Study plan

Name of study plan: BS Jaderné inženýrství C

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Applications of Natural Sciences

Type of study: Bachelor full-time

Required credits: 165
Elective courses credits: 15
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: 165

The role of the block: PO

Code of the group: BSJICPP1

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

Requirement credits in the group: In this group you have to gain at least 52 credits

Requirement courses in the group: In this group you have to complete at least 16 courses

Credits in the group: 52 Note on the group:

Note on the C	<u> </u>					
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
	10 /					
02ELMA	Electricity and Magnetism Iskender Yalcinkaya, Goce Chadzitaskos, Josef Schmidt, Jan Vysoký Jan Vysoký Goce Chadzitaskos (Gar.)	Z,ZK	6	4+2	L	РО
02EXF1	Experimental Physics 1 Jan epila	Z	2	2+0	L	РО
02PRAK	Experimental Laboratory Libor Škoda Libor Škoda (Gar.)	KZ	4	0+4	L	РО
01MATZ1	Mathematics, Examination 1 Radek Fu ik Radek Fu ik Radek Fu ik (Gar.)	ZK	2	-	Z	РО
01MATZ2	Mathematics, Examination 2 Radek Fu ík, Mat j Tušek Mat j Tušek Radek Fu ík (Gar.)	ZK	2	-	L	РО
01MAT1	Mathematics 1 Radek Fu ik Radek Fu ik Radek Fu ik (Gar.)	Z	4	3P+3C	Z	РО
01MAT2	Mathematics 2 Radek Fu ik Radek Fu ik Radek Fu ik (Gar.)	Z	4	3P+3C	L	РО
02MECH	Mechanics Iskender Yalcinkaya, David Be Michal Jex David Be (Gar.)	Z	4	4+2	Z	РО
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, David B e , Filip Petrásek, Stanislav Skoupý, Antonín Hoskovec, Petr Novotný Antonín Hoskovec David B e (Gar.)	ZK	2	-	Z	PO
15CH1	General Chemistry 1 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	РО
15CH2	General Chemistry 2 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	РО
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	РО
17UINZ	Introduction to Engineering	Z,ZK	3	2+1	Z	РО
02ZAJF	Introductory Atomic and Nuclear Physics	Z,ZK	4	2+2	L	РО
17EZE	Basics of Power Engineering and Energy Sources Dušan Kobylka	Z,ZK	3	2+0	Z	РО
18ZPRO	Basics of Programming Maksym Dreval, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	РО

02ELMA	Electricity and Magnetism	Z,ZK	6
Electric charge, Cou	lomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits	s, conductivity. Basics	of the relativity
theory. Electrodynan	nic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. Electromagnetic waves, Maxwe	ell equations	
02EXF1	Experimental Physics 1	Z	2
Lecture represents a	an introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and	methods of measurer	nent evaluation
02PRAK	Experimental Laboratory	KZ	4
Lecture is intended p	orimarily for students who study branch Nuclear Chemistry engineering, or practically oriented bachelor's specializations of b	oranch Nuclear engine	ering. But it ca
be also visited by sto	udents interested in the other specializations. During Experimental laboratory, students learn how to prepare for experiments	s (including work with t	he literature),
•	of the measurement (acquire of different experimental procedures and routines), will teach writing the records of measurement	t, processing and evalu	uation of result
	actically extend the knowledge gained in lectures on physics.		
01MATZ1	Mathematics, Examination 1	ZK	2
01MATZ2	Mathematics, Examination 2	ZK	2
01MAT1	Mathematics 1	Z	4
The course is devote	ed to the study of the basics of calculus of one variable. It includes an introduction to differential and integral calculus, with page	articular emphasis on	applications ir
oractical problems.			
01MAT2	Mathematics 2	Z	4
The course, which is	the continuation of Mathematics 1, is devoted to the integration techniques, improper Riemann integral, introduction to para	ametric curves (especi	ally in polar
coordinates), the ba	sics of sequences and infinite series, and finally to the Taylor and power series and their applications.		
D2MECH	Mechanics	Z	4
	ss, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-din	nensional equations of	motion, moti
n central force field,	forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigic	d body, rotation. Funda	mentals of
continuum mechanic	es, elasticity, hydrodynamics. Sound.		
D2MECHZ	Mechanics - Examination	ZK	2
The content of the s	ubject is the examination according to the plan of studies.	1 1	
15CH1	General Chemistry 1	Z	3
	concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and pro	actical use are illustrat	ed by example
solved in exercises.			, ,
15CH2	General Chemistry 2	Z,ZK	3
	ontinuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes.		_
•	principles is not restricted only to chemical processes is documented. The significance and practical use of explained princip		
n exercises.			
00PT	Preparatory Week	Z	2
17UINZ	Introduction to Engineering	Z,ZK	3
_	ed to an introduction to the engineering profession. Students will gradually learn the characteristics and specialties of engine	1 ' 1	-
	d engineering disciplines, such as the basics of materials science, manufacturing technology, quality control and assurance		
ne basics of selecte		and ecology, Fullifier.	the course w
		and ecology. Further,	the course wi
ocus on some issue	es of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code.		
ocus on some issue	es of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code. Introductory Atomic and Nuclear Physics	Z,ZK	4
ocus on some issue 2ZAJF rief review of micro	es of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code. Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem	Z,ZK entary-particle physics	4 s.
ocus on some issue 2ZAJF rief review of micro 7EZE	s of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code. Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources	Z,ZK entary-particle physics	4 s. 3
ocus on some issue 2ZAJF rief review of micro 7EZE he main purpose of	so of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code. Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources this course is to transmit to students the basic information about energy sector as the part of economics, about its wide range,	Z,ZK entary-particle physics Z,ZK all important parts and	4 3. d about patter
ocus on some issue 2ZAJF rief review of micro 7EZE he main purpose of f energy sector fun	Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources this course is to transmit to students the basic information about energy sector as the part of economics, about its wide range, ction. The course is - from the beginning - structured logically from definition of term "energetics? through the power consum	Z,ZK entary-particle physics Z,ZK , all important parts and option, power sources	4 3 d about patter
ocus on some issue DZZAJF Brief review of micro 7EZE The main purpose of f energy sector fun ining and its influe	Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources this course is to transmit to students the basic information about energy sector as the part of economics, about its wide range, ction. The course is - from the beginning - structured logically from definition of term "energetics? through the power consumnce on our environment, to the transformation of fuel power to nobler types of power. This course describes power plants fro	Z,ZK entary-particle physics Z,ZK , all important parts and option, power sources m the view as a device	4 3 d about patter on Earth, fue be being used
ocus on some issue DZZAJF Brief review of micro 7EZE The main purpose of a fenergy sector fun nining and its influence power transform	Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources this course is to transmit to students the basic information about energy sector as the part of economics, about its wide range, ction. The course is - from the beginning - structured logically from definition of term "energetics? through the power consumnce on our environment, to the transformation of fuel power to nobler types of power. This course describes power plants fro ation mostly from the view of their features for connection to energy network, how they influence the environment and nations	Z,ZK entary-particle physics Z,ZK , all important parts and option, power sources in the view as a device al economy, etc. It continued in the	4 3 d about patter on Earth, fue be being used ains also pov
OCUS ON SOME ISSUED OF THE PRINCE OF THE PRI	Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources this course is to transmit to students the basic information about energy sector as the part of economics, about its wide range, ction. The course is - from the beginning - structured logically from definition of term "energetics? through the power consumnce on our environment, to the transformation of fuel power to nobler types of power. This course describes power plants fro ation mostly from the view of their features for connection to energy network, how they influence the environment and national eir managing and structures, description of power networks in Europe and in the Czech Republic. The final part of this course	Z,ZK entary-particle physics Z,ZK , all important parts and option, power sources in the view as a device al economy, etc. It continued in the	4 3 d about patte on Earth, fue be being used ains also poo
focus on some issue 02ZAJF Brief review of micro 17EZE The main purpose of of energy sector fun mining and its influe the power transform	Introductory Atomic and Nuclear Physics world phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elem Basics of Power Engineering and Energy Sources this course is to transmit to students the basic information about energy sector as the part of economics, about its wide range, ction. The course is - from the beginning - structured logically from definition of term "energetics? through the power consumnce on our environment, to the transformation of fuel power to nobler types of power. This course describes power plants fro ation mostly from the view of their features for connection to energy network, how they influence the environment and national eir managing and structures, description of power networks in Europe and in the Czech Republic. The final part of this course	Z,ZK entary-particle physics Z,ZK , all important parts and option, power sources in the view as a device al economy, etc. It continued in the	4 3 d about patter on Earth, fue being used ains also pov

Code of the group: BSJICPP2

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

Requirement credits in the group: In this group you have to gain at least 49 credits

Requirement courses in the group: In this group you have to complete at least 17 courses

Credits in the group: 49

Note on the group:

programming language.

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
17AEZ	Alternative Energy Resources Martin Kropík	Z	3	1t	L	РО
17ALE	Nuclear Legislation Dušan Kobylka	Z	2	2+0	L	РО
17EXK	Excursion Dušan Kobylka	Z	1	1t	L	РО
17JARE	Nuclear Reactors Tomáš Bílý Tomáš Bílý Tomáš Bílý (Gar.)	ZK	2	2	L	РО

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

01MAT3	Mathematics 3 David Krej i ík, Severin Pošta David Krej i ík David Krej i ík (Gar.)	Z,ZK	4	2+2	Z	РО
01MAT4	Mathematics 4 Mat j Tušek Mat j Tušek Mat j Tušek (Gar.)	Z,ZK	4	2+2	L	PO
14NMA	Materials Science Petr Haušild, Jaroslav ech Petr Haušild Petr Haušild (Gar.)	KZ	3	2+1	5	PO
17NRE	Experiment Design and Control Martin Kropík Dušan Kobylka Martin Kropík (Gar.)	Z,ZK	3	2+1	Z	РО
12NME1	Numerical Methods 1 Pavel Váchal Pavel Váchal (Gar.)	Z,ZK	4	2+2	L	PO
17PSJR	Operational States of Nuclear Reactors	KZ	4	2+1	L	PO
17RAO	Radioactive Waste Management Tomáš Bílý	ZK	2	2	L	PO
17TCJ1	Equipment Complex of Nuclear Power Plants 1 Dušan Kobylka	Z,ZK	3	2+1	Z	PO
17THNJ1	Thermohydraulics Design of Nuclear Devices 1 Dušan Kobylka	Z	2	2+0	Z	PO
17THNJ2	Thermohydraulics Design of Nuclear Devices 2 Dušan Kobylka Dušan Kobylka	Z,ZK	3	2+1	L	PO
17UPC	Introduction in Nuclear Fuel Cycle Dušan Kobylka	KZ	2	2+0	L	PO
17PROJ	Introduction to the Design of Nuclear Facilities	Z	3	2+1	Z	PO
17ZAF1	Introduction to Nuclear Reactor Physics 1	KZ	4	3+1	Z	PO

1/ZAF1	Introduction to Nuclear Reactor Physics 1	KZ	4	3+1		PO
Characteristics	of the courses of this group of Study Plan: Code=BSJICPP2 N	lame=BSJIC - pov	rinné p ed	dm ty 2. ro	ník	
17AEZ	Alternative Energy Resources				z	3
	tudents to get an overview of the problematic and basic information about sources an	d techniques of energy r	oroduction. T	he main attent	ion is focus	-
	transformations, energy technologies and systems. The students will be able to qualify					
lants, steam-gas cy	cles, geothermal, water and wind power, biomass, thermal pumps, solar power, fuel rods	and sea power. In this co	ourse, there a	are also include	ed several r	measuremen
ealized during one v	week intensive course, which will be focused on the problematic mentioned above.					
7ALE	Nuclear Legislation				Z	2
ectures are focused	d on valid legislation of the Czech Republic for peaceful utilisation of nuclear energy a	nd ionising radiation, i.e.	above all on	the Atomic Ac	ct and its in	nplementing
egulations. Attentior	n is paid to Atomic Act structure, basic terms and legislation requirements for various	control domain such as r	nuclear safet	y, radiation pro	tection, en	nergency
reparedness, etc.						
I7EXK	Excursion				Z	1
his course - excursi	ion - has to provide the basic ideas about various nuclear devices of various parts of fu	el cycle, their production	and operation	ons. There are	several res	earch center
uclear facilities, ma	chine works, etc., that students visit during one week of their examination period. The	works we visit usually a	re: NRI - ež	ź, plc., (reactor	s LR-0 a L\	VR-15), Škor
S plc (reactor hall,	, test loop of control drive mechanism, production of control drive mechanism), radioac	ctive wastes storage Ricl	hard, uraniur	m mining (Doln	ıí Rožínka	or Mine of
hemical mining in S	Stráž pod Ralskem), Nuclear power plant Temelín, etc.	· ·		•		
7JARE	Nuclear Reactors			Z	K K	2
ntroduction. World p	ower issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assembl	ies, active core, control s	svstems, safe	etv svstems. co	ontainment	. Classificati
of reactors into IV de	enerations. Standard types of nuclear power reactors: concept, description, layout, previous	ous evolution, world sha	re perspecti	ves Pressuriza	ed water re	actors (PWR
-	(Westinghouse, KWU, Framatom). VVER-type reactors , Temelin nuclear power plant.					
		-	-			
	is cooled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVE	,			J initiatives	s. Evaluation
	posed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen po	wer, role of nuclear pow	er in long-tei		714	
01MAT3	Mathematics 3			Z,	ZK	4
	rises the most important notions and theorems related to the study of finite-dimensional	al vector spaces.				
D1MAT4	Mathematics 4			1 .	ZK	4
inear and non-linea	ar differential equations of the first order. Linear differential equations of higher order w	ith constant coefficients.	. Multivariable			
4NMA	Materials Science			K	(Z	3
ntroduction to the M	faterials Science					
7NRE	Experiment Design and Control			Ζ,	ZK	3
ecture deals with de	esign and operation of systems for control of experiments, acquisition and evaluation	of experimental data. It p	provides infor	mation about i	nterfaces of	of personal
omputers for contro	ol of experimental systems (COM, USB, Firewire, LAN, GPIB), further about measuring	g systems with VME, VX	I and LXI inte	erfaces, discus	s their adv	antages and
lisadvantages. Next	, lectures deal with programming of measuring systems - special dedicated software,	problems of use of high	programming	g languages ar	nd especial	lly use of
raphical oriented de	evelopment tools (Agilent VEE and LabView); data acquisition and evaluation. Finally, st	udents prepare individua	l software pro	oject for data a	cquisition a	and evaluation
2NME1	Numerical Methods 1			Z,	ZK	4
here are explained	the basic principles of numerical mathematics important for numerical solving of probl	ems important for physic	s and techno	ology. Methods	for solution	n of tasks ve
•	sts (ordinary differential equations, random numbers) are included in addition to the ba					
	programming language as a demonstration tool. The seminars are held in computer lal		=	•		
7PSJR	Operational States of Nuclear Reactors			K	Z	4
	course is focused on reactor kinetics and dynamics, namely reactor kinetics, delayed r	neutrons, prompt neutror	n lifetime, rea			ations and it
•	ransfer function of zero reactor, reactivity coefficients, temperature coefficients, reactor					

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fuel cycle of the nuclear power plants, particularly PWR used and / or planned in the Czech Republic, namely fuel changes during the cycle, burn-up, changes of keff during the cycle, xenon poisonings and xenon oscillations, samarium, fuel handling, fuel management, reactor operation, burn-up, fuel loading, fuel reloading, loading pattern, legislative requirements for the core, core loading and fuel handling, fuel cycle of Dukovany & amp; Temelín NPP and MOX. Note: Front-end & amp; back-end of the nuclear fuel cycle of the nuclear power

The subject is focused on getting the knowledge on the system of radioactive waste and spent fuel management system, from the waste formation to their disposal to repository. Waste management subjects to licensing by Atomic law, what is a determining factor to the possibility of using different ways of waste management, i. e. collecting, sorting, treatment, processing, storage and disposal. Waste management in the Czech Republic and/or abroad is assured by more different technologies. To familiarize with these technologies is also a

ZK

plants is the part of 17JPC - Nuclear fuel cycle course.

Radioactive Waste Management

17RAO

part of the subject.

17TCJ1	Equipment Complex of Nuclear Power Plants 1

Z,ZK

3

Lectures are composed as encyclopedic overview of power current electrotechnical facilities using LV, HV and VHV and are focused on their utilization in nuclear power plants including power extraction to electrical network. Theoretical background is supported by examples from work experience along with parameters of currently used facilities used in power engineering with focus on NPPs. First, the general relations of the electric circuits theory and electromagnetic and electric field theories are recapitulated. Then the overview of electrotechnic materials (electric current conductors, semiconductors, magnetic flux conductors, insulators, dielectrics), their properties, applications. After general introduction, there follow lectures on particular types of electrical machines and devices, their characteristics, equivalent diagrams, phasor diagrams, applications in NPPs. Finally, electric facilities of NPPs are presented including most applied power extraction schemes and schemes for assuring unit auxiliaries and for common plant operations. Examples of electric schemes of Czech NPPs are given including electric devices parameters. Lectures are supported by technical visits of university power plant, high-voltage lab, electric machines lab). In the university power plant, the measurement on power unit model is carried out. This includes examples and evaluations of transients of artificially generated failure states.

17THNJ1 Thermohydraulics Design of Nuclear Devices 1

Z

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.

17UPC Introduction in Nuclear Fuel Cycle

K7

2

The course is focused on front-end & Dark-end of the nuclear fuel cycle of the nuclear power plants, particularly PWR used and / or planned in the Czech Republic. The first part of the course consists of introduction to front-end of the nuclear fuel cycle. After the first division and definitions of various types of fuel cycles, the lectures are pointed to various uranium and thorium sources, their mining, mechanical and chemical processing to the shape of yellow cake. The next step there are very briefly described types of purifications, conversions, enrichment and fabrication of nuclear fuel. The second part of the course consists of introduction to back-end of the nuclear fuel cycle, namely spent nuclear fuel, spent nuclear fuel inventory, wet and dry spent fuel storage, interim spent fuel storage and final disposal of spent nuclear fuel. At the end of the course basic information about thorium fuel cycle is mentioned. Note: Inner nuclear fuel cycle is the part of 17PRF - Core physics and fuel management course.

17PROJ Introduction to the Design of Nuclear Facilities

Z

3

methodology of engineering, significance and organization of technical documentation at nuclear power plant, archive, preparatory and project documentation, project phases of nuclear power plants: basic design, detailed design, operational regulations, emergency plan, operational documents, operational records, quality assurance, introduction to engineering drawing, reading of drawings, engineering imaging, AUTOCAD.

17ZAF1 Introduction to Nuclear Reactor Physics 1

ΚZ

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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: BSJICPP3

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

Requirement credits in the group: In this group you have to gain at least 64 credits

Requirement courses in the group: In this group you have to complete at least 18 courses

Credits in the group: 64

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
17BPJR1	Bachelor Thesis 1 Dušan Kobylka	Z	5	0+5	Z	РО
17BPJR2	Bachelor Thesis 2 Dušan Kobylka	Z	10	0+10	L	РО
17BES	Control Systems of Nuclear Reactors Martin Kropik 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
17CSI	Nuclear-Power-Plant Simulator Exercise Dušan Kobylka	Z	3	0+3	Z	РО
17DEZ	Detection of radiation Marcel Miglierini, Miloš Tichý Tomáš Bílý	Z,ZK	3	2+1	Z	РО
17OPKB	Operator Course for Bachelors Dušan Kobylka	Z,ZK	4	4	Z	РО
17REPR	Reactor Experiments	KZ	5	2+2	Z	PO
14TM	Engineering Mechanics Ji í Kunz, Aleš Materna Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	4	2+2	3	РО
17TCJ2	Equipment Complex of Nuclear Power Plants 2 Dušan Kobylka	ZK	3	3+0	L	PO
17THNJ3	Thermohydraulics Design of Nuclear Devices 3 Dušan Kobylka Dušan Kobylka	Z,ZK	3	2+1	Z	РО
17URO	Introduction to Radiation Protection of Nuclear Facilities	KZ	2	2+0	L	PO
17ZEL	Basics of Electronics Martin Kropík Martin Kropík (Gar.)	KZ	3	2+2	Z	PO

17ZAF2	Introduction to Nuclear Reactor Physics 2	Z,ZK	3	2+1	L	PO
17ZJBE	Jan Frýbort, Lenka Frýbortová Dušan Kobylka Basics of Nuclear Safety	ZK	4	4	Z	PO
	Dušan Kobylka Intership Bachelors					
17PRAXB	Dušan Kobylka	Z	1	1 tyd	Z	PO
Characteristics of th	e courses of this group of Study Plan: Code=BSJICPP3 Name=I	BSJIC - povi	nné p ec	dm ty 3. r	o ník	
- 1	achelor Thesis 1	46-4 :		-4:	Z	5
	atic of officially given theme of bachelor thesis and its defense during state examination visor that defines literature, checks the progress and ability of work defense, and operati	•			•	•
•	tant solves given problem. Theme of work is generally selected from the list and is appro-					•
	. Contact hours relate to cooperation with the supervisor and are solved according to work	•			•	
17BPJR2 B	achelor Thesis 2				Z	10
Subject deals with problem	atic of officially given theme of bachelor thesis and its defense during state examination	that is necessary	for comple	etion of bach	elor study.	The guarantor
-	visor that defines literature, checks the progress and ability of work defense, and operati					-
· -	tant solves given problem. Theme of work is generally selected from the list and is appro- . Contact hours relate to cooperation with the supervisor and are solved according to work	=	-		-	
	ontrol Systems of Nuclear Reactors	Tieeus. The subje	ect is trierer		Z,ZK	2
	ortifol Systems of Nuclear Reactors Identrated on categorization of systems in nuclear power plant according to importance is	to nuclear safety.	next on red	I	<i>'</i>	
•	nentation of research nuclear facilities and nuclear power plants. Attention is given to de	•				•
common cause failures, inc	dependence and diversity; furthermore to qualification of safety systems. At the end, lect	ures deal with co	ntrol and sa	afety system:	s of system	ns research
nuclear facilities. The lectur	res are completed with visit of the training reactor VR 1 with demonstration of its safety a	and control syster	n.			
15CHB C	hemistry			Z	z,zk	4
· ·	ter treatment processes, the sources of radioactive contamination and the principles of the					
•	hnological operations used to the purification of feeding waters and cooling circuit waters	· · · · · · · · · · · · · · · · · · ·	_		e media en	countered in
<u>_</u>	erations used to the treatment of wastes and the corrosion problems of the construction	materials are disc	cussea in a	etaii, too.	7	
1	uclear-Power-Plant Simulator Exercise	tunes of reactors	about phys	iool oounline	Z	3
	o students the idea about main operating features of nuclear power plants with various t d about principles of operating. In the theoretical part, there is briefly described each pov				_	-
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•	BWR and CANDU 6. During these exercises the basic physical features of system are all	,		•		•
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177AF2	Introduction to Nuclear Reactor Physics 2

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.

