Study plan

Name of study plan: BS Jaderná chemie

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: 163
Elective courses credits: 17
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: 163

The role of the block: PO

Code of the group: BSJCHPP1

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

Requirement credits in the group: In this group you have to gain at least 60 credits

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

Credits in the group: 60 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
15ANAL1	Analytical Chemistry 1 Vlastimil Vysko il, Anna Kubí ková Vlastimil Vysko il Vlastimil Vysko il (Gar.)	Z	5	3+2	L	РО
15ANCH1	Michaela Fridrichová, Václav Tyrpekl, Jan Kotek Václav Tyrpekl Jan Kotek (Gar.)	Z,ZK	5	3+2	Z	РО
15ANCH2	Inorganic Chemistry 2 Michaela Fridrichová, Václav Tyrpekl, Jan Kotek, Petr Št pni ka Václav Tyrpekl Jan Kotek (Gar.)	Z,ZK	5	3+2	L	PO
15ANP	Practical Training in Inorganic Chemistry Václav Tyrpekl, Vojt ch Kubí ek Václav Tyrpekl Václav Tyrpekl (Gar.)	Z	4	9 dní	L	РО
02DEF1	History of Physics 1 Igor Jex, Miroslav Myška Miroslav Myška Igor Jex (Gar.)	Z	2	2+0	Z	РО
02ELMA	Electricity and Magnetism Iskender Yalcinkaya, Goce Chadzitaskos, Josef Schmidt, Jan Vysoký Jan Vysoký Goce Chadzitaskos (Gar.)	Z,ZK	6	4+2	L	PO
15LABT	Practical Training in Laboratory Technique Michaela Fridrichová, Michaela Fridrichová Michaela Fridrichová (Gar.) Michaela Fridrichová (Gar.)	Z	3	0+4	Z	PO
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	PO
02MECH	Mechanics Iskender Yalcinkaya, David Be Michal Jex David Be (Gar.)	Z	4	4+2	Z	PO
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, David Be, Filip Petrásek, Stanislav Skoupý, Antonín Hoskovec, Petr Novotný Antonín Hoskovec David Be (Gar.)	ZK	2	-	Z	РО
15OCH	General Chemistry Petr Distler, Ond ej Holas Petr Distler Petr Distler (Gar.)	Z,ZK	6	5+2	Z	РО
15ORC1	Organic Chemistry 1 Ján Kozempel, Stanislav Smr ek, Martin VIk, Michal Sakmár Stanislav Smr ek Ján Kozempel (Gar.)	Z,ZK	4	2+2	L	РО

	Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)					
haracteristics o	f the courses of this group of Study Plan: Code=BSJCHPP1 Name=	BSJCH - po	vinné p e	edm tv 1.	ro ník	
5ANAL1	Analytical Chemistry 1		р	7 till 19 11	7	5
	of analytical chemistry, scheme of analytical procedures. Sampling and preparation of Hampl	e Precipitation r	eactions so	lubility produ	ct factores	
	Statistical evaluation of results. Precipitation titrations, titration curve, endpoint indication. Com	•				•
	Chelatometric titrations, titration curve, endpoint indication. Qualitative analysis of cations and	-		-		_
	ntification of ions. Acid-base reactions, acids, basis, acidity function, salts, hydrolysis of salts,				-	
-	and weak acids, bases and salts. Acid-base reactions in nonaqueous solvents.					,
5ANCH1	<u> </u>			Z	,ZK	5
5ANCH2	Inorganic Chemistry 2				,ZK	5
	is devoted to systematical chemistry of elements. The properties of representative elements,	transition eleme	ents and che			_
•	d chapters in the second part of course deal with catalysis, organometallic compounds and che			-		-
s discussed at the end	• • • • • • • • • • • • • • • • • • • •	,				
5ANP	Practical Training in Inorganic Chemistry				7	4
	dealing with synthesis and characterization of inorganic compounds. Students get practical tr	aining in synthe	ses of inorga	l anic compou	-	•
-	ictions, complex formation reactions and reactions in melt.				,	
2DEF1	History of Physics 1				Z	2
	n the system of sciences. The relationship of man and nature. Natural sciences in ancient Ori	entand Greece	Greek natur	ı	_	_
-	imed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano B			-		-
•	e. Newton and his work.	rano. Coponiloa	o, nopioi, o	amoo, ridygo	710. THO DITE	r or priyotoo
2ELMA	Electricity and Magnetism			7	,ZK	6
	Electricity and Magnetism mb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectric	s Electric currer	at and circuit			-
•	forces,magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. El				•	uie relativity
		ectionagnetic w	aves, max we	- I equations		
	Dractical Training in Laboratory Tachnique				7	2
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this course covers base of the students gained including handling the bules as well as about the course is devoted in the course is devoted in the course is devoted in the course, which is the course, which is the course, which is the course is devoted in the course, which is the course is devoted in the course, which is the course, which is the course in the basic in the course in the basic in the course is devoted in the course, which is the course, which is the course in the basic in the course in the basic in the course in the basic in the course in th	is laboratory training and is designed for students of "Chemistry in Science", "Teaching of Chat secondary school to an equal level and gets them ready for all following laboratory training most frequently used laboratory equipments (pH-meter, UV-Vis spectrophotometer, vacuum rewriting laboratory diaries. The training is organized in blocks of four hours a week. The studer plete set of (all) 10 exercises during semester. In the exercises, measurements of properties analyses are involved. Mathematics, Examination 1 Mathematics, Examination 2 Mathematics 1 to the study of the basics of calculus of one variable. It includes an introduction to differential mathematics 2 the continuation of Mathematics 1, is devoted to the integration techniques, improper Riemann of sequences and infinite series, and finally to the Taylor and power series and their application mathematics and units. Particle kinematics, basic types of motion and their application recession innoninertial reference frames. Mechanics of system of free particles, two-body problem elasticity, hydrodynamics. Sound. Mechanics - Examination Mechanics - Examination General Chemistry selfication of substances, concentrations, chemical reactions and equations, stoichiometric coordynamics, first law of thermodynamics, thermochemistry, second law of thermodynamics, entinetic equation, Arrhenius' equation. Organic Chemistry 1 Impounds, properties of covalent bond, reactions on covalent bonds. Nomenclature of organic	gs. After absolvin otary evaporator ats work in group of unknown same and integral calculations. In Particle dynar, collisions. Medical decompounds (m. ds. Configuration wity of polycyclic compounds) (m. ds. Configuration with compounds) (m. ds. Confi	g of the cou) and have t is of two accomples, basic culus, with p action to para nics, one-dir nanics ofrigin s and molec gy, phase an ain chain, g and conforr arenes. Inte	articular emplements of dependent of the synthetic and articular emplements of dependent of the synthetic and articular emplements of dependent of the synthetic articular emplements of dependent of the synthetic articular emplements of the synthetic articular	the laborator the laborator the laborator lents have the year property of the laborator lents have the year property of the laborator lents have the year laboration and the laborator lents have th	ry experience the basic skill in about safe to so that each operations. 2 2 4 splications in 4 ry in polar 4 notion, motion, motion, motion, motion, motion, motion, motion, motion, sentals of the states of ctrochemistre. 4 d suffixes)

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Code of the group: BSJCHPP2

Preparatory Week

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

Preparatory Week

00PT

Requirement credits in the group: In this group you have to gain at least 51 credits

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

Credits in the group: 51 Note on the group:

00PT

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
15ANAL2	Analytical Chemistry 2 Vlastimil Vysko il	Z,ZK	6	3+2	Z	РО
15FCHN1	Physical Chemistry 1 Viliam Mú ka, Jan Bárta Jan Bárta Viliam Mú ka (Gar.)	Z,ZK	5	3+2	Z	РО
02PRAK	Experimental Laboratory Libor Škoda Libor Škoda (Gar.)	KZ	4	0+4	L	РО
15JACH1	Nuclear Chemistry 1 Xenie Popovi , Václav uba, Jan John Václav uba Jan John (Gar.)	Z,ZK	3	2+1	L	РО
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	РО
15MZD	Measurement and Data Handling Aleš Vetešník, Lucie Baborová, Dušan Vopálka Aleš Vetešník Aleš Vetešník (Gar.)	Z,ZK	3	2+1	Z	РО
15ORC2	Organic Chemistry 2 Martin VIk	Z,ZK	4	2+2	Z	РО
15ALPN	Laboratory Practice in Analytical Chemistry	Z	5	0+4	Z	PO
15POCH	Organic Chemistry Practical	Z	5	0+4	Z	РО
15POLE	Theory of Electromagnetic Field and Waves Aleš Vetešník Aleš Vetešník (Gar.)	Z,ZK	4	4+1	L	РО
15ZBCH	Fundamentals of Biochemistry Tomáš Je men Tomáš Je men Tomáš Je men (Gar.)	Z,ZK	4	4+1	L	РО

