	cussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer	preparation will be	e mentioned
	as well as soldering and encasement.		
12PDR1	Data Communication and Interfaces 1	Z	2
'	Principles of computer networks, networks architectures and data transfer. Specification of existing network architectures.	•	'
12PDR2	Data Communication and Interfaces 2	Z	2
'	Principles of Ethernet standards and basics of protocol suite TCP/IP.		'
12PEL1	Practical Electronics 1	Z,ZK	2
l l	basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analogous electronic, measurement of frequency and phase.	· ′	1
	digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser.	gg	
12PEL2	Practical Electronics 2	Z,ZK	2
121 LL2	Noise analyses in electronics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit de	'	
12PIN1	Practical Informatics for Technics 1	Z	2
IZI IINI			
Computer and o		_	1
=	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface	ce. Hardware and	software.
Principles of operati	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfacting systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, k	ce. Hardware and ernel services. Do	software. cumentation.
Principles of operati File system, file atri	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaing systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, kenters, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling process	ce. Hardware and ernel services. Do sses, process stati	software. cumentation. us, computer
Principles of operati File system, file atri	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaing systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, k butes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling proces riorities. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer networks.	ce. Hardware and ernel services. Do ses, process stati ks: Internet. Addre	software. cumentation. us, computer
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Principles of operati File system, file atri load a process p 12PIN2 Practically oriented	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaing systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, kebutes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling process riorities. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer networks protocols TCP/IP. Network configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network application. Practical Informatics for Technics 2 I three semester course of basics and applications of informatics for science and engineering included as obligatory alternative course in computer classrooms. The second part of the course is "Introduction to computer algebra systems?.	ce. Hardware and ernel services. Do sees, process statuks: Internet. Addresses.	software. cumentation. us, computer esses and 2 rt is realized
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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 methods of their programm mainly to programming in the Fortran language.	ning. The course is oriented	d
12ZAOP Fundamentals of Optics	Z,ZK 2	
The lecture covers the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geometric	, I	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		- 1
work. Particular topics are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves in v effects), and further from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next in	·	- 1
anisotropic media, it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference p	•	- 1
of two-wave interference and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a graphical	form, including fundament	tals
of grating diffraction. Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics limit.	-	ical
approach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optica 12ZDP Data Processing for Publishing	Z 2	
Typography, computer computer-assisted publishing, coding of text, OCR (optical code recognition), DTP (desk top publishing), programming languages	I	eX,
HTML, XML,, publishing into www pages, cloud computing, commonly used graphical formats, formatting of typical data (PDF, PS, DOC, DOCX, PPS	s, PPSX, RFT, XLS, XLSX)),
multimedial presentations, multimedial formats.	7.71/	
12ZEL1 Basic Electronics 1 The subject provides primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circuit	Z,ZK 3	٠.
circuits include symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe	-	aı
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 the		d.
12ZFP 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, linea and propagation of electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and paramet	•	- 1
It comprises brief introduction into magnetohydrodynamics and nuclear fusion. Fokker-Planck collision term is derived. Basics of atomic physics od mu	•	
introduced.	.,	
12ZMD Measurement and Data Processing	KZ 2	
Basic knowledge for the measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propeties, or accuracy, normal distribution and its propeties, accuracy, normal distribution and accuracy accuracy, acc	data fitting, separation of th	he
signal from the noise. 12ZPLT Basic Laser Technique Laboratory	KZ 6	
Lasers, solid state Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmonic, l		ser
diode, diode pumped Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acous	-	
12ZPOP Basic Optical Laboratory	KZ 6	
The practical laboratories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be 14ELMI Electron Microscopy	Z,ZK 3	
14ELMI Electron Microscopy In this course the students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The introdu	,	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		
mathematical formulations and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and dynamic and dy		oes
of contrast, and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques 14NMA Materials Science		
14NMA Materials Science Introduction to the Materials Science	KZ 3	
14TEM Engineering Mechanics	Z,ZK 6	
Abstract: The course represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with stress and strain are	nalysis of real structure par	rts
(elasticity, plasticity, fracture mechanics, etc.). Principles of statics, kinematics, and dynamics and their application.	7.71/	
14TM Engineering Mechanics The course represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with the stress and strain analy	Z,ZK 4	
14ZZKS Testing and Processing of Metals and Alloys	KZ 4	
Abstract: Tension tests, hardness, impact toughness, technological testing, fatigue testing, creep testing. Light microscopy, preparation of specimens for m	l l	on.