Basics of Nuclear Safety

Introduction: History and evolution of nuclear power plant safety. Classification of events, incidents, accidents, accident of US NPP TMI-2, accident of Chernobyl NPP Basics of nuclear safety - legislative approach: safety principles of NPP, legislative frame of nuclear power plant safety, international requirements on NPP safety, defense-in-depth, safety culture, classification of NPP states and criteria of acceptance, safety analysis. Severe accidents of NPP with pressurized water reactors - engineering and physical approach: loss of coolant accident (LOCA), anticipated transient without scram (ATWS). Safety systems of modern NPP with pressurized water reactors: VVER, EPR, AP-1000. The course consists of two parts: first is secured by prof. B. He manský; the second one is secured by a group of external instructors from NRI and SONS coordinated by Z. K íž (NRI). Instructors belong to notable experts in various fields of nuclear safety who works at least 30 years in the field, some of them have experience from international organizations- IAEA, NEA

17PRAXB Intership Bachelors

Inteship is intended for acquiring of deeper knowledge about systems and operation of nuclear power plant. At present, it takes part at nuclear power plant Dukovany or Temelín, where students in form of extended excursion make the acquaintance of all important parts of nuclear power plant and gain basic ideas about activities of reactor physicist and operator. Part of the intership is also visit of power plant training center and full-scope simulator.

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 - languages Requirement credits in the group:

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

Credits in the group: 0 Note on the group.

	Name of the course / Name of the group of courses					_
Code	(in case of groups of courses the list of codes of their members)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
04AMZK	English for Intermediate Students Examination Slav na Brownová, Hana ápová, Jana Ková ová Jana Ková ová Hana ápová (Gar.)	ZK	4		Z	PV
04APZK	English for Advanced Students Examination Slav na Brownová, Darren Copeland	ZK	5		Z	PV
04CESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová	ZK	4		Z	PV
04CESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová	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 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 Jana Ková ová 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 Miloslava echová Zhanna Isaeva (Gar.)	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 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo	ZK	3		L	PV

Characteristics of the courses of this group of Study Plan: Code=BSJAZYKY Name=BS - languages

04AMZK English for Intermediate Students Examination ZK

The course content is the examination as given by the study plan. The examination covers the 04AM1, 04AM2, and 04AM3 courses and consists of two parts - written (100 min) and oral (20-30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English courses.

)4APZK	English for Advanced Students Examination	ZK	5
	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
	04AP courses. The examination consists of 2 parts - written (110 min) and oral (30 min) and includes also oral presentation or		•
tudy.		,	
4CESMZK	Czech for Intermediate Students Examination	ZK	4
	the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the		es and can only
	sful completion of the 3 courses. Detailed information is to be obtained from the teacher.	0.020,2,0 000.0	
4CESPZK	Czech for Foreign Students - Advanced Examination	ZK	5
	the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the		-
	sful completion of the 3 courses. Detailed information is to be obtained from the teacher.	010201 1,2,0 00uic	oo ana oan om
04FMZK	French for Intermediate Students Examination	ZK	4
	amination as given by the study programme. The whole French programme is ended with an examination covering the conten	1	•
	and oral part and is organized according to Examination Instructions, a document available on the web.	11.5 01 1 1011 1 1010. 1110	CAUTITION
04FPZK	French for Intermediate Students Examination	ZK	5
—	pgram is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral p		_
•	ons, a document available on the web. Assessment of the presentation is included into the examination grading.	art and is organized	according to
		71/	
)4FZZK	French for Beginners Examination	ZK	3
	amination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination consisting of oral and written part. The examination consisting of oral and written part.	tamination is ruled b	y the documen
	ation. Its content covers the levels FZ1 - FZ5.	714	
4NMZK	German for Intermediate Students Examination	ZK	4
he course content is	the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination of the students o	ation consisting of tw	o parts - writte
	the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 ass	sessment. More deta	ailed informatio
s to be obtained from	the teacher.		
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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 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 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 í Zima Ji í Zima Ji í Zima (Gar.)	ZK	2	2+0	Z	V
04ABZK	English - State Examination Jana Ková ová	ZK	5	2	L	V
04AM1	English for Intermediate Students M1 Jana Ková ová	Z	1	0+2	Z	V
04AM2	English for Intermediate Students M2 Jana Ková ová	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	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 Tomáš echák	ZK	5	4+0	L	V
12APL	Application of Lasers Helena Jelínková, Alexandr Jan árek Helena Jelínková 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 Zden k Pot ek (Gar.)	ZK	2	2	Z	٧
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	Z	1	0+2	Z	V
04CESM2	Intermediate Czech 2 Jana Ková ová	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	Z	1	0+2	Z	V
04CESP2	Czech for Foreigners - Advanced Jana Ková ová	Z	1	0+2	L	V
04CESP3	Czech for Foreigners - Advanced	Z	1	0+2	Z	V
15DALCH	History of Alchemy and Chemistry Vladimír Karpenko Vladimír Karpenko (Gar.)	ZK	2	2+0	Z	V
02DEF1	History of Physics 1 Igor Jex, Miroslav Myška Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	Z	V
02DEF2	History of Physics 2 Igor Jex Miroslav Myška 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 Libor Šnobl (Gar.)	Z	4	2+2	Z	V
01DIM1	Discrete Mathematics 1 Zuzana Masáková, Lubomíra Dvo áková, Edita Pelantová Lubomíra Dvo áková Zuzana Masáková (Gar.)	Z	2	2P+0C	Z	V
01DIM2	Discrete Mathematics 2 Zuzana Masáková, Edita Pelantová Zuzana Masáková Zuzana Masáková (Gar.)	Z	2	2P+0C	L	V
01DIM3	Discrete Mathematics 3 Lubomíra Dvo áková	Z	2	2+0	Z	V
00EKOT	Economy in Technology Jana Ková ová	Z	1	2+0		V
11ELEA	Instrumentation and Measurement Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	2	2	L	V
14ELMI	Electron Microscopy	Z,ZK	3	2+0		V
18ESPG1	European Computer Driving Licence 1	Z	2	0+2	Z	V
18ESPG2	European Computer Driving Licence 2	Z	2	0+2	L	V
16EPAM	Exact Methods in Research of Historic Monuments Ladislav Musílek Ladislav Musílek (Gar.)	ZK	2	2+0	Z	V
02EXF1	Experimental Physics 1 Jan epila	Z	2	2+0	L	V
02EXF2	Experimental Physics 2	ZK	2	2+0	Z	V
17ENF	Experimental Neutron Physics Jan Rataj	KZ	2	2+1	L	V
04FM1	French for Intermediate Students M1	Z	1	0+2	Z	V
04FM2	French for Intermediate Students M2	Z	1	0+2	L	V
04FM3	V ra Ślechtová French for Intermediate Students M3	Z	1	0+2	Z	V
04FP1	V ra Slechtová (Gar.) French for Advanced Students P1	Z	1	0+2	Z	V
	Michal Beneš			3.2		

04FP2	French for Advanced Students P2	Z	1	0+2	L	V
04FP3	French for Advanded Students P3	Z	1	0+2	Z	V
04FZ1	V ra Slechtová (Gar.) French for Beginners Z1 V ra Šlechtová	Z	1	0+4	L	V
04FZ2	French for Beginners Z2	Z	1	0+4	Z	V
04FZ3	Michal Beneš French for Beginners Z3	Z	1	0+4	L	V
04FZ4	V ra Ślechtová French for Beginners Z4	Z	1	0+4	Z	V
04FZ5	V ra Šlechtová (Gar.) French for Beginners Z5		1	0+4	 	V
01FKP	V ra Šlechtová V ra Šlechtová (Gar.) Functions of Complex Variable	ZK	2	2+0	Z	V
	Severin Pošta, Pavel Š oví ek Pavel Š oví ek Pavel Š oví ek (Gar.) Functions of Complex Variable B					
01FKPB	Pavel Š oví ek Functional Analysis 1	Z	2	2+0	Z	V
01FAN1	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 Pavel Š oví ek (Gar.)	Z,ZK	4	2+2	L	V
02PRA1	Experimental Laboratory 1 Libor Škoda, Katarína K ížková Gajdošová, Barbara Antonina Trzeciak, Jaroslav Biel ík Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	Z	V
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	L	٧
02FYS1	Physical Seminar 1 Voit ch Svoboda (Gar.)	Z	2	0+2	Z	V
02FYS2	Physical Seminar 2 Jan epila	Z	2	0+2	L	V
01GTDR	Geometric Theory of Ordinary Differential Equations Michal Beneš Michal Beneš (Gar.)	Z	2	0+2	Z	V
12INS1	Information Systems 1	Z,ZK	2	2	Z	V
12INS2	Information Systems 2 Antonín Novotný	Z,ZK	2	2	L	V
16ZJTB	Nuclear Energy Facilities and Accelerators Kamil Augsten, Tomáš echák Kamil Augsten Tomáš echák (Gar.)	ZK	2	2+0	Z	V
17JARE	Nuclear Reactors Tomáš Bílý Tomáš Bílý (Gar.)	ZK	2	2	L	V
01JEPR	Simple Compilers Zden k ulík Zden k ulík (Gar.)	Z	2	2	L	V
16KPR	Clinical Propaedeutic Jana Votrubová Jana Votrubová (Gar.)	ZK	2	2+0	Z	V
04AKS	English Conversation Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
02KF	Quantum Physics Filip Petrásek Libor Šnobl (Gar.)	Z,ZK	3	2P+1C	Z	V
02LCF1	Experimental Laboratory 1	Z	2	0+2	Z	V
02LCF2	Jaroslav Biel ík Jaroslav Biel ík (Gar.) Experimental Laboratory 2	Z	2	0+2	L	V
12LT1	Jaroslav Biel ik Jaroslav Biel ik (Gar.) Laser Technique 1	Z,ZK	3	2+1	Z	V
12LT2	Václav Kube ek Václav Kube ek Václav Kube ek (Gar.) Laser Technique 2		2	2+0	L	V
12LAS	Helena Jelínková Laser Systems	Z,ZK	3	2+1	L	V
01LIP	Václav Kube ek Václav Kube ek Václav Kube ek (Gar.) Linear Programming	Z,ZK	3	2+1	 	V
18MAK1	Jan Volec estmír Burdík Jan Volec (Gar.) Macroeconomics 1	Z,ZK	4	2+2	 	V
	Quang Van Tran Quang Van Tran (Gar.) Macroeconomics 2					
18MAK2	Quang Van Tran Quang Van Tran (Gar.) Markov processes	Z,ZK	4	2+2	Z	V
01MAPR	Jan Vybíral Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	4	2+2	7	V
18EKO1	Mathematical Economics 1	Z,ZK	5	2+2	Z	V
18EKO2	Mathematical Economics 2 Mathematical Statistics - Seminar	Z,ZK	5	2+2	L	V
01MASC	Tomáš Hobza Tomáš Hobza (Gar.)	Z 	2	0+2		V
00MAM1	Essentials of High School Course 1 David B e	Z	1	0+1		V

00MAM2	Essentials of High School Math Course 2 Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.)	Z	1	0+1		V
01MMPV	Mathematical Models of Groundwater Flow Ji í Mikyška Ji í Mikyška (Gar.)	KZ	2	2+0	L	V
01MMF	Methods of Mathematical Physics Pavel Š oví ek	Z,ZK	6	4+2	L	V
18MIK1	Microeconomics 1 Quang Van Tran Quang Van Tran (Gar.)	Z,ZK	5	2P+2C	Z	V
18MIK2	Microeconomics 2 Quang Van Tran Quang Van Tran (Gar.)	Z,ZK	5	2P+2C	L	V
11MIK	Logical Circuits and Microprocessors Pavel Jiroušek, Petr Levinský Pavel Jiroušek Pavel Jiroušek (Gar.)	Z,ZK	4	4	L	V
12MPR1	Microprocessors 1	ZK	4	4+0	Z	V
12MPR2	Miroslav ech Miroslav ech Miroslav ech (Gar.) Microprocessors 2	ZK	2	2+0	L	V
12MOF	Miroslav ech Miroslav ech Miroslav ech (Gar.) Molecular Physics	ZK	2	2+0	 L	V
12NT	Jan Proška, Martin Michl Martin Michl Jan Proška (Gar.) Nanotechnology		2	2+0	Z	-
	Jan Proška, Eduard Hulicius Jan Proška Eduard Hulicius (Gar.) Simulations and Data Analysis Tools	ZK				V
02NSAD	Jan epila	Z	2	2+0		V
04NM1	German for Intermediate Students M1 German for Intermediate Students M2	Z	1	0+2	Z	V
04NM2	Miloslava echová Miloslava echová (Gar.)	Z	1	0+2	L	V
04NM3	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	1	0+2	Z	V
04NP1	German for Advanced Students P1	Z	1	0+2	Z	V
04NP2	German for Advanced Students P2 Miloslava echová	Z	1	0+2	L	V
04NP3	German for Advanced Students P3 Miloslava echová 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 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	V
02OR	General Relativity Old ich Semerák Boris Tomášik Boris Tomášik (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 Pavel Strachota (Gar.)	Z	2	2	L	V
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
12PIN1	Practical Informatics for Technics 1 Richard Liska, Milan Kucha ik Milan Kucha ik Milan Kucha ik (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
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 Václav K s	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 Kamil Augsten Ladislav Musílek (Gar.)	ZK	2	2+0	Z	V
16FNZB	Problems of Non-ionizing Radiation	ZK	2	2+0	Z	V
12PSEM	Problem Seminary	Z	2	0+4	L	V

01PERI	Programming of Peripherals Devices Zden k ulík Zden k ulík (Gar.)	Z	2	2+0	Z	V
01PW	Windows Programming Zden k ulik Zden k ulik (Gar.)	Z	2	2+0	Z	V
18PRC1	Programming in C++ 1 Vladimír Jarý, Miroslav Virius Miroslav Virius (Gar.)	Z	4	2+2	Z	٧
18PRC2	Programming in C++ 2 Vladimír Jarý, Miroslav Virius, Jakub Klinkovský Miroslav Virius Miroslav Virius (Gar.)	KZ	4	2+2	L	V
18PJ	Programming in Java Miroslav Virius Miroslav Virius (Gar.)	Z,ZK	5	2P+2C	Z	V
18MTL	Programming in MATLAB	Z,ZK	5	2+2	Z	V
18MPT	Programming in MATLAB	KZ	5	0+4	Z	V
18PAS	Pascal Programming Miroslav Virius	Z	4	2+2	L	V
12PDR1	Data Communication and Interfaces 1	Z	2	2+0	Z	V
12PDR2	Data Communication and Interfaces 2 Josef Blažej	Z	2	2+0	L	V
01PSL	LaTeX - Publication Instrument Petr Ambrož Petr Ambrož Petr Ambrož (Gar.)	Z	2	0+2	L	V
00RET	Rhetoric Jana Ková ová Jana Ková ová	Z	1	0+2		V
01RMF	The Equations of Mathematical Physics Václav Klika Václav Klika Václav Klika (Gar.)	Z,ZK	6	4+2	Z	V
02RQGP1	Seminar on Quark-Gluon Plasma 1 Jaroslav Biel ik	Z	1	2+0		V
02RQGP2	Seminar on Quark-Gluon Plasma 2 Jaroslav Biel ik	Z	1	2+0		V
04RM1	Russian for Intermediate Students M1	Z	1	0+2	Z	V
04RM2	Russian for Intermediate Students M2 Miloslava echová	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	Z	1	0+2	Z	V
04RP2	Russian for Advanced Students P2 Miloslava echová	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 Miloslava echová	Z	1	0+4	L	V
04RZ2	Russian for Beginners Z2 Michal Beneš	Z	1	0+4	Z	V
04RZ3	Russian for Beginners Z3 Miloslava echová	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 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 Ladislav Hlavatý (Gar.)	Z	2	0+2	Z	V
01SSM1	Seminar of Contemporary Mathematics 1 Mat j Tušek Edita Pelantová (Gar.)	Z	2	0+2	Z	V
01SSM2	Seminar of Contemporary Mathematics 2 Václav Klika	Z	2	0+2	L	V
16SED1	Dosimetry Seminar 1 Kate ina Pila ová (Gar.)	Z	2	0+2		V
16SED2	Dosimetry Seminar 2 Kate ina Pila ová	Z	2	0+2		V
01SMB1	Seminar on Calculus B1 Milan Krbálek	Z	2	0+2	Z	V
01SMB2	Seminar on Calculus B2 Milan Krbálek	Z	2	0+2	L	V
01SOS1	Software Seminar 1 Zden k ulík Zden k ulík Zden k ulík (Gar.)	Z	2	0+2	Z	V
01SOS2	Software Seminar 2 Zden k ulík Zden k ulík Zden k ulík (Gar.)	Z	2	0+2	L	V
02SPRA1	Special Practicum 1 Lukáš Novotný, Jan epila Jan epila Jan epila (Gar.)	KZ	6	0+4	Z	V
02SPRA2	Special Practicum 2 Jan epila Jan epila Jan epila (Gar.)	KZ	6	0+4	L	V