Characteristics of the co	ourses of this group of Study Plan: Code=BSJCHPP2 Name=BSJCH - povinné p edm	ty 2. ro ník	
15ANAL2 Analy	tical Chemistry 2	Z,ZK	6
Analytical chemistry II is the con	tinuation of lecture Analytical chemistry I. This course is oriented to the instrumental methods of analysis and proces	ssing of analytical r	esults.
15FCHN1 Physic	cal Chemistry 1	Z,ZK	5
he introductive part is devoted t	o the recapitulation of the thermodynamic systems and thermodynamic properties of ideal and real gases. Next chapte	ers are devoted to t	ne first, seco
and third law of thermodynamics	and their applications. Last but not least, attention is devoted also to the thermodynamic, phase and chemical equilib	riums as well as to	the elementa
f nonequilibrium thermodynami	CS.		
)2PRAK Exper	imental Laboratory	KZ	4
ecture is intended primarily for	students who study branch Nuclear Chemistry engineering, or practically oriented bachelor's specializations of branch	ch Nuclear engine	ring. But it o
e also visited by students intere	ested in the other specializations. During Experimental laboratory, students learn how to prepare for experiments (inc	cluding work with th	e literature)
ne implementation of the measu	rement (acquire of different experimental procedures and routines), will teach writing the records of measurement, pro	ocessing and evalu	ation of resu
t the same time practically exte	nd the knowledge gained in lectures on physics.		
5JACH1 Nucle	ar Chemistry 1	Z,ZK	3
oncept and history of nuclear o	hemistry and radiochemistry, nuclear entities, nuclear reactions, natural and artificial radioactivity. Kinetics of nuclear	r reactions, laws of	radioactive
ecay. Energetics of nuclear rea	ctions, mass and energy balance of nuclei and energy of alpha, beta decay, gamma deexcitation in nuclear reactions	S.	
1MAT3 Mathe	ematics 3	Z,ZK	4
he subject summarises the mo	st important notions and theorems related to the study of finite-dimensional vector spaces.	, ,	
1MAT4 Mathe	ematics 4	Z,ZK	4
inear and non-linear differential	equations of the first order. Linear differential equations of higher order with constant coefficients. Multivariable calculations	, ,	ations.
5MZD Meas	urement and Data Handling	Z.ZK	3
nultidimensional data; chemome	ibution functions (one-dimensional data), hypotesis testing, analysis of variance (ANOVA), correlation analysis, regreetrics; testing of analytical methods; numerical methods and computers in data processing	Z,ZK	4
1 - 3	nic Chemistry 2		•
• '	of organic compounds, carboxylic acids and their derivatives, heterocyclic compounds, important natural compound and natural. Introduction to the metods of structural analysis.	is, industriai organi	c compound
		7	5
-	atory Practice in Analytical Chemistry	-	•
•	is oriented to qualitative analysis of cations and anions using wet chemistry procedures. Quantitative determination e last part of exercises students become acquainted with basic instrumental methods of chemical analysis.	of analyte based t	pon various
		7	
1 3	nic Chemistry Practical	Z	5
	udents to become familiar with some basic organic chemistry laboratory techniques and methods of organic chemistry		
	with basic chemical operations, properties of selected organic compounds, and acquire basic skills to synthesize a ra ical knowledge of organic chemistry.	ange or organic co	ripourius. i
·	y of Electromagnetic Field and Waves	Z,ZK	4
	y of Electromagnetic Field and waves arts: the first part contains selected passages of the theory of the electromagnetic field, the second part is dedicated t	,	•
nd the third part is the introduc		to the wave motion	and the opt
· · · · · · · · · · · · · · · · · · ·		7 71/	4
	amentals of Biochemistry	Z,ZK	•
•	stry is covered by the lecture. Structures of metabolites are discussed together with basic metabolic processes in wh		
	rse in biochemistry is provided by Helena Ryšlavá, Helena Ryšlavá, Veronika Doubnerová, Helena Dra ínská, Petr Iling with basic biochemical methods.There are methods used for protein and nucleic acid isolation and their character		-
	iling with basic blochemical methods. There are methods used for protein and nucleic acid isolation and their character Inge chromatography and gel filtration are used for protein purification from a complex mixture. The students have to		•
	rige chromatography and genitiration are used for protein purification from a complex mixture. The students have to	determine the 1619	uve molecu