Casting, forming, welding, soldering, brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, titanium alloys, special alloys of		ical
	non-ferrous metals. Techni	
drawing and CAD.		
drawing and CAD. 15CH1 General Chemistry 1	Z 3	iles
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drawing and CAD. 15CH1 General Chemistry 1 The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical uses	Z 3	oles
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drawing and CAD. 15CH1 General Chemistry 1 The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2 General Chemistry 2 The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using visible validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are if	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact	hat ved
drawing and CAD. 15CH1 General Chemistry 1 The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2 General Chemistry 2 The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using verthe validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are it in exercises. 15CHB Chemistry At first, the principles of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are of is paid to the individual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioactive contamination could be compared to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and the principles of the treatment of all liquid and gaseous radioactive contamination and th	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact	hat ved tion
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drawing and CAD. 15CH1 General Chemistry 1 The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2 General Chemistry 2 The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using verthe validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are if in exercises. 15CHB Chemistry At first, the principles of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are of is paid to the individual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioal NPP. The technological operations used to the treatment of wastes and the corrosion problems of the construction materials are discussed. Analytical Calculations and Chemometry Principals	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact	hat ved tion in
drawing and CAD. 15CH1 General Chemistry 1 The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2 General Chemistry 2 The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using verthe validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are if in exercises. 15CHB Chemistry At first, the principles of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are dispaid to the individual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioal NPP. The technological operations used to the treatment of wastes and the corrosion problems of the construction materials are discussed.	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact	tion in
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The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2 General Chemistry 2 The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using verthe validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are in exercises. 15CHB Chemistry At first, the principles of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are of is paid to the individual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioactive in the individual technological operations used to the treatment of wastes and the corrosion problems of the construction materials are discussed in the individual technological operations used to the treatment of wastes and Chemometry Principals Lecture deals with basic principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, basic two-tailed significance testing, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, semi solving, titration stoichiometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. PH calculations, calculations in pospectrophotometry and separation methods, solving of complex forming equilibria.	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact	tion in
The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact the lustrated by examples solv Z,ZK 4 discussed. The main attentificative media encountered in the din detail, too. ZK 2 data distributions, one- an inar part consists of equation tentiometry, coulometry, ZK 2	hat wed tition in and on
The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical us solved in exercises. 15CH2 General Chemistry 2 The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using verthe validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are in exercises. 15CHB Chemistry At first, the principles of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are of is paid to the individual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radioactive in the individual technological operations used to the treatment of wastes and the corrosion problems of the construction materials are discussed in the individual technological operations used to the treatment of wastes and Chemometry Principals Lecture deals with basic principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, basic two-tailed significance testing, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, semi solving, titration stoichiometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. PH calculations, calculations in pospectrophotometry and separation methods, solving of complex forming equilibria.	Z 3 se are illustrated by examp Z,ZK 3 arious examples, the fact the lustrated by examples solv Z,ZK 4 discussed. The main attentificative media encountered in detail, too. ZK 2 data distributions, one- an inar part consists of equation tentiometry, coulometry, ZK 2 ellenistic world is discussed.	that wed tion in and on ad.

15INPR	Laboratory Practice in Instrumental Methods	KZ	4
Practical training	of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical and other	ners problems. The	training is
carried	out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of	Nuclear Chemistry.	
15ZKJE	Nuclear Power Plants Design and Operation	ZK	3
-	to create basic knowledge of physics of nuclear reactors utilizing fission. Further explains arrangement of nuclear fuel, purpose, technological fields are account of the company of the	-	
	nd construction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material science	-	
=	ites knowledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison with		
environment and to	o strategic importancy of nuclear sources of energy. Gives basic knowledge of construction, operation and decommissioning of nuclear	r power stations. In	forms about
16 A M M D	high level nuclear waste and spent fuel and their management.	ZK	2
16AMMB	Fundamentals of Analytical Measurement Methods technical performance and utilization of methods of chemical analysis. Basic methodology of analytical determination, gravimetry, titra		2
	ractometry, polarimetry, UV-VIS spectroscopy, atomic emission and absorption spectroscopy, infrared and Raman spectroscopy, X-ra		
polarography, for	magnetic and electron spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography.	y otraotarar ariaryor	o, madicai
16APLB	Application of Ionizing Radiation in Analytical Methods	ZK	5
	ation of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiatio	l l	
, , , , , ,	of technological processes.	,	Ü
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2
	of historic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further radiati	on methods, dendro	chronology,
archaeomagneti	ism), analytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence a	nalysis and other n	nethods),
	photogrammetry.		