01STR	Statistical Decision Theory Václav K s Václav K s Václav K s (Gar.)	ZK	2	2+0	L	V
11SFBM	Structure and Function of Biomolecules Petr Kolenko, Tomáš Kova Petr Kolenko Petr Kolenko (Gar.)	Z,ZK	3	2+1	Z	V
04SM1	Spanish for Intermediate Students M1	Z	1	0+2	Z	V
04SM2	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo 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	Z	1	0+2	Z	V
04SP2	Spanish for Advanced Students P2	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	Z	1	0+4	L	V
04SZ2	Spanish for Beginners Students Z2	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 Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+4	L	V
14TM	Engineering Mechanics Ji í Kunz, Aleš Materna Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	4	2+2	3	V
14TEM	Engineering Mechanics Ji í Kunz Ji í Kunz Ji í Kunz (Gar.)	Z,ZK	6	4	5	V
12TAIS	Ion Beam Techniques and Applications.	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 Petr Novotný Igor Jex (Gar.)	Z,ZK	4	2+2	Z	V
02TEF2	Theoretical Physics 2 Filip Petrásek, Petr Novotný Josef Schmidt Petr Novotný (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 Edita Pelantová Jan Volec (Gar.)	ZK	2	2P+0C	L	V
02TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	V
02TSFA	Thermodynamics and Statistical Physics Jaroslav Novotný, Igor Jex Antonín Hoskovec 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	Z,ZK	4	2+2	L	V
18INTA	Development of internet applications Jakub Klinkovský, Dana Majerová Dana Majerová (Gar.)	KZ	4	2P+2C	L	V
01DYK	Introduction to Continuum Dynamics Pavel Strachota	Z	2	0+2		V
16ZIVB	Introduction to Ecology Hana Pr šová Hana Pr šová (Gar.)	KZ	2	2+0	Z	V
02UFEC	Introduction to Elementary Particle Physics Jaroslav Biel ik, Marek Matas 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	Z,ZK	3	2+1	Z	V
02UKP	Introduction to Curves and Surfaces Jan epila	Z	2	1+1	L	V
12ULT	Introduction to Laser Technique	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	2P+2C	Z	V
00UPRA	Introduction to Law Martin ech Jana Ková ová	Z	1	0+2		V
00UPSY	Introduction to Psychology 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	٧
12VAK	Vacuum Physics and Technology Richard Švejkar Richard Švejkar (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	L	V
12VTV	Scientific and Technical Computing Nan 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 Dušan Kobylka	ZK	2	2	L	V
12EPR1	Basic Electronics Practicum 1 Ivan Procházka, Jaroslav Pavel Ivan Procházka Ivan Procházka (Gar.)	KZ	3	0+2	Z	V
12EPR2	Basic Electronics Practicum 2 Ivan Procházka, Jaroslav Pavel Ivan Procházka Ivan Procházka (Gar.)	KZ	3	0+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 Vladimír Jarý, Miroslav Virius, Petr Pauš, František Vold ich, Zuzana Pet í ková, František Gašpar Vladimír Jarý Miroslav Vírius (Gar.)	Z,ZK	4	2+2	L	V
16AMMB	Fundamentals of Analytical Measurement Methods Hana Pr šová 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	Z,ZK	4	2+2	Z	V
	Doubková Alena Doubková (Gar.) Fundamentals of Human Biology, Anatomy and Physiology					
16ZBAF2	2 Alena Doubková, Šimon Vaculín, Josef Stingl Alena Doubková 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		٧
16ZDOZ2	Fundamentals of Radiation Dosimetry 2 Tomáš Trojek Tomáš Trojek (Gar.)	ZK	2	2+0	L	٧
17ZEH	Basics of Economic Assessment Dušan Kobylka	ZK	2	2+0	Z	٧
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 Jan epila	Z	2	2+0	Z	V
02ZFM2	Foundations of Physical Measurements 2 Jan epila	Z	2	0+2	L	V
11ZFPL	Basic to Solid State Physics Ladislav Kalvoda, Eva Mihóková Eva Mihóková Ladislav Kalvoda (Gar.)	KZ	2	26P+0C	Z	V
12ZFP	Principles of Plasma Physics Martin Jirka, Ji í Limpouch Martin Jirka 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 Lenka Frýbortová Tomáš Bílý (Gar.)	ZK	3	2+0	L	V
16MEZB	Fundamentals of Ionizing-Radiation Metrology Tomáš echák	Z,ZK	4	2+1	Z	V
01ZOS	Introduction to Operating Systems Zden k ulík Zden k ulík Zden k ulík (Gar.)	Z	2	2+0	L	V
12ZAOP	Fundamentals of Optics Ivan Richter, Pavel Kwiecien Ivan Richter 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 Kamil Augsten Kamil Augsten (Gar.)	Z	2	0+2	1	V
18ZPRO	Basics of Programming Maksym Dreval, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet i ková Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	٧
16ZRAO	Basics of Radiation Protection Aneta Dušková Aneta Dušková (Gar.)	Z	2	2+0		V

027CM	Introduction to the Standard Model	71/	2	2.0		.,	
2ZSM	Zden k Hubá ek Zden k Hubá ek Zden k Hubá ek (Gar.)	ZK	2	2+0	Z	V	
6ZEDB	Basics of Experimantal Data Processing Kate ina Pila ová Kate ina Pila ová (Gar.)	ina Pila ová Kate ina Pila ová (Gar.)					
4ZZKS	Testing and Processing of Metals and Alloys	KZ	4	4	6	V	
2ZDP	Data Processing for Publishing Antonín Novotný Antonín Novotný Antonín Novotný (Gar.)	Z	2	2	Z	V	
	ne courses of this group of Study Plan: Code=BSVOLPREDM Na	me=BS - vol	itelné p	edm ty			
I I	experimental Physics 1 boductory course in experimental physics. Students will learn methods of measurement of	f hasic nhysical d	uantities an	d methods o	Z	2 nent evaluati	
· · · · · · · · · · · · · · · · · · ·	General Chemistry 1	i basic priysical q	uarititios ari	d methods o	7	3	
ı	pts, quantities and units used in chemistry are introduced in the course General Chemis	try I. Their signific	cance and p	ractical use		_	
SCH2	General Chemistry 2			Z	Z,ZK	3	
-	ation of the course General chemistry I. The main attention is paid to general principles goles is not restricted only to chemical processes is documented. The significance and practices is not restricted only to chemical processes is documented.	_	-	_	-		
	ntroduction to Engineering			Z	Z,ZK	3	
-	in introduction to the engineering profession. Students will gradually learn the characteristic	stics and specialt	ties of engin			_	
•	ineering disciplines, such as the basics of materials science, manufacturing technology,			e and ecolog	y. Further,	the course v	
	&D activities organization and on selected parts of technical drawings and the world are in a 4 December 2015.	k with AutoCAD o	code.	I	7		
	tasics of Programming ainly for students with little or no experience in programming. It familiarizes the students	with the basic co	ncente in ne	ngramming s	Z	4 Python	
iis course is intended m ogramming language.	anny tor students with fittle of the experience in programming, it familiarizes the students	with the Dasic CO	nochia III bli	ogramming 8	and with the	, i yuiOII	
 	luclear Reactors				ZK	2	
-	ssue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, activ	e core, control sy	ystems, safe	1			
•	ons. Standard types of nuclear power reactors: concept, description, layout, previous evol					,	
	nghouse, KWU, Framatom). VVER-type reactors , Temelin nuclear power plant. Boiling v		-				
	ed reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200) systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role	_			RO initiative	es. Evaluatio	
	Ingineering Mechanics	o or riddical powe	in long to		Z.ZK	4	
l l	nk-up between the theoretical mechanics of rigid bodies and engineering disciplines dea	aling with the stre	ss and strai	1	, ,	-	
	easics of Electronics				KZ	3	
mpleted with electronic	nue with general amplifiers and operational amplifiers. Finally, lectures deal with digital c laboratory exercises. dministration of UNIX System.	ircuits, digital/ana	alog and ana		KZ		
sic and more advanced	administration of Unix operating system				'		
	lgebra		5 1		ZK	4	
er an introduction into the mmutative fields.	ne set theory standard algebraic structures are dealt with: groups, rings, fields, modules,	linear algebras, la	attices, Book	ean algebras	s, rings of p	olynomials (
	lgebra			7	Z,ZK	6	
- 1	are treated in detail. Elements of the set theory cover only: equivalence and subvalence, t	the Cantorov-Ber	nstein theor		, ,	-	
atements, definition of o	dinals and cardinals. Further standard algebraic structures are addressed: semigroups,	monoids, groups	, rings, integ	gral domains	, principal id	deal domair	
ds, lattices. Independer	t chapters are devoted to divisibility in integral domains and to finite fields.						
1	inear Circuit Analysis			1	Z,ZK	. 4	
	tion to the linear electronics for physicists. In the first part it describes basic methods of I	-		pecially orien	ited to the u	understandi	
	of analysis. The second part gives a short list of most commonly used circuits in experim Inalytical Calculations and Chemometry Principals	entai equipment.		<u> </u>	ZK	2	
	rinciples of chemometry including errors in classical and instrumental analysis, probabili	tv theory, propag	ation of erro				
o-tailed significance test	ing, hypothesis testing, least squares regression and correlation, calibration and fitting n	nethous, non-par	a				
-	ing, hypothesis testing, least squares regression and correlation, calibration and fitting netry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry.	-		in potentiom	etry, coulor	netry,	
lving, titration stoichiom ectrophotometry and se	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. paration methods, solving of complex forming equilibria.	-					
lving, titration stoichiom ectrophotometry and se	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. paration methods, solving of complex forming equilibria. Inglish - State Examination	oH calculations, o	calculations		ZK	5	
lving, titration stoichiom ectrophotometry and se 4ABZK Ecourse content is the	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. paration methods, solving of complex forming equilibria. Inglish - State Examination examination as given by the study plan. Student is eligible for the State language examination.	oH calculations, o	r B2 of CEF	R) only if he	ZK /she has pa	5 assed all the	
Iving, titration stoichiom ectrophotometry and se HABZK E course content is the spective courses and ex	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. paration methods, solving of complex forming equilibria. Inglish - State Examination examination as given by the study plan. Student is eligible for the State language examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the	oH calculations, o	r B2 of CEF	R) only if he	ZK /she has pa	5 assed all the	
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Iving, titration stoichiom ectrophotometry and set IABZK E e course content is the expective courses and examination conditions could IAM1 E e course is designed for	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry, paration methods, solving of complex forming equilibria. English - State Examination examination as given by the study plan. Student is eligible for the State language examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the mply with respective rules and regulations for state language examinations. English for Intermediate Students M1	oH calculations, on the calculation (level C1 on the APIN programs)	r B2 of CEF me covers a	R) only if he, lso examinat	ZK /she has pa tion subject Z mon Europ	5 assed all the s. As require 1 ean Framev	
alving, titration stoichiom electrophotometry and see the ABZK are course content is the spective courses and examination conditions course is designed for Reference for Language of essional oral and writting electrophotometric for the spectra of	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry, paration methods, solving of complex forming equilibria. English - State Examination examination as given by the study plan. Student is eligible for the State language examinations (04AP3KK, 04AP4K, 04AP1, and 04APRK). From its first semester, part of the mply with respective rules and regulations for state language examinations. English for Intermediate Students M1 Estudents who have successfully completed the full secondary school English language as (CEFR). It provides an introduction into English for Specific and Academic Purposes (an communication situations. Thus it covers topics related to the student's life and needs	oh calculations, on mation (level C1 on the APIN programm course at least at ESP, EAP), i.e., i	r B2 of CEF me covers a the A2 leve	R) only if he, lso examinated and lso examinated ls	ZK /she has pation subject Z mon Europ abulary and	5 assed all the s. As requir 1 ean Framev d style typica	
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Iving, titration stoichiom ectrophotometry and se HABZK E e course content is the espective courses and examination conditions content in the ecourse is designed for Reference for Language of Easional oral and writte tending the knowledge of HAM2 E e 04AM2 course expect d lexical items typical of vision is included.	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry, paration methods, solving of complex forming equilibria. Inglish - State Examination examination as given by the study plan. Student is eligible for the State language examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the mply with respective rules and regulations for state language examinations. Inglish for Intermediate Students M1 students who have successfully completed the full secondary school English language as (CEFR). It provides an introduction into English for Specific and Academic Purposes (en communication situations. Thus it covers topics related to the student's life and needs of grammar issues used in EAP. Inglish for Intermediate Students M2 Inglish for Intermediate Students M3 Inglish for Intermediate Student	nation (level C1 o ne APIN programs course at least at ESP, EAP), i.e., i s as well as topics	r B2 of CEF me covers a the A2 leve nto fundame s of subtech	R) only if he, lso examinated and of the Comentals of vocinical interest	ZK /she has pation subject Z mon Europ abulary and t. Attention Z pecific gran	5 assed all the is. As require 1 ean Framev d style typica is also paid 1 nmar, function	
AVM2 elvision, titration stoichiom rectrophotometry and see the course content is the spective courses and extramination conditions content is designed for the course expect and lexical items typical of vision is included.	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry, paration methods, solving of complex forming equilibria. Inglish - State Examination examination as given by the study plan. Student is eligible for the State language examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the mply with respective rules and regulations for state language examinations. Inglish for Intermediate Students M1 students who have successfully completed the full secondary school English language as (CEFR). It provides an introduction into English for Specific and Academic Purposes (en communication situations. Thus it covers topics related to the student's life and needs of grammar issues used in EAP. Inglish for Intermediate Students M2 Is the student to have completed the 04AM1 course. It develops their skills for work with state of the student of	oH calculations, of the calcul	r B2 of CEF me covers a the A2 leve nto fundame s of subtech focusing als	R) only if he, lso examinated a lso exam	ZK /she has pation subject Z mon Europ abulary and t. Attention Z pecific gran ting. If nece	5 assed all the as. As requir 1 ean Framev d style typica is also paid 1 nmar, functionssary, gram 1	
Iving, titration stoichiom ectrophotometry and se HABZK E e course content is the spective courses and examination conditions co HAM1 E e course is designed for Reference for Language of tessional oral and writtending the knowledge of HAM2 E e 04AM2 course expect d lexical items typical of vision is included.	etry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry, paration methods, solving of complex forming equilibria. Inglish - State Examination examination as given by the study plan. Student is eligible for the State language examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the mply with respective rules and regulations for state language examinations. Inglish for Intermediate Students M1 Instituted the full secondary school English language as (CEFR). It provides an introduction into English for Specific and Academic Purposes (en communication situations. Thus it covers topics related to the student's life and needs of grammar issues used in EAP. Inglish for Intermediate Students M2 Inglish for Intermediate Students M3 Inglish for Intermediate Students M3	oH calculations, of the calcul	r B2 of CEF me covers a the A2 leve nto fundame s of subtech focusing als course is als	R) only if he, lso examinated a lso exam	ZK /she has pation subject Z mon Europ abulary and t. Attention Z pecific gran ting. If nece	5 assed all the as. As requir 1 ean Framev d style typica is also paid 1 nmar, function assary, gram 1 and independent	

student's field.

04AP1	English for Advanced Students P1	Z	1
_	I for students who have successfully completed the full secondary school English language course (at least the B1 level of the students who have successfully completed the full secondary school English language course (at least the B1 level of the students who have successfully completed the full secondary school English language course (at least the B1 level of the students who have successfully completed the full secondary school English language course (at least the B1 level of the students who have successfully completed the full secondary school English language course (at least the B1 level of the students who have successfully completed the full secondary school English language course (at least the B1 level of the students).	•	
_	ages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundam		-
	ical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definition I and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writin		
-	sary, revision of selected grammar topics is included.	ig (withing a C v, lett	ei oi applicatioi
04AP2	English for Advanced Students P2	Z	1
-	ased on 04AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of cho	1	ence. Accordin
	it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical ri		
types of descriptions, a	nd, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of	linguistically more	demanding
materials. The course	extends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focuse	ed on formal writing	including the
	h structure, linking, cohesion and coherence in texts.		
04AP3	English for Advanced Students P3	Z	1
	ased on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret		-
	skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summari		-
written communication	g a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and i	mormai language t	oun in oral and
16APLB	Application of Ionizing Radiation in Analytical Methods	ZK	5
-	of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods and the use of radionuclides and ionizing radioanalytical methods are used to be a superior of the use of radionuclides and ionizing radioanalytical methods are used to be a superior of the use of radionuclides and ionizing radioanalytical methods are used to be a superior of the use of radionuclides and ionizing radioanalytical methods are used to be a superior of the used to be a superior of	1	_
of technological proces		alation in the analys	io and diagnoc
12APL	Application of Lasers	Z,ZK	2
	industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and other branch	1	_
11APLG	Applications of Group Theory in Solid State Physics	ZK	2
	c system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy state	1	
	n them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the inform		
alone will provide. The	application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field environment.	onment, normal mo	des of molecul
vibrations, and selection	n 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 extending	the student's vocab	ulary for vario
social situations.			
04CESM2	Intermediate Czech 2	Z	1
The course develops the	ne topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and re	eading skills and tra	ains the studer
in understanding comm	non abbreviations, abbreviated words, and mathematical terms and formulas.		
04CESM3	Intermediate Czech 3	Z	1
	morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especially	ecially focused on s	tylistics and
	loping the student's writing skills.		
04CESP1	Czech for Foreign Students - Advanced Examination	Z	1
	course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common	•	
	evision of standard language structures, but mainly on practising more complex grammatical structures typical of the style o		_
	le of engineering and professional communication, both in spoken and written form. The topics include University Studies ar n with teachers and faculty administrators.	ia Student Life. Wri	tten practice
		7	4
04CESP2	Czech for Foreigners - Advanced	Z	l Dodona aroot
emphasis on individua	e student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical	and specialist texts	s placing great
04CESP3		Z	1
	Czech for Foreigners - Advanced estudent's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presenta		I scentation of t
•	re student s knowledge from CL372. It includes working with authentic specialist materials, their interpretation and presentang skills necessary for professional communication are trained.	tion, and, imally, pre	esentation of t
15DALCH	History of Alchemy and Chemistry	ZK	2
	History of Alcherny and Chemistry ie overview of crafts with chemical and/or metallurgical basis. Development of alchemy from ancient times in China, India, a	1	
•	is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approx		
advancement is illustra	•	dovolopinient	orano
02DEF1	History of Physics 1	Z	2
	ithe system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural p	_	_
	med. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galile		
•	e. Newton and his work.	-	
02DEF2	History of Physics 2	Z	2
	al mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach.		
electrostatics, galvanis	m, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzma	ann. The birth of mo	dern quantun
and relativistic physics	Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear	energy, Elementary	/ particles,
standard model. The co	oncept of Nature and Universe of today.		
01DEM	History of Mathematics	Z	1
The subject has the for	m of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the fie	ld - give their talks o	on varoius top
from the history of mat			
02DRG	Differential Equations, Symmetries and Groups	Z	4
The purpose of the lec	ure is to teach students computation of symmetries of the differential equations.	<u></u>	
01DIM1	Discrete Mathematics 1	Z	2
OTDINI			
-	to elementary number theory and applications. It includes individual problem solving.		
-	to elementary number theory and applications. It includes individual problem solving. Discrete Mathematics 2	Z	2

01DIM3	Discrete Mathematics 3	Z	2
	to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the seminar	students present	a problem with
solution chosen from th	<u> </u>	7	4
00EKOT	Economy in Technology the basics of micro- and macroeconomics.	Z	1
11ELEA	Instrumentation and Measurement	Z,ZK	2
	luction to the instrumentation and measurement for physicists.	2,21	2
14ELMI	Electron Microscopy	Z,ZK	3
	nts are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The intr		
analogy of light and ele	ctron microscopy and to various types of microscopes. An important part of the course is given to the interaction of different ty	pes of radiation v	vith matter,
	ons and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and dy	-	diffraction, types
	on and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques in a	T	
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- is put on advanced functions of MS Excel (names, functions and expressions, pivot table and graph). Next, the VBA language		
and user functions will b		, 20 caacc	a ana masiss
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 the	he winter semeste	r with advanced
	es (charts, objects, graphical user interface, add-ins programming) and introduces some applications in economics, mathematic	tics, operational re	esearch, and
computer science.			
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2
	toric monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further rad alytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence a		• • •
photogrammetry.	larytical methods for determination of origin and production technologies of artefacts (activation analysis, A-ray fluorescence a	ariarysis ariu otriei	metrious),
02EXF2	Experimental Physics 2	ZK	2
	ntroductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and met		
17ENF	Experimental Neutron Physics	KZ	2
	focused on detailed characterisation of neutron properties, characteristics of neutron (reactor and non reactor) sources, prop	perties of prompt a	and delayed
neutrons, neutron detec	ction methods, neutron induced nuclear reactions, modification and adjustment of neutron field, science and industry neutron	applications. Last	lecture deals
	processing and analysis. The lectures are supplemented with experimental practices in the field of neutron detection, determinat		
	in in various materials, preparation and characterisation of photo-neutron source and neutron source calibration. Experimental p	oractices will be ru	nning at training
reactor VR-1 and in the		Z	
04FM1	French for Intermediate Students M1 M The objective of this three-semester course is to improve and further develop communication in the French language in bo	_	I I form Students
	cate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tra		
	problems. 04FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, s	_	
skills gained in previous	study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, per	sonal statement,	request, answer
	Iture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work	based on these to	exts.
04FM2	French for Intermediate Students M2	Z	1
	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 scienchisects. Description of an object, device, shapes, dimensions, material.	ence and technolo	igy, French
	French for Intermediate Students M3	7	1
	in improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (ا subordinate and ir	nfinitive clauses,
	mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-cl		
field of students' future	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w	ork compiled from	French articles
and one's own knowled	lge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and c	coherence.	
04FP1	French for Advanced Students P1	Z	1
	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 topic	_	
•	osé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of tr		
	wer to an advert, environmental issues, success of French science and technology, chosen topics from French regional cultures.		
mathematics, internet, p	physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.		
04FP2	French for Advanced Students P2	Z	1
	ents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication or	n given topics. Fea	atures typical of
	communication are stressed (passive voice, nominalization, word formation).		
04FP3	French for Advanded Students P3	Z	1
	in systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in rter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cov		
	rk compiled from 3 French sources. Preparation of several set topics for oral examination.	crs a teermiear /a	pplied science
04FZ1	French for Beginners Z1	Z	1
French for beginners Th	be objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in s	ا socializing and in إ	orofessional life.
The course includes Fre	ench for specific / technical communication and reading of popular science and scientific texts. 04FZ1 The objective is to be al	ole to communicat	e at elementary
	knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda		٠ .
	ate ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions,	-	tion, asking and
04FZ2	nple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciat	7	1
	French for Beginners Z2 with 04FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 o	∠ of the textbook: Pr	ı avda - Pravdová
= :	Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreem		
•	o of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral commi	•	
How does the machine	work? A few expressions concerning the study. Name of University and Faculty.		

04FZ3			
	French for Beginners Z3	Z	1
· ·	04FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda		_
•	ituations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for ir Reading covers short adapted texts of general interest first, and later popular science texts.	nformation and loc	ud as part of
04FZ4	French for Beginners Z4	Z	1
	n 04FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. Th	l	l hlv covered wi
•	extbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lea	_	-
	course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, sho		_
country and in France,	how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.		
04FZ5	French for Beginners Z5	Z	1
All four skills acquired	FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. The	y present it orally	in the class. Th
	rered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.		
	ch science and technology, information about France. Grammar is systemized and complemented with syntax (subordinate cl	auses, typical cor	ijunctions,
ubjunctive clauses, g		717	
)1FKP	Functions of Complex Variable	ZK	2
-	dvanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings, ties of complex functions of several complex variables together with improper line integrals and its applications are presented		na meromorpn
	 		2
)1FKPB	Functions of Complex Variable B	Z transcondental a	_
-	dvanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings, ties of complex functions of several complex variables together with improper line integrals and its applications are presented		na meromorph
1FAN1	Functional Analysis 1	Z,ZK	4
	Furnational Ariatysis Its are addressed concerning successively topological spaces, metric spaces, topological vector spaces, normed and Banach		· ·
1FA1	Functional Analysis 1	Z,ZK	3
	athematical analysis and algebra introduction to the basics of functional analysis. There are the concepts that students need t	· '	
nd technical disciplina			
1FA2	Functional Analysis 2	Z,ZK	4
	esent selected fundamental results from functional analysis including basic theorems of the theory of Banach spaces, closed of		· -
=	ors, spectral decomposition of bounded self-adjoint operators.	•	
2PRA1	Experimental Laboratory 1	KZ	6
	pecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear	l .	_
tended by students in	terested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with	h theliterature), the	e implementati
the measurement (a	cquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	uation of results. A	At the same tim
ractically extendthe k	nowledge gained in lectures on physics.		
2PRA2	Experimental Laboratory 2	KZ	6
	pecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclean		
•	terested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with	**	•
•	cquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evalunowledge gained in lectures on physics.	uation of results. F	At the same tim
2FYS1	Physical Seminar 1	Z	2
_	Priysical Serimal 1 I to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic	_	_
	ms are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laboratory equ	-	e course or
2FYS2	Physical Seminar 2	Z	2
	I to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic	l I	
	sm. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physical	•	
1GTDR	Geometric Theory of Ordinary Differential Equations	Z	2
	f the qualitative theory of ODEs dealing with the geometric and topological properties of the solution. In this context, we mentio	_	
	3 3 3		
	riqueness, continuous dependence on parameters and initial conditions. Main part is devoted to the autonomous systems.	canaziy ioiinaa	100 50010 1000
ZIINO I	iqueness, continuous dependence on parameters and initial conditions. Main part is devoted to the autonomous systems. Information Systems 1	-	
	Information Systems 1	Z,ZK	2
formation technology	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to	Z,ZK o solve task of info	2 rmation syster
formation technology 2INS2	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2	Z,ZK c solve task of info Z,ZK	2 rmation syster 2
formation technology 2INS2 raduation of Informat	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to	Z,ZK c solve task of info Z,ZK	2 rmation syster 2
formation technology 2INS2 raduation of Informat formation managame	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application approaches to solve task of information systems	Z,ZK c solve task of info Z,ZK coplication Google,	2 rmation syster 2
oformation technology 2INS2 raduation of Information managame 6ZJTB	Information Systems 1 , architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application for the databases, network databases,	Z,ZK c) solve task of info Z,ZK c) pplication Google,	2 rmation syster 2 Microsoft,
oformation technology 2INS2 raduation of Information managame 6ZJTB asic scheme of nuclei	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application application of the databases, network databases, cloud application of the databases, network	Z,ZK c) solve task of info Z,ZK c) splication Google, ZK mportant reactor	2 rmation syster 2 Microsoft, 2 types, linear
oformation technology 2INS2 raduation of Information managame 6ZJTB asic scheme of nucleigh-voltage accelerate	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems Nuclear Energy Facilities and Accelerators Accelerators Information Systems Information managament, approaches to solve task of information systems	Z,ZK c) solve task of info Z,ZK c) splication Google, ZK mportant reactor	2 rmation syster 2 Microsoft, 2 types, linear
formation technology 2INS2 raduation of Information managame 6ZJTB asic scheme of nucleigh-voltage accelerations, targets.	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems Nuclear Energy Facilities and Accelerators Accelerators Information Systems Information managament, approaches to solve task of information systems	Z,ZK c) solve task of info Z,ZK c) splication Google, ZK mportant reactor	2 rmation syster 2 Microsoft, 2 types, linear
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formation technology 2INS2 raduation of Informat formation managame 6ZJTB asic scheme of nucle gh-voltage accelerate ccelerators, targets. 1JEPR exical and syntax and 6KPR aking students famili	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems Nuclear Energy Facilities and Accelerators are reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most in port, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons. Simple Compilers Simple Compilers Information Systems 2 Informati	Z,ZK p solve task of info Z,ZK pplication Google, ZK mportant reactor s, electron and ior	2 mation system 2 Microsoft, 2 types, linear on sources for 2
formation technology 2INS2 raduation of Informat formation managame 6ZJTB asic scheme of nucle gh-voltage accelerate ccelerators, targets. 1JEPR exical and syntax and 6KPR laking students famili 4AKS	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems Nuclear Energy Facilities and Accelerators are reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most in port, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons. Simple Compilers Information Systems 2 Inform	Z,ZK p solve task of info Z,ZK pplication Google, ZK mportant reactor s, electron and ion Z ZK cal examinations	2 mation system 2 Microsoft, 2 types, linear n sources for 2 and anaesthes 1
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aformation technology 2INS2 iraduation of Information managame 6ZJTB asic scheme of nucleigh-voltage accelerators, targets. 1JEPR exical and syntax and 6KPR laking students famili 4AKS he course will developeir vocabulary for validscussions. The stu	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application groups are reacted to solve task of information systems Nuclear Energy Facilities and Accelerators are reacted and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most in portions, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons allows, code generation, simple optimizations, development environments, reflection. Clinical Propaedeutic are with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemic English Conversation by the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communications.	Z,ZK p solve task of info Z,ZK pplication Google, ZK mportant reactor s, electron and ion Z ZK cal examinations Z ication. The stude or to better follow ker.	2 mation system 2 Microsoft, 2 types, linear n sources for 2 and anaesthes 1 ent will develop
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aformation technology 2INS2 Graduation of Information managame 6ZJTB Graduation of nucleigh-voltage accelerate accelerators, targets. DIJEPR exical and syntax and 6KPR Making students familially MAKS The course will develope in vocabulary for various of discussions. The students and syntax and the course will develope in discussions. The students of angulary to an discussion of angulary to an unitization of angulary and syntax and the course will develope and the course will	Information Systems 1 a architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud agent, aproaches to solve task of information systems Nuclear Energy Facilities and Accelerators are reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most it ors, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons	Z,ZK psolve task of info Z,ZK pplication Google, ZK mportant reactor s, electron and ion Z ZK cal examinations Z idication. The stude of the better follow ker. Z,ZK senberg uncertain	2 rmation system 2 Microsoft, 2 types, linear n sources for 2 and anaesthes 1 ent will develop and participate 3 ty principle,
aformation technology 2INS2 braduation of Information managame 6ZJTB asic scheme of nucleigh-voltage acceleration celerators, targets. ITJEPR exical and syntax and 6KPR daking students familional fa	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud agent, aproaches to solve task of information systems Nuclear Energy Facilities and Accelerators are reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most it ors, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons Simple Compilers It is proposed to generation, simple optimizations, development environments, reflection. Clinical Propaedeutic Clinical Propaedeutic The proposed of anamnesis, physical examination, examinational methods of different organs, hematological and biochemical proposedition English Conversation The proposedition of the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communicus communication situations and will master their communication strategy. They will also practise their listening skills in orded the strained to express their ideas clearly and according to current English usage, and become a more confident speator Quantum Physics	Z,ZK p solve task of info Z,ZK poplication Google, ZK mportant reactor s, electron and ion Z ZK cal examinations Z idication. The stude or to better follow ker. Z,ZK	2 mation system 2 Microsoft, 2 types, linear a sources for 2 and anaesthes 1 ent will develop and participate
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formation technology 2INS2 raduation of Informat formation managame 6ZJTB asic scheme of nucle gh-voltage accelerate coelerators, targets. 1JEPR exical and syntax and 6KPR aking students famili 4AKS ne course will develoe eir vocabulary for va discussions. The stu 2KF ate description, wavuantization of angula 2LCF1 avendish experiment 2LCF2	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information systems Nuclear Energy Facilities and Accelerators are reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most it possible. In the properties of nuclear energetic reactor, most it possible components in the properties of nuclear energetic reactor, most it possible. It possible components is properties of nuclear energetic reactor, most it possible components in the properties of quantum development environments, reflection. Clinical Propaedeutic are with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemic lenglish Conversation English Conversation The student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication or the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication communication situations and will master their communication strategy. They will also practise their listening skills in order details in the previous studies. It aims to improve all aspects of oral communication, postulates of quantum mechanics, Born is statistical interpretation, expectation values, Schrödinger equation, Heis momentum,	Z,ZK psolve task of info Z,ZK pplication Google, ZK mportant reactor s, electron and ion Z ZK cal examinations Z idication. The stude of the better follow ker. Z,ZK senberg uncertain	2 rmation system 2 Microsoft, 2 types, linear n sources for 2 and anaesthes 1 ent will develop and participate 3 ty principle,
formation technology 2INS2 raduation of Informat formation managame 6ZJTB asic scheme of nucle gh-voltage accelerate coelerators, targets. 1JEPR exical and syntax and 6KPR aking students famili 4AKS ne course will develoe eir vocabulary for va discussions. The stu 2KF ate description, wavuantization of angula 2LCF1 avendish experiment 2LCF2	Information Systems 1 architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to Information Systems 2 ion systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud application systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud applications and systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud applications, approaches to solve task of information systems Nuclear Energy Facilities and Accelerators	Z,ZK p solve task of info Z,ZK poplication Google, ZK mportant reactor s, electron and ion Z ZK cal examinations Z idication. The stude er to better follow ker. Z,ZK eenberg uncertain	2 rmation syster 2 Microsoft, 2 types, linear a sources for 2 and anaesther 1 ent will develop and participat 3 ty principle, 2

12LT1			
	Laser Technique 1	Z,ZK	3
· ·	oility. Transverse and Longitudinal Modes. Elements of Open Resonators. Threshold of laser oscillations. Gausian beam as an Optical radiation propagation in resonant medium. Two-level approximation. Equations for polarisation and inversion, dispersi	* *	
	opagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optical resonator.	on, saturation. Co	north and
12LT2	Laser Technique 2	Z,ZK	2
Laser oscillator, the ra	te equation, the laser amplifier, Q-switching, mode-locking		
12LAS	Laser Systems	Z,ZK	3
	osecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers		-
	niconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ult ers. Infrared high power lasers. Submilimeter lasers. Lasers with high degree of coherence. Free electron lasers.	raviolet lasers. X-r	ay lasers. High
01LIP	Linear Programming	Z.ZK	3
-	lems about constrained extremum problems for multivariable functions (the function is linear and the constraint equations are g	1 '	
inequalities).			
18MAK1	Macroeconomics 1	Z,ZK	4
· · · · · · · · · · · · · · · · · · ·	evides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroecong		-
•	brium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic ations for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic phe		
· · · · · · · · · · · · · · · · · · ·	ise them under the conditions of modern economic life.	momena and men	interconnections
18MAK2	Macroeconomics 2	Z.ZK	4
-	tends theoretical knowledge acquired from Macroeconomics I of its students with the latest knowledge of contemporary macro	,	1
economic growth, esp	ecially those with an emphasis on the role of human capital and technological progress. Furthermore, it introduces students to	o modern principle	es of economic
•	conomic models derived from microeconomic behavior of subjects and economics and their rational expectations. It also provide	s students with mo	odern knowledge
of labor market mode		7.71/	1
01MAPR	Markov processes	Z,ZK	4
18EKO1	Mathematical Economics 1 selected models and methods for economic decision making. The main attention is given to optimization models of linear pro-	Z,ZK	5
	solving by means of the current software products.	gramming, possib	ilities of their rea
18EKO2	Mathematical Economics 2	Z,ZK	5
The course introduce	s selected models and methods for economic decision making. The main attention is given to optimization models in graphs, p	1 '	nt, inventory
management with det	erministic and stochastic demand, queuing theory and simulation models.		
01MASC	Mathematical Statistics - Seminar	Z	2
•	to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation		
	ing unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likeliho ng the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density estimation		ritical regions for
00MAM1	Essentials of High School Course 1	Z	1
00MAM2			
UUIVIAIVI	ESSENIIAIS OFFICIO SCHOOLIVIAIN COURSE /		1 1
	Essentials of High School Math Course 2 gh school mathematics.	Z	1
		Z KZ	2
Review of basics of hi	gh school mathematics.	KZ	2
Review of basics of his O1MMPV The course provides a problems. The second	mathematics. Mathematical Models of Groundwater Flow an overview of computational methods for selected groundwater flow problems. The first part of the course is devoted to mathematic at selected numerical methods, emphasizing implementation issues related to these methods.	KZ ematical formulation	2 ons of these
Review of basics of hit 01MMPV The course provides a problems. The second 01MMF	Mathematical Models of Groundwater Flow In overview of computational methods for selected groundwater flow problems. The first part of the course is devoted to mathematic aimed at selected numerical methods, emphasizing implementation issues related to these methods. Methods of Mathematical Physics	KZ ematical formulation	2 ons of these
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04NM1	German for Intermediate Students M1	Z	1
	rse is to level off the students' skills in the German language. The course focuses on revision of more difficult phenomena and		
•	es (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repub	-	
	gether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicist communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.	s, and the fundam	lentais of 11
04NM2	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	car technology e	tc. Students
	mation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	natically revises of	her grammatical
· · · · · · · · · · · · · · · · · · ·	or professional discourse (participles, relative clauses).		
04NM3	German for Intermediate Students M2	Z	1
	ther more complex grammatical structures and their application in communication based on technical texts, such as the relatior 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 (participles, relative clauses).	,	g
04NP1	German for Advanced Students P1	Z	1
This course requires go	od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be lev	elled off at the be	ginning of the
	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 participles, pa	oractical everyday	communication,
i.e., telephoning.	Cormon for Advanced Students DO	7	1
04NP2	German for Advanced Students P2 students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend	Z	•
•	oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and		
, ,	V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).		ĺ
04NP3	German for Advanced Students P3	Z	1
The course consists of	3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a va	riety of less com	non situations
	r accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vo		
	ing, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used	-	
students are trained to p practice to and from Ge	rocess information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. Th	ie course also inc	udes translation
01NME2	Numerical Methods 2	KZ	2
	o numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equatio	ı	_
boundary-value problen	ns to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equ	ations.	_
02OR	General Relativity	ZK	3
_	heory of relativity: principle of equivalence and principle of general covariance, parallel transport and geodesic equation, grav	vitational redshift.	Curvature and
	aw. Schwarzschild solution of the Einstein equations, homogeneous and isotropic cosmological models.	7	
01POPJ1	Computers and Natural Language 1	Z ding made in stati	2
· · · · · · · · · · · · · · · · · · ·	ational processing and understanding of natural languages. Automatic methods of morphological and syntactic analysis inclu will be discussed. Two-level morphology, tagging and language models, Viterbi algorithm, grammars, chart parsing, probabili	-	stical methods
01POPJ2	Computers and Natural Language 2	7	2
	s to get acquainted with the broad topic of machine translation (MT). Machine translation is a challenging task that can serve	- 1	- 1
of systems as complex	as natural languages. We cover several rather different approaches to the task as well as issues related to automatic and mai	nual evaluation of	translation
quality.			
12POAL	Computer Algebra	KZ	2
• • •	asic objects (integers, rational and algebraic numbers, polynomials, rational functions, radicals, algebraic functions), arithmetics		
	tion, series summation, integration, ordinary differential equations, factorization, equations solving, quantifier elimination, sub graphics, Maple - detailed introduction and solving of practical examples, applications, overview of other systems (Axiom, Mac		ŭ.
01POGR1	Computer Graphics 1	Z	2
	semester "Computer Graphics" course is devoted to the specifics of digital display devices spanning from history up to the stat		
a survey of fundamental	problems in 2D computer graphics is given together with their solutions. Focus is put on mathematical description of problems and	d explanation of th	e corresponding
algorithms using knowle	edge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of co	mputer graphics	approaches in
<u> </u>	g scientific documents and presentations.		
01POGR2	Computer Graphics 2	Z	2
•	two-semester "Computer Graphics" course begins with a brief introduction to signal theory in the context of aliasing - a pheno I structured survey of fundamental problems in 3D computer graphics is given together with their solutions, from the description	•	
• •	on mathematical description of problems and explanation of the corresponding algorithms using knowledge previously obtaine		
- · · · ·	n implementation aspect such as data structures design etc. is also a matter of concern. In the last lecture, a number of theor	=	-
using Blender, an open-	source 3D modeling and rendering software instrument.		
01SITE1	Computer Networks 1	Z	2
•	ry and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network		
	s. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification at letwork security - firewalls (packet filters, provies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, provies, gateways, NAT, DMZ), practical exercises. (According to the interest - the security - firewalls (packet filters, provies, gateways, NAT, DMZ), practical exercises.		·
	letwork security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the se		modems)
01SITE2 Understanding the histo	Computer Networks 2 ry and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network	Z protocols, practic	
-	s. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification at	•	
	letwork security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the se		·
01POPR	Advanced Probability	Z	2
•	o advanced Theory of probability and statistics on measure-theoretic level for general distributions of random variables. We determine the control of the co	•	٠ ا
characteristics of rando	m variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametric	c and nonparame	tric cases.