16FNZB	Problems of Non-ionizing Radiation	ZK	2
Subject is focused	d on biological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and method	ods used in fields o	f magnetic
	resonance and ultrasound as applied in various types of technical or medical equipment are given as well.		
16KPR	Clinical Propaedeutic	ZK	2
Making students fa	imiliar with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemical	examinations and a	anaesthesia
16MCRB	Transport of Ionizing Radiation and Monte Carlo Method	Z,ZK	4
Introduction to prin	nciples of Monte Carlo method and its use for radiation transport simulation, selected concepts of probability theory and mathematica	I statistics. Physica	I models of
	rent types of radiation and their use for stochastic modeling of their substance transport. Model description concepts, geometric model	•	
	eling of measured variables and parameters. Statistical evaluation of reliability of modeling results, variance reduction methods, progra		
transport modeling	g, MCNP program, its possibilities and use. Procedures for the practical use of the program for typical tasks in the field of dosimetry, a	pplication of ionizin	ig radiation,
40MEZD	detection and detection systems, radiation protection and medical applications.	7 71/	4
16MEZB	Fundamentals of Ionizing-Radiation Metrology arizes the basic objectives and content of ionizing radiation metrology. It deals with the interpretation of radiation quantities and units i	Z,ZK	4
	perimental foundations of metrology, the determination of basic parameters of radiation. Lectures are supplemented with basic summ		
incorollour and ox	regulations.	ary or rolovant logi	olation and
16SED1	Dosimetry Seminar 1	Z	2
	supposed to motivate the student's interest in the field of dosimetry. Since the students are usually not familiar with dosimetry, the se	_	
-	tudy and employment. First two lectures focus on the basics of radiation physics. The following lectures are given by the former studen		
empl	oyed in various organizations (SÚRO, v.v.i., ÚJF AV R v.v.i., ÚJV ež, MI, Hospital Na Homolce, FN v Motole, PTC Czech s.r.o., C	ERN, Fermilab).	
16SED2	Dosimetry Seminar 2	Z	2
Dosimetry Semina	ry 2 follows-up SED1. In this seminary students will listen to the lectures of the older students of DDAIR. The older students give lectures	res about their prog	gress on the
	search topic of their theses. The course also introduces the principles of creating good presentation and advice for working with scien		
16UAZB	Principles of Ionizing-Radiation Applications	ZK	2
	of applications, review of interaction of radiation with a matter, radiation sources, detectors and instrumentation, evaluation of radion		
	and scattering of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the u	ise of ionizing radia	ation.
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1	Z,ZK	4
-	ving systems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecular	-	
their regulation. G	eneral human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system a	ind its physiology. F	Respiratory
4070450	system and physiology of respiration. Excretory and genital tract.	7 71/	4
16ZBAF2	Fundamentals of Human Biology, Anatomy and Physiology 2	Z,ZK	4
	logy of cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, blood S. Visual system and physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, en	_	or rierves.
16ZDOZ1			1
	Fundamentals of Radiation Dosimetry 1 pment, and objectives of dosimetry. Quantities and units used for description of sources, fields, interactions of ionizing radiation, ioniz	Z,ZK	4 efer and
r listory, develo	absorption. Fundamentals of the effects of ionizing radiation.	allons, energy train	sici aliu
16ZDOZ2	Fundamentals of Radiation Dosimetry 2	ZK	2
	iological effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Principles		
	in dosimetry. Determination of activity and neutron source emission. Measurements of absorbed dose and exposure.		
16ZEDB	Basics of Experimantal Data Processing	ZK	2
. 0	Statistical analysis of experimental data; univariate data; calibration; regression; multivariate data.	,	_
16ZIVB	Introduction to Ecology	KZ	2
	about basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the environments of the environments of the environments of the environments.		
	indicators and sustainable development.		