12PIN1	Practical Informatics for Technics 1	Z	2
Computer and operat	production information for recrimics in a supercomputers. Processor, memory, bus, devices, hard disk, network interface.	1 1	
	systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kern		
	es, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling programming (scripts).		
load a process prioriti	es. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer networks.	orks: Internet. Addr	esses and
protocols TCP/IP. Net	ork configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications		
12PIN2	Practical Informatics for Technics 2	Z	2
Practically oriented th	ee semester course of basics and applications of informatics for science and engineering included as obligatory alternative of	ourse. Constituent	part is realized
in computer classroor	s. The second part of the course is "Introduction to computer algebra systems?.		
12PIN3	Practical Informatics for Technics 3	Z	2
Practically oriented th	ee semester course of basics and applications of informatics for science and engineering included as obligatory alternative of	ourse Constituent	part is realized
in computer classroor	s. The third part of the course is "Introduction to scientific computing?.		
15INPR	Laboratory Practice in Instrumental Methods	KZ	4
Practical training of st	dents in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical and	others problems. T	he training is
	ratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of Nuclean		
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	-	
	deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). This kn	nowledge is further	applied to the
	of observations and statistical parametric model estimation.		
01PRA2	Probability and Mathematical Statistics 2	ZK	2
	to the statistical techniques for estimation and testing within parametric and nonparametric models such as Maximum likelihood		
	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
	probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition a as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit	_	-
	as random variable, distribution function of random variable and characteristics of random variable are freated and basic limit eory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are ex		ed and proved
		`	4
01PRSTB	Probability and Statistics B probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition a	KZ	•
	as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit	_	-
	eory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are ex		ed and proved
16UAZB	Principles of Ionizing-Radiation Applications	ZK	2
	plications, review of interaction of radiation applications	1	_
•	ring of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the use		
16FNZB	Problems of Non-ionizing Radiation	ZK	2
	in 1006113 of 14011-10112111g (radiation) biological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and me	1	
	und as applied in various types of technical or medical equipment are given as well.	strious used in neic	is of magnetic
12PSEM	Problem Seminary	Z	2
	ics from the region of solid materials engineering, physical electronics, materials science, nuclear reactors, dosimetry and ap		
01PERI	Programming of Peripherals Devices	7	2
-	input and output ports, computer bus. Software libraries for computer peripherals, 3D graphic libraries. Principles of periphera		2
01PW	Windows Programming	7	2
	ams for MS Windows. Basic editing controls. File input and output. User defined components, dynamic type identification and		2
18PRC1	Programming in C++ 1	Z	4
	inly the C programming language and non-object oriented features of the C++ language.		4
18PRC2	Programming in C++ 2		
	TETOOLAHIIIIIO III CTT /		
		KZ ko Library	4
This course covers the	object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template	te Library.	
This course covers the 18PJ	object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Templater Programming in Java	1	4 5
This course covers the 18PJ This course is devoted	e object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java to the Java platform and to the development of the basic types of applications for this platform.	te Library.	5
This course covers the 18PJ This course is devoted 18MTL	bobject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB	z,ZK	5
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en	biolect oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java It to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB vironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic arrays.	z,ZK	5
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric represe	biolect oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java It to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB irronment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic are intation of results.	Z,ZK Z,ZK Z,ZK allysis, statistics, a	5 5 Igorithmization
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric representations.	Programming in Java to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB	Le Library. Z,ZK Z,ZK Analysis, statistics, a	5 5 Igorithmization 5
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric representation 18MPT The subject acquaints	Programming in Java to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in programming to the standard Template C+;+ programming language and	Le Library. Z,ZK Z,ZK Analysis, statistics, a	5 5 Igorithmization 5
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric representation 18MPT The subject acquaints compared to classical	biject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB vironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic are entation of results. Programming in MATLAB students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in proglanguages.	Le Library. Z,ZK Z,ZK nalysis, statistics, a KZ gramming methodol	5 Igorithmization 5 ogy in Matlab
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric represed 18MPT The subject acquaints compared to classical 18PAS	biject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java I to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB vironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic are entation of results. Programming in MATLAB Students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in proglanguages. Pascal Programming	te Library. Z,ZK Z,ZK nalysis, statistics, a KZ gramming methodol	5 Igorithmization 5 ogy in Matlab
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric representation 18MPT The subject acquaints compared to classical 18PAS This lecture is intended.	Programming in Java It to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB Students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in programguages. Pascal Programming d mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program	te Library. Z,ZK Z,ZK nalysis, statistics, a KZ gramming methodol	5 Igorithmization 5 ogy in Matlab
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric representation 18MPT The subject acquaints compared to classical 18PAS This lecture is intended programming language.	biject oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template Programming in Java It to the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB vironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic are relation of results. Programming in MATLAB students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in programguages. Pascal Programming d mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in programe.	te Library. Z,ZK Z,ZK nalysis, statistics, a KZ gramming methodol Z amming and with th	5 Igorithmization 5 ogy in Matlab 4 e Pascal
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This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en eand geometric represent 18MPT The subject acquaints compared to classical 18PAS This lecture is intended programming language 12PDR1 Principles of computer	Programming in Java Ito the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB vironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic are relation of results. Programming in MATLAB students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in progranguages. Pascal Programming mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program. Data Communication and Interfaces 1 networks, networks architectures and data transfer. Specification of existing network architectures.	te Library. Z,ZK Z,ZK nalysis, statistics, a KZ gramming methodol Z amming and with th	5 Igorithmization 5 ogy in Matlab 4 e Pascal
This course covers the 18PJ This course is devoted 18MTL Introducing Matlab en and geometric representation 18MPT The subject acquaints compared to classical 18PAS This lecture is intended programming language 12PDR1 Principles of computer 12PDR2	Programming in Java Ito the Java platform and to the development of the basic types of applications for this platform. Programming in MATLAB vironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic are relation of results. Programming in MATLAB students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in progranguages. Pascal Programming mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program. Data Communication and Interfaces 1 networks, networks architectures and data transfer. Specification of existing network architectures. Data Communication and Interfaces 2	te Library. Z,ZK Z,ZK nalysis, statistics, a KZ gramming methodol Z amming and with th	5 Igorithmization 5 ogy in Matlab 4 e Pascal
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02RQGP2	Seminar on Quark-Gluon Plasma 2	Z	1
The aim of the semin	ar is discuss the selection of the most fundamental articles in heavy ion physics.		
04RM1	Russian for Intermediate Students M1	Z	1
-	ed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alpha		•
· · · · · · · · · · · · · · · · · · ·	communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asl		-
-	ammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievemen	it level of the RZ2	course. The
	f 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
	on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.		
04RM3	Russian for Intermediate Students M3	Z	1
· ·	the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, I	nowever, for half of	f the time allotted
in the timetable.			1
04RP1	Russian for Advanced Students P1	Z	1
-	ment for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, pı	racticing more diffi	icult grammar
	ding the fundamentals of technical language and training writing skills.		,
04RP2	Russian for Advanced Students P2	Z	1
	on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives,	, verb aspects, spe	ecific syntactic
structures). Stress is	put on independent oral and written communication.		,
04RP3	Russian for Advanced Students P3	Z	1
The course is based	on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphra	asing, translation).	The RP1 - RP3
	previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations)		
	tudy is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and		-
	nical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write	accurately and wi	th confidence or
technical topics.			T .
04RZ1	Russian for Beginners Z1	Z	1
	s the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Rus		
<u>-</u>	(for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speal	king). Students wil	l be able to read
	ted stress, understand its contents and summarize it.		1
04RZ2	Russian for Beginners Z2	Z	1
	r of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short s		
	using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will	l also develop thei	r vocabulary and
	natical 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
	on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for train	-	_
and listening) and inti	oduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will b		
		be able to respond	so as to be
understood, and to ex	press their opinion. Writing skills will be trained on guided writing tasks and note-taking.		so as to be
understood, and to ex	press their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4	Z	1
understood, and to ex 04RZ4 The course is based	press their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer text)	Z ts with a certain po	1 ercentage of
understood, and to ex 04RZ4 The course is based unfamiliar words, oral	Russian for Beginners Z4 on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer text communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., in	Z ts with a certain perregular verbs, diff	1 ercentage of erences in verb
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01SOS2	Software Seminar 2	<u> </u>	
•	+ and Qt. Development of graphical user interface using C and C++ programming languages. Portable applications for Unix li bility to Microsoft Windows.	ike operating syste	erns, especially
02SPRA1	Special Practicum 1	KZ	6
Physics measurement for	ocused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chose	en so that students	can familiarize
	xperimental physics and metrology.		
02SPRA2	Special Practicum 2	KZ	6
•	ocused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chose xperimental physics and metrology.	en so that students	can iamilianze
01STR	Statistical Decision Theory	ZK	2
The subject is devoted to	o the statistical techniques for general decision procedures based on optimization of suitable stochastic criterion, their mutual	comparisons with	respect to their
properties and applicable	-		
11SFBM	Structure and Function of Biomolecules lecular structure is crucial for the understanding of its function. The subject is focused on the introduction to building blocks of	Z,ZK	3 overall structure
· ·	n relationship including macromolecular complexes.	macromolecules,	overall structure
04SM1	Spanish for Intermediate Students M1	Z	1
The course is designed	for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-seme	ester course devel	ops standard
	ention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, nega		-
	and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts o	r listening to them	1
04SM2 The course develops the	Spanish for Intermediate Students M3 e students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for	specific purposes	•
•	lized texts on the Internet.	opcomo parposes	in order to be
04SM3	Spanish for Intermediate Students M3	Z	1
The course books are si	upplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acad	emic style. They w	ill be competent
=	net in Spanish and search for information of their specialization or field of interest. Students will use the information to write s	short articles and s	summaries. The
	me, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.	7	
04SP1	Spanish for Advanced Students P1 more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicati	Z ion Course prered	T ruisites: level B2
of CEFR.	There difficult granifical topics, revision of vecasidary, sacree of opening represent purposes as work as written communication	ion. Course proreq	fulcitoo: lovol B2
04SP2	Spanish for Advanced Students P2	Z	1
Course SP2 is the second	nd part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and sy	ntax and focuses	on independent
written communication.			
04SP3	Spanish for Advanced Students P3	Z	1
based on what students	al part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is will need in their career	locused on written	communication
04SZ1	Spanish for Beginners Z1	Z	1
Course 04SZ1 is the first	st stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fund	ı damental gramma	r structures and
will be able to communic	cate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanis	_	
will be able to communion 04SZ2	cate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2	sh and will develop	o it. 1
will be able to communion 04SZ2 Course 04SZ2 is based	cate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2 on course 04SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structure	sh and will develop Z s and lexis will be	t. 1 chosen so as
will be able to communion 04SZ2 Course 04SZ2 is based to enable them to under	cate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish for Beginners Students Z2	sh and will develop Z s and lexis will be	t. 1 chosen so as
will be able to communion 04SZ2 Course 04SZ2 is based to enable them to under	Spanish for Beginners Students Z2 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 countries are also included.	sh and will develop Z s and lexis will be	t. 1 chosen so as
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3	Spanish for Beginners Students Z2 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 country.	sh and will develop Z s and lexis will be ries and others suc	to it. 1 chosen so as ch as the Czech
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3 The course is based on mainly of Spain. It pays	Spanish for Beginners Students Z2 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 countriesh-speaking countries are also included. Spanish for Beginners Z3 course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative	sh and will develop Z Is and lexis will be ries and others such	o it. 1 chosen so as ch as the Czech 1 aking countries,
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3 The course is based on mainly of Spain. It pays communication on a give	Spanish for Beginners Students Z2 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 countriesh-speaking countries are also included. Spanish for Beginners Z3 course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of 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.	sh and will develop Z s and lexis will be ries and others such that the second of the second of the second of the second of the Spanish-specie). It includes written	o it. 1 chosen so as ch as the Czech 1 aking countries, en and oral
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3 The course is based on mainly of Spain. It pays communication on a giv 04SZ4	Spanish for Beginners Students Z2 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 countries are also included. Spanish for Beginners Z3 course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of 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	sh and will develop Z Is and lexis will be ries and others such that the second of the second of the Spanish-specie). It includes writt Z	o it. 1 chosen so as ch as the Czech 1 aking countries, en and oral
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3 The course is based on mainly of Spain. It pays communication on a giv 04SZ4 The course is based on	Spanish for Beginners Students Z2 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 countriesh-speaking countries are also included. Spanish for Beginners Z3 course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of 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.	sh and will develop Z Is and lexis will be ries and others such that Spanish-specie). It includes writt Z sh speaking count	o it. 1 chosen so as ch as the Czech 1 aking countries, en and oral 1 tries, mainly of
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3 The course is based on mainly of Spain. It pays communication on a giv 04SZ4 The course is based on Spain. It pays attention to	Spanish for Beginners Students Z2 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 countries are also included. Spanish for Beginners Z3 course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of 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	sh and will develop Z Is and lexis will be ries and others such that Spanish-specie). It includes writt Z sh speaking count	o it. 1 chosen so as ch as the Czech 1 aking countries, en and oral 1 tries, mainly of
will be able to communic 04SZ2 Course 04SZ2 is based to enable them to under Republic. Realia of Spar 04SZ3 The course is based on mainly of Spain. It pays communication on a giv 04SZ4 The course is based on Spain. It pays attention to written and oral communication on a giv 04SZ5	Spanish for Beginners Students Z2 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 countries are also included. Spanish for Beginners Z3 course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of 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 for truther grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of trunication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them. Spanish for Beginners Z5	sh and will develop Z Z Is and lexis will be ries and others such the Spanish-speare). It includes writt Z Sh speaking count the imperative, and Z	o it. 1 chosen so as ch as the Czech 1 aking countries, en and oral 1 tries, mainly of d subjunctive),
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01DYSY	Theory of Dynamic Systems	ZK	3
•	introduction to system theory with emphasis on control theory and understanding of the fundamental concepts of systems a	=	
-	the dynamical behavior of systems as well as provide the necessary mathematical background. Internal and external system	-	
_	riable, impulse response and transfer function, polynomial matrix, and fractional representations. Stability, controllability, obs	-	
	asis always being on fundamental results. State feedback, state estimation, and eigenvalue assignment are discussed in detail.	•	
	using polynomial and fractional system representations. The emphasis in this primer is on linear time-invariant systems, both		
01TKO	Theory of Codes I in error detecting and error correcting codes.	ZK	2
02TER	Heat and Molecular Physics	Z,ZK	4
	naterials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynaterials,	1	
•	ystems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity		•
02TSFA	Thermodynamics and Statistical Physics	Z,ZK	4
Foundation of thermody	namics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Ch	atelier principle. S	tatistical entropy.
Basics of many body de	scriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canon	ical ensemble, Fe	rmi gas, models
of crystals and the black	body radiation). The Boltzmann equation is usedto discusses simple transport phenomena.		
01TOP	Topology	ZK	2
The aim of lecture is the	systematization and deepening the knowledge of general topology.		
16MCRB	Transport of Ionizing Radiation and Monte Carlo Method	Z,ZK	4
Introduction to principle	s of Monte Carlo method and its use for radiation transport simulation, selected concepts of probability theory and mathemat	tical statistics. Phy	sical models of
	pes of radiation and their use for stochastic modeling of their substance transport. Model description concepts, geometric m	-	_
_	of measured variables and parameters. Statistical evaluation of reliability of modeling results, variance reduction methods, pro	-	
· ·	NP program, its possibilities and use. Procedures for the practical use of the program for typical tasks in the field of dosimetr	y, application of ic	onizing radiation,
	systems, radiation protection and medical applications.	1.7	
18INTA	Development of internet applications	KZ	4
· ·	overview of modern technologies for the development of web applications. Students will learn basic web languages and con		
	o relational database systems. The tutorials are dedicated to practical examples of building web applications, from the simple	est to more advan	cea. The course
	ards backend technologies and using the Python languages, but covers also frontend frameworks and JavaScript.	7	2
01DYK	Introduction to Continuum Dynamics	Z	2
	uction to the mathematical description of continuum dynamics. It summarizes the necessary mathematical apparatus with en ns, and integration on manifolds. It includes the basic concepts of continuum mechanics such as strain and stress tensors or	•	
	derive the fundamental laws of conservation of mass, momentum, angular momentum, and energy in integral and differential		=
· ·	are adapted to the case of viscous and inviscid fluid and linear and nonlinear elastic body.	ionni: in the last p	art of the course,
16ZIVB	Introduction to Ecology	KZ	2
	t basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the er	I .	
indicators and sustainal			
02UFEC	Introduction to Elementary Particle Physics	Z	2
020. 20			
The course provides an	easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject	are presented.	_
The course provides an 11UFPLN	easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject	are presented.	
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17VYR Research Reactors Course is devoted to research reactors and their applications for the need of research and industry. Students get familiar with research reactor types		2 ental programme
along with experimental equipment needed for particular applications and their specifics. The course is supported by technical visit to research read 12EPR1 Basic Electronics Practicum 1	KZ	3
The aim of the practicum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulat consists of blocks lasting 4 hours.		
12EPR2 Basic Electronics Practicum 2 The aim of the practicum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulat consists of blocks lasting 4 hours.	KZ ion of the results. T	3 The practicum
12ZPLT Basic Laser Technique Laboratory Lasers, solid state Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harm	KZ	6
diode, diode pumped Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acousto	-optic modulators.	
12ZPOP Basic Optical Laboratory The practical laboratories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must be elaborated	KZ	6
18ZALG Basics of Algorithmization This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of	Z,ZK	4
16AMMB Fundamentals of Analytical Measurement Methods	ZK	2
Basic principles, technical performance and utilization of methods of chemical analysis. Basic methodology of analytical determination, gravimetry, polarography, refractometry, polarimetry, UV-VIS spectroscopy, atomic emission and absorption spectroscopy, infrared and Raman spectroscopy, X	-	
magnetic and electron spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography.	7 71/	4
16ZBAF1 Fundamentals of Human Biology, Anatomy and Physiology 1 Organization of living systems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecu	Z,ZK ular genetics. Cell o	1 -
their regulation. General human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system and physiology of respiration. Excretory and genital tract.	m and its physiolo	gy. Respiratory
16ZBAF2 Fundamentals of Human Biology, Anatomy and Physiology 2 Heart and physiology of cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, b	_	4 riew of nerves.
CNS. Visual system and physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, endocrine gl 16ZDOZ1 Fundamentals of Radiation Dosimetry 1	Z,ZK	4
History, development, and objectives of dosimetry. Quantities and units used for description of sources, fields, interactions of ionizing radiation, ioni absorption. Fundamentals of the effects of ionizing radiation.	zations, energy tra	insfer and
16ZDOZ2 Fundamentals of Radiation Dosimetry 2 Fundamentals of biological effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Princip	ZK	2 of measurements
in dosimetry. Determination of activity and neutron source emission. Measurements of absorbed dose and exposure.		
17ZEH Basics of Economic Assessment The course focuses on the economic evaluation of Nuclear power plants. Introductory lectures are concerned with an introduction to economy and	ZK the basic compone	2 ent parts of
microeconomics. Lectures continued with insight into the business and managerial economics, explanation of the concepts of incomes, expenses, et energy resources evaluation. Second part of lectures is focused on evaluation of nuclear power plants - the fuel cycle and operations of NPP.	-	
12ZEL1 Basic Electronics 1	Z,ZK	3
The subject provides primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. C circuits include symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe	•	
12ZEL2 Basic Electronics 2	Z,ZK	3
The subject follows up with the Basic Electronics 1. Semiconductor elements basic properties are explained. The course's final part deals with basic 02ZFM1 Foundations of Physical Measurements 1	themes of logical Z	circuits field.
The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however		
other branches. The goal of the lecture is to introduce the basics of physical measurements, the methods of processing and evaluation of acquired of basic habits of work in a physics lab.	iala on a PC. Slud	lenisieam the
02ZFM2 Foundations of Physical Measurements 2 This introductory course is devoted to the essentials of measurements of the most important physical quantities. It is especially recommended to the	Z	2
one of the physicas curricula - Physical engineering and Nuclear engineering. Also the methods of evaluation of statistical data using PC and practic		
is involved. Students learn main rules connected with experimental work in physical laboratory. 11ZFPL Basic to Solid State Physics	KZ	2
Description of fundamental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bo	1	1
solids, various types of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and are derived. The periodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electron		
energy bands explained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to		
interpret a broad phenomenological basis of physical properties of crystalline solids 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	s, linear theory of w	vaves in plasmas
and propagation of electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and palt comprises brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas are introduced		es are explained.
02ZJF Nuclear Physics	Z,ZK	6
This scientific field presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic definition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.	main, where much	n of our classical
02ZJFB Nuclear Physics B	KZ	3
This scientific field presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic de intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.	main, where much	ii oi our ciassical
15ZKJE Nuclear Power Plants Design and Operation Toget of legture is to greate begin knowledge of physics of support sectors utilizing fiscion. Further evaluate extraordinate to a support for suppo	ZK	3
Target of lecture is to create basic knowledge of physics of nuclear reactors utilizing fission. Further explains arrangement of nuclear fuel, purpose, tech of core. Function and construction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material so	_	
dosimetry. Creates knowledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison wit environment and to strategic importancy of nuclear sources of energy. Gives basic knowledge of construction, operation and decommissioning of nu		
high level nuclear waste and spent fuel and their management.		about

16MEZB	Fundamentals of Ionizing-Radiation Metrology	Z.ZK	4
-	rizes the basic objectives and content of ionizing radiation metrology. It deals with the interpretation of radiation quantities and	1 '	ı t summarizes the
	erimental foundations of metrology, the determination of basic parameters of radiation. Lectures are supplemented with basic s	• • • • • • • • • • • • • • • • • • • •	
egulations.	3,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, , , , , , , , , , , , , , , , , , , ,	
01ZOS	Introduction to Operating Systems	Z	2
Introduction to struc	cture of operating systems. Processes, thread, memory management. Synchronization of multi=threaded applications. Memory	mapped files.	1
12ZAOP	Fundamentals of Optics	Z.ZK	2
The lecture covers t	the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and g	eometrical optics. T	he main goal of
the lecture is to obta	ain, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with re	espect to character	of the bachelor
work. Particular topi	ics are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane way	ves in vacuum (inclu	uding polarization
effects), and further	r from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It ne:	xt informs on conse	quences in
anisotropic media, it	it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interfere	ence processes, ex	plains elements
of two-wave interfere	ence and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a gr	aphical form, includ	ing fundamentals
of grating diffraction	n. Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optic	s limit. It takes notic	e on geometrica
approach imaging, s	substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical instrume	ents.	
01ZPB1	Introduction to Computer Security 1	Z	2
16ZPSP	Basic Work with PC	Z	2
The aim of the cours			
THE WITH OF THE COURT	rse is to acquaint students with the basic skills related to working on a personal computer. The introductory part of the course is	devoted to informa	tion systems and
			•
resources available	at the CTU in Prague and the FNSPE. Emphasis is placed on effective handling of work with office productivity software (text	editor, spreadsheet	and presentation
resources available software) with exerc	e at the CTU in Prague and the FNSPE. Emphasis is placed on effective handling of work with office productivity software (text cises in MS Office. The practical content focuses mainly on further use during studies (laboratory reports, research work, bache	editor, spreadsheet elor's and diploma t	and presentation heses) and in
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resources available software) with exerc specific practice (ho home exercises and	e at the CTU in Prague and the FNSPE. Emphasis is placed on effective handling of work with office productivity software (text cises in MS Office. The practical content focuses mainly on further use during studies (laboratory reports, research work, bache ospitals, state administration, companies). Other sections summarize basic information about computer hardware, software, and d participation in exercises above 60% is a necessary condition for passing the course.	editor, spreadsheet elor's and diploma t security. Completio	and presentation heses) and in on of independen
resources available software) with exerc specific practice (ho home exercises and 16ZRAO	e at the CTU in Prague and the FNSPE. Emphasis is placed on effective handling of work with office productivity software (text ecises in MS Office. The practical content focuses mainly on further use during studies (laboratory reports, research work, bache ospitals, state administration, companies). Other sections summarize basic information about computer hardware, software, and diparticipation in exercises above 60% is a necessary condition for passing the course. Basics of Radiation Protection	editor, spreadsheet elor's and diploma t security. Completio	and presentation heses) and in on of independen
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List of courses of this pass:

Code	Name of the course	Completion	Credits
00EKOT	Economy in Technology	Z	1
	The course introduces the basics of micro- and macroeconomics.	1	'
00MAM1	Essentials of High School Course 1	Z	1
00MAM2	Essentials of High School Math Course 2	Z	1
	Review of basics of high school mathematics.		'
00PT	Preparatory Week	Z	2
00RET	Rhetoric	Z	1
	used on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are ar		•
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 alge commutative fields.	bras, rings of polyr	nomials ove
01ALGE	Algebra	Z,ZK	6
Firstly, the Peano a	ixioms are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, the	axiom of choice an	d equivalen
statements, defini	tion of ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral don fields, lattices. Independent chapters are devoted to divisibility in integral domains and to finite fields.	nains, principal ide	al domains,
01DEM	History of Mathematics	Z	1
The subject has th	e form of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the field - of the from the history of mathematics.	jive their talks on va	aroius topics
01DIM1	Discrete Mathematics 1	Z	2
	The seminar is devoted to elementary number theory and applications. It includes individual problem solving.	'	1

01DIM2	Discrete Mathematics 2	Z	2
	The seminar is devoted to recurrence relations. It includes individual problem solving.		
01DIM3	Discrete Mathematics 3	Z	2
The subject is deve	oted to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the seminar studies above from the private literature	idents present a pi	oblem with
01DYK	solution chosen from the given literature. Introduction to Continuum Dynamics	Z	2
	introduction to Continuum Dynamics introduction to the mathematical description of continuum dynamics. It summarizes the necessary mathematical apparatus with em		
	al forms, and integration on manifolds. It includes the basic concepts of continuum mechanics such as strain and stress tensors or su		
of which it is possib	le to derive the fundamental laws of conservation of mass, momentum, angular momentum, and energy in integral and differential form	n. In the last part of	the course,
	these conservation laws are adapted to the case of viscous and inviscid fluid and linear and nonlinear elastic body.		
01DYSY	Theory of Dynamic Systems	ZK	3
	es an introduction to system theory with emphasis on control theory and understanding of the fundamental concepts of systems and ding of the dynamical behavior of systems as well as provide the necessary mathematical background. Internal and external system		
-	tate variable, impulse response and transfer function, polynomial matrix, and fractional representations. Stability, controllability, obse		
explained with the e	mphasis always being on fundamental results. State feedback, state estimation, and eigenvalue assignment are discussed in detail. All	stabilizing feedbac	controllers
are also paramete	erized using polynomial and fractional system representations. The emphasis in this primer is on linear time-invariant systems, both of	ontinuous and disc	crete time.
01FA1	Functional Analysis 1	Z,ZK	3
Continuing course	of mathematical analysis and algebra introduction to the basics of functional analysis. There are the concepts that students need to u and technical disciplines.	nderstand the vario	ous physical
01FA2	Functional Analysis 2	Z,ZK	4
	to present selected fundamental results from functional analysis including basic theorems of the theory of Banach spaces, closed op-	· '	-
	Hilbert-Schmidt operators, spectral decomposition of bounded self-adjoint operators.		
01FAN1	Functional Analysis 1	Z,ZK	4
	and results are addressed concerning successively topological spaces, metric spaces, topological vector spaces, normed and Banac		
01FKP	Functions of Complex Variable	ZK	2
	os advanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings, tran Inctions. Basic properties of complex functions of several complex variables together with improper line integrals and its applications a		eromorphic
01FKPB	Functions of Complex Variable B	7	2
-	os advanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings, trai		
fur	nctions. Basic properties of complex functions of several complex variables together with improper line integrals and its applications a	re presented.	·
01GTDR	Geometric Theory of Ordinary Differential Equations	Z	2
	ts of the qualitative theory of ODEs dealing with the geometric and topological properties of the solution. In this context, we mention su	-	asic 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
01LIP	Linear Programming	Z,ZK	3
	roblems about constrained extremum problems for multivariable functions (the function is linear and the constraint equations are given	, ,	
	inequalities).		
01MAPR	Markov processes	Z,ZK	4
01MASC	Mathematical Statistics - Seminar	Z	2
•	oted to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation o inding unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood,		
	pothesis testing using the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric densi		regions ioi
01MAT1	Mathematics 1	Z	4
The course is devo	oted to the study of the basics of calculus of one variable. It includes an introduction to differential and integral calculus, with particula	r emphasis on app	lications in
	practical problems.		
01MAT2	Mathematics 2	Z	4
rne course, which	h is the continuation of Mathematics 1, is devoted to the integration techniques, improper Riemann integral, introduction to parametri coordinates), the basics of sequences and infinite series, and finally to the Taylor and power series and their applications.	c curves (especial	y in polar
01MAT3	Mathematics 3	Z,ZK	4
	The subject summarises the most important notions and theorems related to the study of finite-dimensional vector spaces		
01MAT4	Mathematics 4	Z,ZK	4
	n-linear differential equations of the first order. Linear differential equations of higher order with constant coefficients. Multivariable cal		
01MATZ1	Mathematics, Examination 1	ZK	2
01MATZ2	Mathematics, Examination 2	ZK	2
01MMF	Methods of Mathematical Physics san introduction to the theory of distributions with applications to solutions of partial differential equations with constant coefficients,	Z,ZK	6 hooroms
	s an introduction to the theory of distributions with applications to solutions of partial differential equations with constant coefficients, the case of a continuous kernel on a compact set as well as Sturm-Liouville operators on bounded intervals, and applications of the s		
	to the solution of some boundary value problems and mixed problems.		
01MMPV	Mathematical Models of Groundwater Flow	KZ	2
The course provi	des an overview of computational methods for selected groundwater flow problems. The first part of the course is devoted to mathen		of these
04515450	problems. The second part is aimed at selected numerical methods, emphasizing implementation issues related to these methods.		
01NME2	Numerical Methods 2	KZ	2
	ed to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations. Iary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differ	· ·	s converting
01PERI	Programming of Peripherals Devices	Z	2
	ganization, input and output ports, computer bus. Software libraries for computer peripherals, 3D graphic libraries. Principles of peripherals		
01POGR1	Computer Graphics 1	Z	2
The first part of the	two-semester "Computer Graphics" course is devoted to the specifics of digital display devices spanning from history up to the state of	_	
a curvey of fundame	ental problems in 2D computer graphics is given together with their solutions. Focus is put on mathematical description of problems and ex	colanation of the co	rresponding

algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of computer graphics approaches in the process of authoring scientific documents and presentations. 01POGR2 Computer Graphics 2 7 2 The second part of the two-semester "Computer Graphics" course begins with a brief introduction to signal theory in the context of aliasing - a phenomenon ubiquitous in computer graphics. Further, a well structured survey of fundamental problems in 3D computer graphics is given together with their solutions, from the description of a 3D scene to its realistic rendering. Focus is put on mathematical description of problems and explanation of the corresponding algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The algorithm implementation aspect such as data structures design etc. is also a matter of concern. In the last lecture, a number of theoretical concepts are demonstrated using Blender, an open-source 3D modeling and rendering software instrument. 01POPJ1 Computers and Natural Language 1 2 Basic course of computational processing and understanding of natural languages. Automatic methods of morphological and syntactic analysis including modern statistical methods of result disambiguation will be discussed. Two-level morphology, tagging and language models, Viterbi algorithm, grammars, chart parsing, probabilistic grammars. Computers and Natural Language 2 The goal of the course is to get acquainted with the broad topic of machine translation (MT). Machine translation is a challenging task that can serve as a good example for modeling of systems as complex as natural languages. We cover several rather different approaches to the task as well as issues related to automatic and manual evaluation of translation quality. 01POPR Advanced Probability 2 The subject is devoted to advanced Theory of probability and statistics on measure-theoretic level for general distributions of random variables. We deal with sample and integral characteristics of random variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametric and nonparametric cases. Probability and Mathematical Statistics 1 The subject is devoted to the introduction to Theory of probability and statistics on measure-theoretic level for discrete models, continuous distributions and general distributions of random variables. We deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). This knowledge is further applied to the statistical processing of observations and statistical parametric model estimation. Probability and Mathematical Statistics 2 The subject is devoted to the statistical techniques for estimation and testing within parametric and nonparametric models such as Maximum likelihood principle, Uniformly most powerful tests, Goodness of fitness tests of models, confidence regions, etc. We focus on real practical applications of these statistical techniques in frame of the specific examples. 01PRST Probability and Statistics It is a basic course of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and continuing till the Kolmogorov definition. The notions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit theorems are stated and proved. On the basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explained. Probability and Statistics B 01PRSTB It is a basic course of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and continuing till the Kolmogorov definition. The notions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit theorems are stated and proved. On the basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are explained. 01PSL LaTeX - Publication Instrument Z 2 The course is devoted to the basics and facilities of computer typography, particularly to the system LaTeX 01PW Windows Programming Z 2 Simple graphical programs for MS Windows. Basic editing controls. File input and output. User defined components, dynamic type identification and reflection 01RMF The Equations of Mathematical Physics 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). 01RSWP **Project Management of Software Projects** ΚZ 2 The course Project management of software projects is dedicated to an explanation of general ideas, rules and procedures which are common to many projects of very diverse character. The course structure corresponds to a lifecycle of typical projects including many other aspects which have to be taken into account in the course of their management. Specific attention is paid to software project management and to IT projects in general. Interdisciplinary view of project management is emphasized. 01SITE1 Computer Networks 1 2 Understanding the history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network protocols, practical exercises with TCP/IP communications. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification authorities, public key infrastructure (PKI). Use in practice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the serial control lines, modems) 01SITE2 Computer Networks 2 Understanding the history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network protocols, practical exercises with TCP/IP communications, Internet services - mail, remote access, www. Secure communication, tunneling, Directory services, certificates, certification authorities, public key infrastructure (PKI). Use in practice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the serial control lines, modems) 01SMB1 Seminar on Calculus B1 7 2 The course is devoted to support the lectures of Calculus B3. 01SMB2 Seminar on Calculus B2 Ζ 2 The course is devoted to support the lectures of Calculus B4. 01SOS1 Software Seminar 1 Ζ 2 Java, Java Beans, Assembly language programming for microprocessors Intel 80x86 Software Seminar 2 7 018082 2 Graphical libraries GTK+ and Qt. Development of graphical user interface using C and C++ programming languages. Portable applications for Unix like operating systems, especially for Linux systems. Portability to Microsoft Windows. 01SSM1 Seminar of Contemporary Mathematics 1 2 This seminar provides a different approach to those fields of mathematics that are included in curriculum but also to those that are not part of basic courses of mathematics. Seminar of Contemporary Mathematics 2 Ζ 2 This seminar provides a different approach to those fields of mathematics that are included in curriculum but also to those that are not part of basic courses of mathematics. 2 01STR Statistical Decision Theory The subject is devoted to the statistical techniques for general decision procedures based on optimization of suitable stochastic criterion, their mutual comparisons with respect to their properties and applicability. 01TKO Theory of Codes ZK 2 Algebraic methods used in error detecting and error correcting codes.

			2
01TOP	Topology The aim of lecture is the systematization and deepening the knowledge of general topology.	ZK	2
01UTIZ	Introduction to Theoretical Informatics	ZK	2
01ZOS	Introduction to Operating Systems	7	2
	tion to structure of operating systems. Processes, thread, memory management. Synchronization of multi=threaded applications. Mer	_	1
01ZPB1	Introduction to Computer Security 1	Z	2
02AMS	Atomic and Molecular Spectroscopy	Z,ZK	4
OZAMO	The lecture is devoted to atomic and molecular spectroscopy.	2,210	1 -
02DEF1	History of Physics 1	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 philos	sophers, Aristotle	Physics in
Helenistic period,	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, H	luygens. The birt	h of physics
	as experimental science. Newton and his work.		
02DEF2	History of Physics 2	Z	2
•	of classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	-	_
_	vanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann. The project and Finatein Discourage of regional distributions of stars, electrodynamics and Finatein Discourage of regional distributions of stars, electrodynamics and Finatein Discourage of regional distributions of stars, electrodynamics and Finatein Discourage of regional distributions of the project of the p		-
and relativistic p	shysics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear en standard model. The concept of Nature and Universe of today.	ergy, Elementary	particles,
02DRG	Differential Equations, Symmetries and Groups	Z	4
UZDING	The purpose of the lecture is to teach students computation of symmetries of the differential equations.	۷	-
02ELMA	Electricity and Magnetism	Z,ZK	6
	pulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits, condu		1
•	ε Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. Electromagnetic waves, Μ	•	
02EXF1	Experimental Physics 1	 Z	2
-	an introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and method	s of measureme	1
02EXF2	Experimental Physics 2	ZK	2
-	an introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and method		
02FYS1	Physical Seminar 1	Z	2
	devoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physics	presented in the	1
Mecha	anics. The problems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical labora	tory equipments.	
02FYS2	Physical Seminar 2	Z	2
The seminar is o	devoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physics	presented in the	course of
		procented in the	
Electricity and	d Magnetism. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physical	-	oments.
Electricity and 02KF	d Magnetism. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physica Quantum Physics	-	oments.
02KF		I laboratory equip	3
02KF	Quantum Physics	I laboratory equip	3
02KF	Quantum Physics n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heiser	I laboratory equip	3
02KF State description 02LCF1	Quantum Physics n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heiser quantization of angular momentum, solution of simple systems, hydrogen atom.	I laboratory equip Z,ZK nberg uncertainty	3 principle,
02KF State description	Quantum Physics n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heisel quantization of angular momentum, solution of simple systems, hydrogen atom. Experimental Laboratory 1 Cavendish experiment. Elasticity.Thermal capacities. Electric measurements, Acoustic. Oscillations. Experimental Laboratory 2	I laboratory equip Z,ZK hberg uncertainty	3 / principle,
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02KF State description 02LCF1 02LCF2 02MECH ntroduction to phys	Quantum Physics n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heiser quantization of angular momentum, solution of simple systems, hydrogen atom. Experimental Laboratory 1 Cavendish experiment. Elasticity.Thermal capacities. Electric measurements, Acoustic. Oscillations. Experimental Laboratory 2 Electric and magnetic field, microwaves, Xray and gamma rays, geometric optics Mechanics ics, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensional eld, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid body	Z,ZK nberg uncertainty Z Z Z Z al equations of m	3 / principle, 2 2 4 otion, motion
02KF State description 02LCF1 02LCF2 02MECH ntroduction to physic in central force fi	Quantum Physics n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heiser quantization of angular momentum, solution of simple systems, hydrogen atom. Experimental Laboratory 1 Cavendish experiment. Elasticity. Thermal capacities. Electric measurements, Acoustic. Oscillations. Experimental Laboratory 2 Electric and magnetic field, microwaves, Xray and gamma rays, geometric optics Mechanics ics, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensional eld, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid body continuum mechanics, elasticity, hydrodynamics. Sound.	Z,ZK nberg uncertainty Z Z Z al equations of m	3 / principle, 2 2 4 otion, motion mentals of
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02KF State description 02LCF1 02LCF2 02MECH ntroduction to physin central force fi	Quantum Physics n, wave function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heiser quantization of angular momentum, solution of simple systems, hydrogen atom. Experimental Laboratory 1 Cavendish experiment. Elasticity. Thermal capacities. Electric measurements, Acoustic. Oscillations. Experimental Laboratory 2 Electric and magnetic field, microwaves, Xray and gamma rays, geometric optics Mechanics ics, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensional eld, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid body continuum mechanics, elasticity, hydrodynamics. Sound. Mechanics - Examination The content of the subject is the examination according to the plan of studies.	Z,ZK nberg uncertainty Z Z Z al equations of m t, rotation. Funda	3 v principle, 2 2 4 otion, motior mentals of
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02KF State description 02LCF1 02LCF2 02MECH attroduction to physic in central force fit 02MECHZ 02MECHZ 02MECHZ 02MECHZ 02PRA1 Lecture is intended attended by studen	Quantum Physics In, wave function, postulates of quantum mechanics, Born is statistical interpretation, expectation values, Schrödinger equation, Heiser quantization of angular momentum, solution of simple systems, hydrogen atom. Experimental Laboratory 1 Cavendish experiment. Elasticity. Thermal capacities. Electric measurements, Acoustic. Oscillations. Experimental Laboratory 2 Electric and magnetic field, microwaves, Xray and gamma rays, geometric optics Mechanics ics, physical quantities and units. Particle kinematics, basic types of motion and theirsuperposition. Particle dynamics, one-dimensional edd, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics of rigid body continuum mechanics, elasticity, hydrodynamics. Sound. Mechanics - Examination The content of the subject is the examination according to the plan of studies. Simulations and Data Analysis Tools Data analysis and simulations of high energy elementary particle collisions. ROOT and Pythia programs. General Relativity Interval Relativity Interval Relativity: principle of equivalence and principle of general covariance, parallel transport and geodesic equation, gravitations gravitational law. Schwarzschild solution of the Einstein equations, homogeneous and isotropic cosmological mode Experimental Laboratory 1 Interval despecially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear Engineerin	Z Z al equations of m t, rotation. Fundal ZK Z Z S S S S S S S S S S S S S S S	3 y principle, 2 2 4 otion, motion mentals of 2 2 3 urvature and 6 can be also plementation
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02SMF	Seminar of Mathematical Physics Z 2	
The purpose of t	ne seminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics department will present simple tasks concerning their scientific activities that could become the topics of the student?s bachelor theses in the next year	
02SPRA1	Special Practicum 1 KZ 6	
Physics measuren	ent focused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chosen so that students can familiariz with advanced pats of experimental physics and metrology.	е
02SPRA2	Special Practicum 2 KZ 6	
Physics measuren	ent focused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chosen so that students can familiariz with advanced pats of experimental physics and metrology.	e
02TEF1	Theoretical Physics 1 Z,ZK 4	
	troduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalism as well as diferent approache	- 1
•	lynamics (Newton's, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body	- 1
problem, the mot	on of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is	
02TEF2	the first part of the course of classical theoretical physics (02TEF1, 02TEF2). Theoretical Physics 2 Z,ZK 4	\dashv
	sformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and classical field theory in the	
	me. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipol approximation.	.e
02TER	Heat and Molecular Physics Z,ZK 4	\dashv
-	of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynamic principle, ideal and real gas	3,
entropy; non-chem	cal systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity distribution, equipartition theorem	n.
02TSFA	Thermodynamics and Statistical Physics Z,ZK 4	
Foundation of ther	nodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entrop	у.
Basics of many bo	dy descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, model	s
	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	
	se provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject are presented.	\dashv
02UKP	Introduction to Curves and Surfaces Z 2 exture is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts for the curves are introduced	
-	e explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential part of the lecture are the example	es l
	calculated by students	
02ZAJF	Introductory Atomic and Nuclear Physics Z,ZK 4	
Brief review	of microworld phenomena and their physical description. The goal is to provide basics of quantum theory, atomic, nuclear, and elementary-particle physics.	
02ZFM1	Foundations of Physical Measurements 1 Z 2	
	gned for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of	- 1
other branches.	he goal of the lecture is to introducethe basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Studentslearn the	
0075140	basic habits of work in a physics lab.	\dashv
02ZFM2	Foundations of Physical Measurements 2 Z 2 2 purse is devoted to the essentials of measurements of the most important physical quantities. It is especially recommended to those students who are going to students.	.
-	curricula - Physical engineering and Nuclear engineering. Also the methods of evaluation of statistical data using PC and practical work with measurement device	· 1
	is involved. Students learn main rules connected with experimental work in physical laboratory.	
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	al
	intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.	
02ZJFB	Nuclear Physics B KZ 3	
This scientific field	presents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic domain, where much of our classical control of the control of	al
007014	intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.	\dashv
02ZSM	Introduction to the Standard Model ZK 2 nadrons, baryons, mesons, symmetry, symmetry group, quarks, gluons, partons, standard model of electroweak and strong interactions, quantum chromodynamic	_
raiticles, leptoris,	(QCD), cross section, scattering cross section.	·3
04ABZK	English - State Examination ZK 5	\dashv
	nt 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 passed all the	
	and examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the APIN programme covers also examination subjects. As required	1,
	examination conditions comply with respective rules and regulations for state language examinations.	
04AKS	English Conversation Z 1	
	velop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication. The student will develop	- 1
•	r various communication situations and will master their communication strategy. They will also practise their listening skills in order to better follow and participate	•
	scussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more confident speaker.	\dashv
04AM1 The course is designed	English for Intermediate Students M1 Z 1 ned for students who have successfully completed the full secondary school English language course at least at the A2 level of the Common European Framewor	_{.k}
	nguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of	- 1
	nd written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical interest. Attention is also paid to	- 1
	extending the knowledge of grammar issues used in EAP.	
04AM2	English for Intermediate Students M2 Z 1	1
	expects the student to have completed the 04AM1 course. It develops their skills for work with subtechnical texts, focusing also more on specific grammar, functions	- 1
and lexical items ty	pical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided writing. If necessary, gramma	ar
04AM3	revision is included. English for Intermediate Students M3 Z 1	\dashv
	English for intermediate Students wi3 2 1 1 2 1 1 1 1 1 1	nt
	professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication and their appropriate Czech	