16ZJTB	Nuclear Energy Facilities and Accelerators	ZK	2
Basic scheme of	f nuclear reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most im	portant reactor typ	es, linear
high-voltage acc	elerators, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons,	electron and ion so	ources for
	accelerators, targets.		
16ZPSP		_	
-	Basic Work with PC	Z	2
	Basic Work with PC bject is to teach basic skills associated with a personal computer. The introductory part of the course is devoted to information system PE students. Another part summarizes basic information about computer hardware, software and security. Most of the course is devo	ns and resources a	vailable to

to teach students to use office software (word processor, spreadsheet, presentation software) at a level that is required in other courses of study (practice, undergraduate thesis, research and thesis). 16ZRAO Basics of Radiation Protection 7 2 The aim of the course is to familiarize students with the general principles of radiation protection. The main emphasis is put on basic mechanisms and concepts, in order to allow critical orientation in this field. The course provides answers to the cardinal questions: What is ionizing radiation (IR), where it comes from, whether and how it is dangerous for people, what is the meaning of protective units (Gray, Sievert), how to prevent malicious effect of IR and many others. The content of the lectures does not require any prior knowledge. 17BFS Control Systems of Nuclear Reactors 7 7K Matter of the subject is concentrated on categorization of systems in nuclear power plant according to importance to nuclear safety; next on requirements of different categories of systems and typical instrumentation of research nuclear facilities and nuclear power plants. Attention is given to definition of nuclear safety, single failure criterion and redundancy, common cause failures, independence and diversity; furthermore to qualification of safety systems. At the end, lectures deal with control and safety systems of systems research nuclear facilities. The lectures are completed with visit of the training reactor VR 1 with demonstration of its safety and control system. 17BPJR1 Bachelor Thesis 1 Subject deals with problematic of officially given theme of bachelor thesis and its defense during state examination that is necessary for completion of bachelor study. The guarantor of the given theme is an advisor that defines literature, checks the progress and ability of work defense, and operatively solves problems of the work. Student individually or with a little help of guarantor or consultant solves given problem. Theme of work is generally selected from the list and is approved by the head of department and the faculty dean. The work is evaluated by one opponent. Contact hours relate to cooperation with the supervisor and are solved according to work needs. The subject is therefore not included in the faculty timetable. **Bachelor Thesis 2** 17BPJR2 Subject deals with problematic of officially given theme of bachelor thesis and its defense during state examination that is necessary for completion of bachelor study. The guarantor of the given theme is an advisor that defines literature, checks the progress and ability of work defense, and operatively solves problems of the work. Student individually or with a little help of guarantor or consultant solves given problem. Theme of work is generally selected from the list and is approved by the head of department and the faculty dean. The work is evaluated by one opponent. Contact hours relate to cooperation with the supervisor and are solved according to work needs. The subject is therefore not included in the faculty timetable. Detection of radiation The course provides basic information on detection of ionizing radiation. Summary of basic knowledge of nuclear physics necessary to understand derived from parallel course 02ZJF is the content of the first lecture. The main part of the course contain information on sources of radiation and methods of radiation detection of neutrons. Spectroscopy is lectured similarly: all kinds of ionizing radiation with a special lecture on neutron spectroscopy. Emphasis is given on physical principles of detection and spectroscopy but appropriate detection technique and its set-up is provided in an appropriate detail. Last lecture as an introduction to laboratory exercises is devoted to theory of probability and mathematical statistics with emphasis on processing of experimental data because the course on theory of probability and mathematical statistics is no more in CV of nuclear engineering. Basics of writing of scientific article is provided also to make easier writing a laboratory protocol as first student scientific text. Laboratory exercise are rather important part of the course amounting about 2/3 of the time (5-6 tasks). Students are given a problem with prepared short description and task to measure some quantity(ies) and write a protocol as scientific text (an article). Exercise is carried out in groups of maximum 3 students; protocol is written individually. 17ENF **Experimental Neutron Physics** ΚZ 2 The lectures are mainly focused on detailed characterisation of neutron properties, characteristics of neutron (reactor and non reactor) sources, properties of prompt and delayed neutrons, neutron detection methods, neutron induced nuclear reactions, modification and adjustment of neutron field, science and industry neutron applications. Last lecture deals with experimental data processing and analysis. The lectures are supplemented with experimental practices in the field of neutron detection, determination of delayed neutron properties. study of neutron diffusion in various materials, preparation and characterisation of photo-neutron source and neutron source calibration. Experimental practices will be running at training reactor VR-1 and in the neutron laboratory. 17EXK Excursion Ζ This course - excursion - has to provide the basic ideas about various nuclear devices of various parts of fuel cycle, their production and operations. There are several research centers, nuclear facilities, machine works, etc., that students visit during one week of their examination period. The works we visit usually are: NRI - ež, plc., (reactors LR-0 a LVR-15), Škoda JS plc., (reactor hall, test loop of control drive mechanism, production of control drive mechanism), radioactive wastes storage Richard, uranium mining (Dolní Rožínka or Mine of chemical mining in Stráž pod Ralskem), Nuclear power plant Temelín, etc. 17JARE **Nuclear Reactors** 7K 2 Introduction. World power issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety systems, containment. Classification of reactors into IV generations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. Pressurized water reactors (PWR). Western-type PWR (Westinghouse, KWU, Framatom). VVER-type reactors, Temelín nuclear power plant. Boiling water reactors. Heavy water reactors, fast breeder reactors, high-temperature gas cooled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF and INPRO initiatives. Evaluation and selection of proposed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role of nuclear power in long-term outlook 17THNJ1 Thermohydraulics Design of Nuclear Devices 1 2 With this course, students are introduced into the problem of thermal calculation and design of nuclear devices thermodynamic diagrams. Step by step they will learn more about basic quantities and terms in technical thermodynamic, basic reversible and non-reversible thermodynamic changes and cycles with ideal gas. The main focus of course is in thermodynamic of steam: basic reversible and non-reversible thermodynamic changes with steam and Rankine-Clausius cycle. In detail are analyed miscellaneous methods of thermal efficiency increasing of Rankine-Clausius cycle. Course closure is dedicated to thermodynamic of gas mixtures and humid air. 17THNJ2 Thermohydraulics Design of Nuclear Devices 2 Z,ZK 3 With this course, students are introduced into problem of thermohydraulic calculations. Step by step they will learn more about fluid mechanics. The most important part dedicated to fundamentals: description of flow, definition of quantities and equations, pressure drops, 1D description of flow, turbulence and its influences on the flow characteristics, boundary layers and centrifugal pumps. That way students obtain knowledge which are necessary for insight into convection as well as into fundamental principles of devices in nuclear power plants. 17THNJ3 Thermohydraulics Design of Nuclear Devices 3 Z,ZK 3 With this course, students are introduced into problem of thermohydraulic calculations. Step by step they will learn more about fundamentals chapters of heat transfer. Are discussed all types basic modes of heat transfer (conduction, convection a radiation). The lectures are focused to fields which are necessary for designs of nuclear reactors as well as others devices in nuclear power plants. 17UINZ Introduction to Engineering Z.ZK 3 The course is devoted to an introduction to the engineering profession. Students will gradually learn the characteristics and specialties of engineering work, including an overview of the basics of selected engineering disciplines, such as the basics of materials science, manufacturing technology, quality control and assurance and ecology. Further, the course will focus on some issues of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code. 17URO Introduction to Radiation Protection of Nuclear Facilities 2 K7 The course is focused on introduction to the problems of radiation protection at nuclear facilities; the legislative context; the utilization of radiation sources in controlled and monitored areas; practical activities to monitor and measure radiation situation, the protection of public and workers against ionizing radiation 17VYR Research Reactors 2 Course is devoted to research reactors and their applications for the need of research and industry. Students get familiar with research reactor types and their experimental programme along with experimental equipment needed for particular applications and their specifics. The course is supported by technical visit to research reactor workplace.