equivalents. The course also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation on a chosen topic related to the student's field. 04AMZK English for Intermediate Students Examination 7K 4 The course content is the examination as given by the study plan. The examination covers the 04AM1, 04AM2, and 04AM3 courses and consists of two parts - written (100 min) and oral (20-30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English courses 04AP1 English for Advanced Students P1 The course is designed for students who have successfully completed the full secondary school English language course (at least the B1 level of the Common European Framework of Reference for Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamentals of vocabulary, functions, grammar, and style typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, graph descriptions, etc). It also covers professional oral and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writing (writing a CV, letter of application, polite request). If necessary, revision of selected grammar topics is included. 04AP2 English for Advanced Students P2 The 04AP2 course is based on 04AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen branches of science. According to the students' needs it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorical functions (e.g., various types of descriptions, and, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguistically more demanding 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 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 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. Ζ Intermediate Czech 2 The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and reading skills and trains the student in understanding common abbreviations, abbreviated words, and mathematical terms and formulas. 04CESM3 Intermediate Czech 3 Ζ 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 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 1 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. 04CESP3 Czech for Foreigners - Advanced Ζ 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 7K 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. 04FM2 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 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	Z	1
	ourse The objective of this three-semester course is to improve and further develop communication in the French language in both wi		
	municate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit gen		
•	lems. 04FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of trans	· ·	
	t, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture,		
., .,	mathematics, internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretable texts.		
04FP2	French for Advanced Students P2	Z	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 gi	ven topics. Feature	s typical of
	technical and scientific communication are stressed (passive voice, nominalization, word formation).		
04FP3	French for Advanded Students P3	Z	1
	sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in eng	-	
Skill - translation o	of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covers topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.	s a technical /applie	ed science
04FPZK	French for Intermediate Students Examination	ZK	5
	n program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part a	1	-
	Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination gra	_	
04FZ1	French for Beginners Z1	Z	1
French for beginne	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 soci	alizing and in profe	ssional life.
	es French for specific / technical communication and reading of popular science and scientific texts. 04FZ1 The objective is to be able to		- 1
	using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravda	_	
	za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, pel directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation.		١ -
04FZ2	French for Beginners Z2	7	1
_	pg up with 04FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of th	e textbook: Pravda	-
	nners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreeme		
thanking, travelling	, map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communic	ation. Specific topic	cs covered:
	How does the machine work? A few expressions concerning the study. Name of University and Faculty.		
04FZ3	French for Beginners Z3	Z	1
	upon 04FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pr		-
Topics, functions	and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for info pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.	rmation and loud a	as part of
04FZ4	French for Beginners Z4	Z	1
	ן French for Degriffers 24 up on 04FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The co		I overed with
	he textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lecture		
	The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shoppi		
	country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, interne	et.	
04FZ5	French for Beginners Z5	Z	1_
-	red in FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. They pr	· ·	
•	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 class)		
110103, 3000033	subjunctive clauses, gerund, passive.	luses, typical conju	riotioris,
04FZZK	French for Beginners Examination	ZK	3
	examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination		document
	Instruction for examination. Its content covers the levels FZ1 - FZ5.		
04NM1	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 str		
	n processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repu sues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists,	•	
environmentar is:	terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and unders		itais Oi 11
04NM2	German for Intermediate Students M2	7	1
-	ces other more complex grammatical structures and their application in communication based on technical texts, such as the relation be	tween technology a	-
the world at the b	beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and computers and computers are computers.	ar technology etc.	Students
practise reading for	information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematic	cally revises other g	rammatical
	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 c	• • • • • • • • • • • • • • • • • • • •	
	rinformation 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).	, g	
04NMZK	German for Intermediate Students Examination	ZK	4
	t is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination of	onsisting of two pa	rts - written
and oral, which cov	rer the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment of the courses of the course of	ent. More detailed	information
0.445	is to be obtained from the teacher.		
04NP1	German for Advanced Students P1		1
	res good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levell se is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for de		-
	nar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical text.		
	i.e., telephoning.	- ,,	,

04NP2	German for Advanced Students P2	Z	1
vocabulary range. I	os the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending tintroduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and project provides and text of explication, interview, askelerables, and more complex grammatical structures (i.e., subjunctive, indi-	actising formal com	
04NP3	oth written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, india German for Advanced Students P3	rect speech).	1
The course consis	sts of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varience of a main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varience of a main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varience of the part of th	-	situations
	ngineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used.	· -	
· ·	d to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The c practice to and from German.	-	
04NPZK	German for Advanced Students Examination	ZK	5
The course conter	of tis the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination cover the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungrad		
	information is to be obtained from the teacher.		
04RM1 The course is designed.	Russian for Intermediate Students M1 gned for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (Z Z	1 andwritten)
	or 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 I contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetab	evel of the RZ2 cou	
04RM2	Russian for Intermediate Students M2 The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the	Z le timetable.	1
04RM3 The course develo	Russian for Intermediate Students M3 ps 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	Z ever, for half of the ti	1 ime allotted
	in the timetable.		
04RMZK The course conter	Russian for Intermediate Students Examination It is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled	ZK lge and skills acqui	4 red in RM1
	lents 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	Z	1
The entrance req	uirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, prac structures, understanding the fundamentals of technical language and training writing skills.	ticing more difficult	grammar
04RP2	Russian for Advanced Students P2	Z	1
The course is bas	sed on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, ve structures). Stress is put on independent oral and written communication.	erb aspects, specific	c syntactic
04RP3	Russian for Advanced Students P3	Z	1
The course is base	ed on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing	r translation) The	PD1 - PD3
		-	
	nod previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The	e courses develop a	and expand
these skills. Further	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and wi	e courses develop a ritten interpretation)	and expand). Students
these skills. Further		e courses develop a ritten interpretation)	and expand). Students
these skills. Furthedevelop their subte	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and we echnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write according to the students and practice quick and correct communication in professional situations. They will be able to both speak write according to the students and practice quick and correct communication in professional situations. They will be able to both speak write according to the students' specialization, oral and will be able to both speak write according to the students' specialization, oral and will be able to both speak write according to the students' specialization, oral and will be able to both speak write according to the students' specialization.	e courses develop a ritten interpretation) urately and with con	and expand). Students nfidence on
these skills. Furthedevelop their subte	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and we exhibited vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write according to the students of the students of the students according to the students of the stu	e courses develop a ritten interpretation) urately and with cou ZK Ige and skills acqui	and expand). Students infidence on 5 ired in RP1
these skills. Furth develop their subte 04RPZK The course conter - RP3. Stud	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and with echnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accidentation technical topics. Russian for Intermediate Students Examination In it is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledges are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions.	e courses develop a ritten interpretation) urately and with cor ZK Ige and skills acqui uctions by the teac	and expand). Students infidence on 5 ired in RP1 wher.
these skills. Furthedevelop their subtervalue of their subtervalue of the course contervalue of the course contervalue of the course of the co	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and witechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write according to the control of technical topics. Russian for Intermediate Students Examination Into it is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled lents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions are successful written examination.	e courses develop a ritten interpretation) urately and with con ZK age and skills acquiructions by the teac	and expand). Students infidence on 5 ired in RP1 cher. 1
these skills. Furthedevelop their subte 04RPZK The course conter - RP3. Stud 04RZ1 The course representations of the course representation of the course represen	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and with echnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accidental topics. Russian for Intermediate Students Examination In it is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledges are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions.	e courses develop a ritten interpretation) urately and with con ZK dge and skills acquiructions by the teac Z	and expand). Students infidence on 5 ired in RP1 ther. 1 in mastering
these skills. Furthedevelop their subte 04RPZK The course conter - RP3. Stud 04RZ1 The course representations of the course representation of the course represen	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and we exchical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write according to the students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instruction as given by the study plan. The course is completed by taking a written and oral examination testing the knowled lents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions are given instructions are given in the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian bet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking)	e courses develop a ritten interpretation) urately and with con ZK dge and skills acquiructions by the teac Z	and expand). Students infidence on 5 ired in RP1 ther. 1 in mastering
these skills. Furthedevelop their subteredevelop th	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and we chnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write according to the students are contact to the students of the stu	e courses develop a ritten interpretation) urately and with con urately and skills acquiructions by the teac Z. Thus it begins with be a Z.	sand expand and expand by Students infidence on 5 fired in RP1 ther. 1 h mastering able to read 1 ents will be
these skills. Furthedevelop their subteredevelop th	er study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and we chinical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write according to the communication and professional situations. They will be able to both speak write according to pict. Russian for Intermediate Students Examination In it is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled lents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructionally a successful written examination. Students are given instructionally and successful written examination. Students are given instructionally as a successful written examination and texts written in Russian bet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking) a short text with marked stress, understand its contents and summarize it. Russian for Beginners Z2 ster of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subteted using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also	e courses develop a ritten interpretation) urately and with con urately and skills acquiructions by the teac Z. Thus it begins with be a zechnical texts. Students voca develop their voca zechnical texts.	sand expand and expand by Students infidence on 5 fired in RP1 ther. 1 h mastering able to read 1 ents will be
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04SM2	Spanish for Intermediate Students M3 ops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for sp	Z	1 arder to be
The course devel	able to work with specialized texts on the Internet.	ecilic purposes in	order to be
04SM3	Spanish for Intermediate Students M3	Z	1
	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic	style. They will b	e competer
nough to use the	Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short		nmaries. The
0.400.4714	final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral example of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral example of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral example of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral example of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral example of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral example of the programme of t		1 4
04SMZK	Spanish for Intermediate Students Examination	ZK	4
The course conte	ent is the examination as given by the study plan. 04SMZK examination consists of two parts - written and oral; to be eligible for the wr obtained non-graded assessment for course 04SM3.Oral examination follows the written part.	itten part, studen	ts will have
04SP1	Spanish for Advanced Students P1	Z	1
	es on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication.		ites: level B
	of CEFR.		
04SP2	Spanish for Advanced Students P2	Z	1
Course SP2 is the	second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax	and focuses on	independen
04000	written communication.	7	
04SP3	Spanish for Advanced Students P3 ne final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focu	Z	T mmunicatio
0401 313 11	based on what students will need in their career.	sea on written co	minumeano
04SPZK	Spanish for Advanced Students Examination	ZK	5
	ent is the examination as given by the study plan. Examination 04SPZK consists of two parts, namely oral and written. The prerequisite	e for admission to	oral part is
h	aving passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of	the student.	
04SZ1	Spanish for Beginners Z1	Z	1
	he first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundam	-	
	to 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 based on course 04SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures a	Z nd levis will be ch	1
	understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries		
5 5.1.a.5.0 ti.15.11 to	Republic. Realia of Spanish-speaking countries are also included.	aa oo.o oao	20 1110 0200
04SZ3	Spanish for Beginners Z3	Z	1
The course is base	ed on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the	Spanish-speakir	ng countries
mainly of Spain.	It pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative)	. It includes writte	n and oral
	communication on a given general topic, for which the student is trained by reading texts or listening to them.		
04SZ4	Spanish for Beginners Z3	Ζ	1 1
The source is been	and an acurea C72. It develops the student's vessbulery and extends the knowledge of the culture and accial customs of the Chanish	-	n mainly of
	ed on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish ention to further grammar topics (perifrasis verbales, future imperfects, direct object and indirect object pronouns, negative form of the	speaking countrie	=
	ed on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish ention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening	speaking countrie imperative, and s	-
	ention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	speaking countrie imperative, and s	-
Spain. It pays atte	ention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening the student is trained by reading texts or listening to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening the student is trained by reading texts or listening to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening the student is trained by reading texts or listening to the student is trained by reading texts or listening to the student is trained by reading texts or listening texts.	speaking countries imperative, and song to them.	subjunctive).
Spain. It pays atte 04SZ5 The course books	ention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening Spanish for Beginners Z5 are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination.	speaking countries imperative, and song to them. Z r specific purposestion.	ubjunctive) 1 es. In its fina
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Spain. It pays atte 04SZ5 The course books 04SZZK	ention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening the subtechnical communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening the subtechnical subtechnical communication. Spanish for Beginners Z5 are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examination spanish for Beginners Examination ent is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination.	speaking countries imperative, and song to them. Z r specific purposetion. ZK	1 es. In its fina
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	Administration of UNIX System	KZ	2
	Basic and more advanced administration of Unix operating system		
12EPR1	Basic Electronics Practicum 1	KZ	3
The aim of the pr	acticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation	of the results. The	practicum
12EPR2	consists of blocks lasting 4 hours. Basic Electronics Practicum 2	KZ	3
	acticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation		-
a a. a p.	consists of blocks lasting 4 hours.		
12INS1	Information Systems 1	Z,ZK	2
	ogy, architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to sol	·	on systems
12INS2	Information Systems 2	Z,ZK	2
Graduation of Ir	formation systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud app	olication Google, M	licrosoft,
401.40	information managament, aproaches to solve task of information systems	7.71	
12LAS	Laser Systems nanosecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers. O	Z,ZK	3 operators
	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		rent and
	non-coherent pulse propagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optical		
12LT2	Laser Technique 2 Laser oscillator, the rate equation, the laser amplifier, Q-switching, mode-locking	Z,ZK	2
12MOF		ZK	2
	Molecular Physics deas on multi-atomic molecules and molecular matter, and on structure-to-physical properties relations. Methods of molecular structu		2
12MPR1	Microprocessors 1	ZK	4
	nd microcomputer, microprocessor types, memory types CPU, memory, Input output. Code and data, addressing modes(direct, indire	I	-
memory, procedure	calls, IO devices - program control, interrupt. Microprocessor Microchip PIC16F877A, Instruction codes- Assembler and Macroassem	bler, programming	languages.
	RISC processors - principles		
12MPR2	Microprocessors 2	ZK	2
	chitecture IA-32. Data types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assemble		
12NME1	Numerical Methods 1	Z,ZK	. 4
	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Met icists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computati		- 1
Important for priyo	used as a principle programming language as a demonstration tool. The seminars are held in computer laboratory.		VII (1 L) (L) 10
12NT	Nanotechnology	ZK	2
Lectures will introd	luce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Physica	l and chemical fund	daments of
	gies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technolog		
	paration. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for heter cussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer		
growths will be dis	as well as soldering and encasement.	preparation will be	mentioned
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.	'	
12PIN1	Practical Informatics for Technics 1	Z	2
	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfac		oftware
	ing systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, k	ernel services. Doc	umentation.
File system, file atr	butes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling proces	ernel services. Doc ses, process statu	umentation. s, computer
File system, file atr		ernel services. Doc ses, process statu ks: Internet. Addre	umentation. s, computer
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File system, file atr load a process p 12PIN2 Practically oriented	butes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling process priorities. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer network protocols TCP/IP. Network configuration of a computer. Network services: hardware sharing, mail, ftp, etc. Network application Practical Informatics for Technics 2 In 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?.	ernel services. Doc ses, process statu ks: Internet. Addres ns Z se. Constituent part	umentation. s, computer sses and 2 is realized
File system, file atr load a process p 12PIN2 Practically oriented 12PIN3	butes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling process priorities. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer networks protocols TCP/IP. Network configuration of a computer. Network services: hardware sharing, mail, ftp, etc. Network application Practical Informatics for Technics 2 If 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?. Practical Informatics for Technics 3	ernel services. Doc ses, process statu ks: Internet. Addres ns Z se. Constituent part	umentation. s, computer sses and 2 is realized
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12ULT	Introduction to Laser Technique	Z,ZK	3
	ctromagnetic radiation sources; laser principle; classification of lasers; characterization and rough application of various types of lase	rs; laser safety pre	
12UMF	Introduction to Modern Physics	Z	3
The course is intend	ded to be a concise introduction to modern / nonclassical physics for students who have already had basic classical physics course. A	part of the course	is delivered
40) (4) (in a computational laboratory.	1/7	
12VAK	Vacuum Physics and Technology	KZ	4
	basic concepts and relations; flow of rarefied gas. Interaction of gas with surface of solid surface; sorption, desorption; evaporation,	=	-
trirough soilu ma	tter; Vacuum generation. Pumping process. Pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping s searching for leaks. Materials and vacuum instalation parts. Practical exercises.	peed, gas now, col	iductivity,
12VFT	High Frequency and Impulse Circuitry	Z,ZK	2
I	right requerity and impulse Circuitry se is to collect advanced knowledge in high frequency technics and high speed events. The course is focused on Maxwell equation:	1	
The goals of cour	frequency technics, microwaves guidelines, striplines, oscillators, amplifiers and pulse generators.	Joidhorf, Gariff 3 di	ouco, mgm
12VTV	Scientific and Technical Computing	Z	2
	familiar with methods of solving of computational problems in the scientific and technical practice, and with methods of their program	_	
The students get	mainly to programming in the Fortran language.	ming. The course	io orioritoa
12ZAOP	Fundamentals of Optics	Z.ZK	2
	the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geome	1 '	
	stain, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with respec	•	- 1
	ics are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves in		
•	her from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next i	, ,	.
•	it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference	· · · · · · · · · · · · · · · · · · ·	
of two-wave interfere	ence and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a graphic	al form, including fu	ındamentals
of grating diffraction	n. Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics limit	t. It takes notice on	geometrical
арр	proach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optic	al instruments.	
12ZDP	Data Processing for Publishing	Z	2
Typography, compu	uter computer-assisted publishing, coding of text, OCR (optical code recognition), DTP (desk top publishing), programming language	s for typesetting (7	eX, LaTeX,
HTML, XML,, p	ublishing into www pages, cloud computing,commonly used graphical formats, formatting of typical data (PDF, PS, DOC, DOCX, PP	S, PPSX, RFT, XL	S, XLSX),
	multimedial presentations, multimedial formats.		
12ZEL1	Basic Electronics 1	Z,ZK	3
	des primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circu	-	
	e symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient eff	ects inside linear o	
12ZEL2	Basic Electronics 2	Z,ZK	3
	vs up with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic the		
12ZFP	Principles of Plasma Physics	Z,ZK	4
	th temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants, line	-	
· · · -	electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and parameters being the design of the standard parameters and such as follows:		e explained.
	comprises brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas at		
12ZPLT	Basic Laser Technique Laboratory	KZ	6
	Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmonic le pumped Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, aco	_	-
12ZPOP			
- 1	Basic Optical Laboratory	KZ	6
	ne practical laboratories give advanced practical skills by experimental work in optics and optoelectronics. Laboratory records must b		
14ELMI	Electron Microscopy	Z,ZK	3
	students are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The introduced the characterization of the course is given to the interaction of different ty		
0, 0	and election microscopy and to various types of microscopes. An important part of the occurse is given to the meraction of different ty Ilations and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and dyna	•	
	and diffraction and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques	=	
14NMA	Materials Science	KZ	3
1 11 (11/1/)	Introduction to the Materials Science	112	' '
14TEM	Engineering Mechanics	Z,ZK	6
	se represents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with stress and strain		_
	(elasticity, plasticity, fracture mechanics, etc.). Principles of statics, kinematics, and dynamics and their application.	,	
14TM	Engineering Mechanics	Z,ZK	4
	esents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with the stress and strain ana		
14ZZKS	Testing and Processing of Metals and Alloys	KZ	4
	ests, hardness, impact toughness, technological testing, fatigue testing, creep testing. Light microscopy, preparation of specimens for	1	
Casting, forming, we	elding, soldering, brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, titanium alloys, special alloys o	f non-ferrous meta	ls. Technical
-	drawing and CAD.		
15CH1	General Chemistry 1	Z	3
	t concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical u	use are illustrated b	
	solved in exercises.		
15CH2	General Chemistry 2	Z,ZK	3
	continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using	various examples,	the fact that
the validity of these	principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are	illustrated by exan	nples solved
	in exercises.		
15CHB	Chemistry	Z,ZK	4
	es of water treatment processes, the sources of radioactive contamination and the principles of the treatment of all types of wastes are		
•	ridual technological operations used to the purification of feeding waters and cooling circuit waters and of all liquid and gaseous radio		ountered in
NPP.	? The technological operations used to the treatment of wastes and the corrosion problems of the construction materials are discusse	eu in uetali, too.	