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17ZAF1	Introduction to Nuclear Reactor Physics 1 ith a description of the microworld structure at the level of electrons, protons and neutrons. A description of radioactivity and nuclear re	KZ	4
	to neutron interactions with matter. The probability of nuclear reactions is described by introducing of cross-sections in dependence of		
of heavy atoms is the	ne important process for the operation of nuclear reactors. The students will get familiar with issue of nuclear chain reaction, energy re	eleased from fis	sion reaction,
	n balance. Then the most important reactor types are described including the complete scheme of nuclear power plant with the light		•
diffusion environme	nts is based on the application of the diffusion equation obtained from Fick's law. Students will be able to determine the neutron flux of a polytopments with the point source, planar source, and linear source.	listribution in va	rious diffusion
17ZAF2	environments with the point source, planar source, and linear source.	Z,ZK	3
	Introduction to Nuclear Reactor Physics 2 17ZAF1 and expands application of diffusion theory derived based on Fick's low for diffusion in gases. Analysis of bare homogeneou	•	-
	r is main part of lectures. Three basic geometry are considered in derivation - slab, sphere, cylinder. Students learn to determine spa		-
	or core and reflector) and individual energetic groups, based on critical equation they learn how to calculate critical amount of fissile n		
Possible use of diffu	usion theory is discussed also for fast reactor and differences between thermal and fast reactors are stressed. Part is addicted to react	ctor regulation a	nd analysis of
	control rods. There are also summarized differences between homogeneous and heterogeneous reactors.		
17ZEH	Basics of Economic Assessment	ZK	2
	ses on the economic evaluation of Nuclear power plants. Introductory lectures are concerned with an introduction to economy and the		-
microeconomics. Le	ectures continued with insight into the business and managerial economics, explanation of the concepts of incomes, expenses, etc. and energy resources evaluation. Second part of lectures is focused on evaluation of nuclear power plants - the fuel cycle and operation:		is in electrica
17ZEL	Basics of Electronics	KZ	3
1	asic information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and sol		-
=	deal with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor componen		
and triacs). Lectur	res continue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/digital circuits.	tal converters. L	ectures are
	completed with electronic laboratory exercises.		
18EKO1	Mathematical Economics 1	Z,ZK	5
The course introduc	ses selected models and methods for economic decision making. The main attention is given to optimization models of linear program	ming, possibilitie	es of their rea
1051(00	applications and their solving by means of the current software products.	7 71/	
18EKO2	Mathematical Economics 2 luces selected models and methods for economic decision making. The main attention is given to optimization models in graphs, proj	Z,ZK	5
The course introd	management with deterministic and stochastic demand, queuing theory and simulation models.	ect managemer	it, inventory
18ESPG1	European Computer Driving Licence 1	Z	2
1	ators are an important tool, especially for students and graduates in Software engineering in economics. The winter semester introduce		1
-	cent is put on advanced functions of MS Excel (names, functions and expressions, pivot table and graph). Next, the VBA language w		
	and user functions will be addressed.		
18ESPG2	European Computer Driving Licence 2	Z	2
Spreadsheet calcula	ators are an important tool, especially for students and graduates in Software engineering in economics. Summer semester follows the w	inter semester v	vith advanced
\/BA programming	g topics (charts, objects, graphical user interface, add-ins programming) and introduces some applications in economics, mathematic		
VBA programming	,,,	s, operational re	search, and
VBA programming	computer science.	s, operational re	search, and
18INTA	computer science. Generation of Internet Applications	KZ	4
18INTA WWW principles (H	computer science. Generation of Internet Applications TTP, URL, client-server, HTML, CSS), fundamentals of WWW pages generation, server technologies for internet applications, PHP - hy	KZ pertext preproc	4 essor: syntax,
18INTA WWW principles (H	computer science. Generation of Internet Applications TTP, URL, client-server, HTML, CSS), fundamentals of WWW pages generation, server technologies for internet applications, PHP - hynts, user functions, arrays, regular expressions, working with files, working with database, working with objects, working with images,	KZ pertext preproc	4 essor: syntax,
18INTA WWW principles (H variables, statemen	computer science. Generation of Internet Applications TTP, URL, client-server, HTML, CSS), fundamentals of WWW pages generation, server technologies for internet applications, PHP - hynts, user functions, arrays, regular expressions, working with files, working with database, working with objects, working with images, internet applications.	KZ rpertext preproc e-mail, security,	4 essor: syntax, examples of
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18UOA	Introduction into Object Oriented Architecture	Z,ZK	4	
18ZALG	Basics of Algorithmization	Z,ZK	4	
This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the algorithm complexity.				
18ZPRO	Basics of Programming	Z	4	
This lecture is inten	This lecture 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 C++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 03. 12. 2021, time 05:05.