15CHEM			
	Analytical Calculations and Chemometry Principals	ZK	2
	n basic principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, basic		
_	ance testing, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, sem On stoichiometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. pH calculations, calculations in pr	· ·	-
Solving, illiali	spectrophotometry and separation methods, solving of complex forming equilibria.	oteritionieti y, cou	nomeny,
15DALCH	History of Alchemy and Chemistry	ZK	2
-	des the overview of crafts with chemical and/or metallurgical basis. Development of alchemy from ancient times in China, India, and H		I
-	course is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approach		
	advancement is illustrated.		
15INPR	Laboratory Practice in Instrumental Methods	KZ	4
	of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical and oth		e training is
	out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of N		
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, technologic		-
of core. Function a	nd construction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material science	e, chemistry, hea	t transfer and
dosimetry. Crea	tes knowledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison with	other sources of	energy, to
environment and to	strategic importancy of nuclear sources of energy. Gives basic knowledge of construction, operation and decommissioning of nuclear	power stations. I	nforms about
	high level nuclear waste and spent fuel and their management.		
16AMMB	Fundamentals of Analytical Measurement Methods	ZK	2
Basic principles,	echnical performance and utilization of methods of chemical analysis. Basic methodology of analytical determination, gravimetry, titra	tion methods, po	tentiometry,
polarography, ref	ractometry, polarimetry, UV-VIS spectroscopy, atomic emission and absorption spectroscopy, infrared and Raman spectroscopy, X-ray	structural analy	sis, nuclear
	magnetic and electron spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography.		
16APLB	Application of Ionizing Radiation in Analytical Methods	ZK	5
Subject The applic	ation of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation	n in the analysis a	and diagnosis
	of technological processes.		
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2
Aims and methods	, of historic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further radiati	on methods, dend	rochronology,
archaeomagneti	sm), analytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence ar	nalysis and other	methods),
	photogrammetry.		
16FNZB	Problems of Non-ionizing Radiation	ZK	2
Subject is focused	on biological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and metho	ds used in fields	of 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	miliar with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemical	examinations and	l anaesthesia
16MCRB	Transport of Ionizing Radiation and Monte Carlo Method	Z.ZK	4
	1		1 4
Introduction to prir	ciples of Monte Carlo method and its use for radiation transport simulation, selected concepts of probability theory and mathematical	,	-
=	ciples of Monte Carlo method and its use for radiation transport simulation, selected concepts of probability theory and mathematical rent types of radiation and their use for stochastic modeling of their substance transport. Model description concepts, geometric mode	statistics. Physic	cal models of
interaction of diffe		statistics. Physic I layout, source t	cal models of erm, scoring
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16ZIVB	Introduction to Ecology	KZ	2
The subject inform	about basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the enviro	nment and evaluat	te economic
16ZJTB	indicators and sustainable development. Nuclear Energy Facilities and Accelerators	ZK	2
	nuclear reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most im		
	elerators, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons,		
	accelerators, targets.		_
16ZPSP	Basic Work with PC	Z	2
	rse is to acquaint students with the basic skills related to working on a personal computer. The introductory part of the course is devot at the CTU in Prague and the FNSPE. Emphasis is placed on effective handling of work with office productivity software (text editor,		
	ercises in MS Office. The practical content focuses mainly on further use during studies (laboratory reports, research work, bachelor's		
specific practice (ho	ospitals, state administration, companies). Other sections summarize basic information about computer hardware, software, and secur	ity. Completion of i	ndependent
167040	home exercises and participation in exercises above 60% is a necessary condition for passing the course.	Z	2
16ZRAO The aim of the cour	Basics of Radiation Protection se is to familiarize students with the general principles of radiation protection. The main emphasis is put on basic mechanisms and cor		
	ield. The course provides answers to the cardinal questions: What is ionizing radiation (IR), where it comes from, whether and how it		
	g of protective units (Gray, Sievert), how to prevent malicious effect of IR and many others. The content of the lectures does not requ	ire any prior knowl	ledge.
17AEZ	Alternative Energy Resources	Z	3
	rs students to get an overview of the problematic and basic information about sources and techniques of energy production. The main		
	gy transformations, energy technologies and systems. The students will be able to qualify the power sources features: usual thermal ycles, geothermal, water and wind power, biomass, thermal pumps, solar power, fuel rods and sea power. In this course, there are also ir	•	
,,	realized during one week intensive course, which will be focused on the problematic mentioned above.		
17ALE	Nuclear Legislation	Z	2
	sed on valid legislation of the Czech Republic for peaceful utilisation of nuclear energy and ionising radiation, i.e. above all on the Ato	-	- 1
regulations. Attei	ntion is paid to Atomic Act structure, basic terms and legislation requirements for various control domain such as nuclear safety, radia preparedness, etc.	ation protection, en	nergency
17BES	Control Systems of Nuclear Reactors	Z,ZK	2
-	ect is concentrated on categorization of systems in nuclear power plant according to importance to nuclear safety; next on requirement	· .	
	cal instrumentation of research nuclear facilities and nuclear power plants. Attention is given to definition of nuclear safety, single failu		- 1
common cause fa	ailures, independence and diversity; furthermore to qualification of safety systems. At the end, lectures deal with control and safety synuclear facilities. The lectures are completed with visit of the training reactor VR 1 with demonstration of its safety and control sy	=	research
17BPJR1	Bachelor Thesis 1	Z	5
	problematic of officially given theme of bachelor thesis and its defense during state examination that is necessary for completion of the		
-	is an advisor that defines literature, checks the progress and ability of work defense, and operatively solves problems of the work. Stu	-	
	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. T	The work is
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	oponent. Contact hours relate to cooperation with the supervisor and are solved according to work needs. The subject is therefore not in		ty timetable.
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network features, their managing and structures, description of power networks in Europe and in the Czech Republic. The final part of this course is pointed to energetics of the Czech Republic and the State energy policy. 17JARE 7K 2 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 17NRE **Experiment Design and Control** Lecture deals with design and operation of systems for control of experiments, acquisition and evaluation of experimental data. It provides information about interfaces of personal computers for control of experimental systems (COM, USB, Firewire, LAN, GPIB), further about measuring systems with VME, VXI and LXI interfaces, discuss their advantages and disadvantages. Next, lectures deal with programming of measuring systems - special dedicated software, problems of use of high programming languages and especially use of graphical oriented development tools (Agilent VEE and LabView); data acquisition and evaluation. Finally, students prepare individual software project for data acquisition and evaluation. 170PKB Operator Course for Bachelors The lectures are focused on reasearch end experimental nuclear reactors, their typical experimental equipments, fuel for research reactors, control and instrumentation systems of nuclear reactors and operation of research reactors. The main part of lectures deals VR-1 reactor and its operation and nuclear safety of research reactors. The lectures are supplemented with practices at VR-1 reactor including practical acquaint oneself with VR-1 reactor, operation of VR-1 reactor technological systems, start-up and operation of VR-1 reactor and training of VR-1 reactor control and operation. 17PRAXB Intership Bachelors Inteship is intended for acquiring of deeper knowledge about systems and operation of nuclear power plant. At present, it takes part at nuclear power plant Dukovany or Temelín, where students in form of extended excursion make the acquaintance of all important parts of nuclear power plant and gain basic ideas about activities of reactor physicist and operator. Part of the intership is also visit of power plant training center and full-scope simulator. 17PRO.I Introduction to the Design of Nuclear Facilities methodology of engineering, significance and organization of technical documentation at nuclear power plant, archive, preparatory and project documentation, project phases of nuclear power plants: basic design, detailed design, operational regulations, emergency plan, operational documents, operational records, quality assurance, introduction to engineering drawing, reading of drawings, engineering imaging, AUTOCAD. 17PSJR Operational States of Nuclear Reactors ΚZ The first part of the course is focused on reactor kinetics and dynamics, namely reactor kinetics, delayed neutrons, prompt neutron lifetime, reactors period, kinetic equations and its simplified solution, transfer function of zero reactor, reactivity coefficients, temperature coefficients, reactor stability. The second part of the course is focused on reactor inner nuclear fuel cycle of the nuclear power plants, particularly PWR used and / or planned in the Czech Republic, namely fuel changes during the cycle, burn-up, changes of keff during the cycle, xenon poisonings and xenon oscillations, samarium, fuel handling, fuel management, reactor operation, burn-up, fuel loading, fuel reloading, loading pattern, legislative requirements for the core, core loading and fuel handling, fuel cycle of Dukovany & amp; Temelín NPP and MOX. Note: Front-end & amp; back-end of the nuclear fuel cycle of the nuclear power plants is the part of 17JPC - Nuclear fuel cycle course. Radioactive Waste Management The subject is focused on getting the knowledge on the system of radioactive waste and spent fuel management system, from the waste formation to their disposal to repository. Waste management subjects to licensing by Atomic law, what is a determining factor to the possibility of using different ways of waste management, i. e. collecting, sorting, treatment, processing, storage and disposal. Waste management in the Czech Republic and/or abroad is assured by more different technologies. To familiarize with these technologies is also a part of the subject. 17REPR Reactor Experiments K7 5 The course is focused on experimental neutron and reactor physics. The first part of the course is focused on experimental neutron physics, namely characterisation of neutron properties, characteristics of neutron (reactor and non reactor) sources, properties of prompt and delayed neutrons, neutron detection methods, and neutron induced nuclear reactions. The second part of the course is focused on experimental reactor physics, namely experimental methods focused on reactivity measurement, determination of control rod characteristics in the nuclear reactor, dynamics study of nuclear reactor and critical experiment. Theoretical lectures are followed by experiments at Training reactor VR-1 and at Neutron laboratory, both operated by Department of nuclear reactors. **Equipment Complex of Nuclear Power Plants 1** 17TCJ1 Lectures are composed as encyclopedic overview of power current electrotechnical facilities using LV, HV and VHV and are focused on their utilization in nuclear power plants including power extraction to electrical network. Theoretical background is supported by examples from work experience along with parameters of currently used facilities used in power engineering with focus on NPPs. First, the general relations of the electric circuits theory and electromagnetic and electric field theories are recapitulated. Then the overview of electrotechnic materials (electric current conductors, semiconductors, magnetic flux conductors, insulators, dielectrics), their properties, applications. After general introduction, there follow lectures on particular types of electrical machines and devices, their characteristics, equivalent diagrams, phasor diagrams, applications in NPPs. Finally, electric facilities of NPPs are presented including most applied power extraction schemes and schemes for assuring unit auxiliaries and for common plant operations. Examples of electric schemes of Czech NPPs are given including electric devices parameters. Lectures are supported by technical visits of university labs (university power plant, high-voltage lab, electric machines lab). In the university power plant, the measurement on power unit model is carried out. This includes examples and evaluations of transients of artificially generated failure states. 17TCJ2 Equipment Complex of Nuclear Power Plants 2 The course familiarizes students with basic machine devices of nuclear power plants, which are important for their operation, as are: pressurizer system, pumps and blowers, steam and gas turbines, heat exchangers (condensers, steam generators, reheaters, feed water heaters, etc.) and pipes and valves. Informations about devices are given primarily in descriptive level. It means that students are familiarized with different designs, used materials, manufacturing and operational experiences and parameters of real devices from power plants. Students also receive basic outline of fundamental theory about calculations of devices. 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. 17THNJ2 Thermohydraulics Design of Nuclear Devices 2 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 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 whe basics of selected engineering disciplines, such as the basics of materials science, manufacturing technology, quality control and assurance and ec		
focus on some issues of R&D activities organization and on selected parts of technical drawings and the work with AutoCAE		Course will
17UPC Introduction in Nuclear Fuel Cycle	KZ	2
he course is focused on front-end & amp; back-end of the nuclear fuel cycle of the nuclear power plants, particularly PWR used and / or planned in the	Czech Republic. Tr	he first part
the course consists of introduction to front-end of the nuclear fuel cycle. After the first division and definitions of various types of fuel cycles, the lectures	-	
nd thorium sources, their mining, mechanical and chemical processing to the shape of yellow cake. The next step there are very briefly described types enrichment and fabrication of nuclear fuel. The second part of the course consists of introduction to back-end of the nuclear fuel cycle, namely spent nu	•	
inventory, wet and dry spent fuel storage, interim spent fuel storage and final disposal of spent nuclear fuel. At the end of the course basic information		
mentioned. Note: Inner nuclear fuel cycle is the part of 17PRF - Core physics and fuel management course.		,,,,,,
17URO Introduction to Radiation Protection of Nuclear Facilities	KZ	2
he course is focused on introduction to the problems of radiation protection at nuclear facilities; the legislative context; the utilization of radiation source		monitored
areas; practical activities to monitor and measure radiation situation, the protection of public and workers against ionizing radia		
17VYR Research Reactors course is devoted to research reactors and their applications for the need of research and industry. Students get familiar with research reactor types and	ZK their experimental r	2 programme
along with experimental equipment needed for particular applications and their specifics. The course is supported by technical visit to research		
17ZAF1 Introduction to Nuclear Reactor Physics 1	KZ	4
he lectures start with a description of the microworld structure at the level of electrons, protons and neutrons. A description of radioactivity and nuclear re-		
reat focus is given to neutron interactions with matter. The probability of nuclear reactions is described by introducing of cross-sections in dependence		
f heavy atoms is the important process for the operation of nuclear reactors. The students will get familiar with issue of nuclear chain reaction, energy r nd issue of neutron balance. Then the most important reactor types are described including the complete scheme of nuclear power plant with the light		
ffusion environments is based on the application of the diffusion equation obtained from Fick's law. Students will be able to determine the neutron flux of		,
environments with the point source, planar source, and linear source.		
17ZAF2 Introduction to Nuclear Reactor Physics 2	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		-
eactor with reflector is main part of lectures. Three basic geometry are considered in derivation - slab, sphere, cylinder. Students learn to determine spa r each part (reactor core and reflector) and individual energetic groups, based on critical equation they learn how to calculate critical amount of fissile r		
ossible use of diffusion theory is discussed also for fast reactor and differences between thermal and fast reactors are stressed. Part is addicted to reactors		
control rods. There are also summarized differences between homogeneous and heterogeneous reactors.		
17ZEH Basics of Economic Assessment	ZK	2
The course focuses on the economic evaluation of Nuclear power plants. Introductory lectures are concerned with an introduction to economy and the icroeconomics. Lectures 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		iii electricai
17ZEL Basics of Electronics	KZ	3
ectures provide basic information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and sol		
em. Next, lectures deal with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor componer	=	
and triacs). Lectures continue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/dig completed with electronic laboratory exercises.	ital converters. Lec	tures are
17ZJBE Basics of Nuclear Safety	ZK	4
troduction: History and evolution of nuclear power plant safety. Classification of events, incidents, accidents, accident of US NPP TMI-2, accident of Che	ernobyl NPP. Basics	s of nuclear
safety - legislative approach: safety principles of NPP, legislative frame of nuclear power plant safety, international requirements on NPP safety, defen		
lassification of NPP states and criteria of acceptance, safety analysis. Severe accidents of NPP with pressurized water reactors - engineering and phys ccident (LOCA), anticipated transient without scram (ATWS). Safety systems of modern NPP with pressurized water reactors: VVER, EPR, AP-1000. The		
first is secured by prof. B. He manský; the second one is secured by a group of external instructors from NRI and SONS coordinated by Z. K íž (NRI). I		•
experts in various fields of nuclear safety who works at least 30 years in the field, some of them have experience from international organiza	tions- IAEA, NEA.	
18EKO1 Mathematical Economics 1	Z,ZK	5
he course introduces selected models and methods for economic decision making. The main attention is given to optimization models of linear program	ming, possibilities	of their real
applications and their solving by means of the current software products. 18EKO2 Mathematical Economics 2	Z,ZK	5
The course introduces selected models and methods for economic decision making. The main attention is given to optimization models in graphs, projection of the course introduces selected models and methods for economic decision making.		
management with deterministic and stochastic demand, queuing theory and simulation models.		·
18ESPG1 European Computer Driving Licence 1	Z	2
preadsheet calculators are an important tool, especially for students and graduates in Software engineering in economics. The winter semester introduc		
office tools. The accent is put on advanced functions of MS Excel (names, functions and expressions, pivot table and graph). Next, the VBA language wand user functions will be addressed.	ill be introduced ar	nd macros
18ESPG2 European Computer Driving Licence 2	Z	2
preadsheet calculators are an important tool, especially for students and graduates in Software engineering in economics. Summer semester follows the v	1	
VBA programming topics (charts, objects, graphical user interface, add-ins programming) and introduces some applications in economics, mathematic	s, operational rese	arch, and
computer science.		
18INTA Development of internet applications he lectures provide an overview of modern technologies for the development of web applications. Students will learn basic web languages and concept	KZ	4
ill also be introduced to relational database systems. The tutorials are dedicated to practical examples of building web applications, from the simplest to		
is oriented primarily towards backend technologies and using the Python languages, but covers also frontend frameworks and Jav	o more advanced.	
is oriented primarily towards backend technologies and using the Python languages, but covers also frontend frameworks and Jav 18MAK1 Macroeconomics 1	o more advanced.	4
18MAK1 Macroeconomics 1 Macroeconomics I provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconom	o more advanced. TraScript. Z,ZK ic indicators, mone	y market,
18MAK1 Macroeconomics 1 Macroeconomics I provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconom acroeconomic equilibrium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic macroeconomic equilibrium theory.	o more advanced. TaScript. Z,ZK ic indicators, mone croeconomic model	y market, s of IS-LM,
18MAK1 Macroeconomics 1 Macroeconomics I provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconom	o more advanced. TaScript. Z,ZK ic indicators, mone croeconomic model	y market, s of IS-LM,
Macroeconomics 1 Macroeconomics 1 provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconomic acroeconomic equilibrium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic mac S-AD and their implications for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic phenometers.	o more advanced. TaScript. Z,ZK ic indicators, mone croeconomic model	y market, s of IS-LM,
18MAK1 Macroeconomics 1 Macroeconomics I provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconom acroeconomic equilibrium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic mac S-AD and their implications for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic phenom and subsequently to use them under the conditions of modern economic life. 18MAK2 Macroeconomics 2 Macroeconomics II extends theoretical knowledge acquired from Macroeconomics I of its students with the latest knowledge of contemporary macroeconomics.	o more advanced. Trascript. Z,ZK ic indicators, mone croeconomic model lena and their intercetal tracks. Z,ZK onomics. They are	y market, ls of IS-LM, connections 4 models of
18MAK1 Macroeconomics 1 Macroeconomics I provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconomy acroeconomic equilibrium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic mac S-AD and their implications for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic phenomand subsequently to use them under the conditions of modern economic life. 18MAK2 Macroeconomics 2	o more advanced. Trascript. Z,ZK ic indicators, mone croeconomic model lena and their intercetal tracks. Z,ZK onomics. They are	y market, ls of IS-LM, connections 4 models of

ioueling, i.e., mad	roeconomic models derived from microeconomic behavior of subjects and economics and their rational expectations. It also provides students of labor market modeling.	Jenus With moder	n knowledg
18MIK1	Microeconomics 1	Z,ZK	5
licroeconomics is	a set of theories, which help us to understand processes by which the scarce resources are allocated among alternative uses. Microe	conomics explair	ns the role o
prices and mark	ets in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduct	ion in Microecon	omics and
	Consumer Theory.		
18MIK2	Microeconomics 2	Z,ZK	5
licroeconomics is	a set of theories, helping us to understand process by which scarce resources are allocated among alternative uses. Microeconomics	explain the role	of prices an
markets	in this process and make clear economic agents behaviour. The lectures of Microeconomics II are oriented on Theory of Firm and Indu	strial Organisati	on.
18MPT	Programming in MATLAB	KZ	5
Γhe subject acqu	aints students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in programming	ning methodolog	y in Matlab
	compared to classical languages.		
18MTL	Programming in MATLAB	Z,ZK	5
troducing Matlal	o environment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic analys	s, statistics, algo	rithmizatio
	and geometric representation of results.		
18PAS	Pascal Programming	Z	4
This lecture is	ntended mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in program	ıming and with th	ne Pascal
	programming language.		
18PJ	Programming in Java	Z,ZK	5
	This course is devoted to the Java platform and to the development of the basic types of applications for this platform.		•
18PRC1	Programming in C++ 1	Z	4
	This course covers mainly the C programming language and non-object oriented features of the C++ language.		'
18PRC2	Programming in C++ 2	KZ	4
This	ourse covers the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard	emplate Library.	
18UOA	Introduction into Object Oriented Architecture	Z,ZK	4
18ZALG	Basics of Algorithmization	Z,ZK	4
	s devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the	,	nplexity.
18ZPRO	Basics of Programming	Z	4
	ntended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	ming and with th	e Python
	programming language.		-
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1
	· · · / - · · · · · · · · · · · · · · ·	_	
TV-3	Physical education	Z	1

For updated information see http://bilakniha.cvut.cz/en/FF.html Generated: day 2024-05-19, time 09:17.