Code of the group: BSJCHPP3

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

mass of a protein by SDS polyacrylamide electrophoresis comparing the mobility of it with those of proteins with

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 14 courses Credits in the group: 52

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
15BPCH1	Bachelor Thesis 1 Petr Distler, Martin VIk, Jan Bárta, Xenie Popovi , Václav uba, Aleš Vetešník, Lucie Baborová, Kate ina ubová, Mojmír N mec, Václav uba Václav uba (Gar.)	Z	5	0+5	Z	РО
15BPCH2	Bachelor Thesis 2 Petr Distler, Martin VIk, Jan Bárta, Xenie Popovi , Václav uba, Aleš Vetešník, Lucie Baborová, Kate ina ubová, Mojmír N mec, Petr Distler Václav uba (Gar.)	Z	10	0+10	L	РО
15DIZ	Detection of Ionizing Radiation Jan John, Martin Da o Jan John Jan John (Gar.)	ZK	2	2+0	L	РО
16DRH	Dosimetry and Radiation Protection	Z,ZK	3	2+1	5	PO
15EXK1	Excursion 1 Barbora Drtinová, Alena Zavadilová Alena Zavadilová Barbora Drtinová (Gar.)	Z	1	5 dn	L	РО
15FCHN2	Physical Chemistry 2 Václav uba, Barbora Drtinová, Marta Burešová Barbora Drtinová Václav uba (Gar.)	Z,ZK	5	3+2	Z	РО
15INSN1	Instrumental Methods 1 Martin VIk, Alena Zavadilová Martin VIk (Martin VIk (Gar.)	ZK	3	3+0	L	РО
15JACH2	Nuclear Chemistry 2 Xenie Popovi , Václav uba, Jan John Václav uba Václav uba (Gar.)	Z,ZK	4	2+2	Z	РО
12NMEA	Numerical Methods for Scientists and Engineers Alena Zavadilová, Pavel Váchal Pavel Váchal Pavel Váchal (Gar.)	KZ	3	2+2	L	РО
15DEIZ	Practical Exercises in Detection of Ionizing Radiation Mojmír N mec, Pavel Bartl, Miroslava Semelová Miroslava Semelová Mojmír N mec (Gar.)	KZ	3	0+3	L	РО
15PFCH		Z	6	0+4	Z	PO
15PINS	Laboratory Practice in Instrumental Methods Martin Vlk, Alena Zavadilová Martin Vlk Alena Zavadilová (Gar.)	KZ	2	0+3	L	РО
15RATEC	Practical Exercises in Radiochemical Techniques Kate ina ubová, Mojmír N mec, Pavel Bartl, Miroslava Semelová Miroslava Semelová Mojmír N mec (Gar.)	KZ	2	0+2	Z	РО
15SBP	Bachelor Thesis Seminar Barbora Drtinová, Alena Zavadilová Alena Zavadilová (Gar.)	Z	1	0+1	Z	РО
15ZKJE	Nuclear Power Plants Design and Operation Tomáš Bílý, Lenka Frýbortová, ubomír Sklenka Lenka Frýbortová Tomáš Bílý (Gar.)	ZK	3	2+0	L	РО
Characteristics of	of the courses of this group of Study Plan: Code=BSJCHPP3 Name	=BSJCH - po	vinné p (edm ty 3	B. ro ník	
15BPCH1	Bachelor Thesis 1		-		Z	5
	and results of research				-	
15BPCH2	Bachelor Thesis 2			- 1	Z	10

Character istics of	the courses of this group of Study Plan: Code=BSJCHPP3 Name=BSJCH - povinne p edm	ty 3. 10 llik	
15BPCH1	Bachelor Thesis 1	Z	5
Background research a	nd results of research		
15BPCH2	Bachelor Thesis 2	Z	10
Background research a	nd results of research		
15DIZ	Detection of Ionizing Radiation	ZK	2
The first part of the cou	rse deals with the definitions, properties, and application of the detectors of ionising radiation (IR). In the second part, a detai	led overview of th	e gas detectors,
scintillation detectors, d	etectors for high energy IR, semiconductor detectors, and integrating solid state detectors is given. The last part of the course	e reviews the princ	ciples of the
statistical treatment of o	lata, and limits of detection.		
16DRH	Dosimetry and Radiation Protection	Z,ZK	3
Main part of the course	deals with the interactions of ionizing radiation with matter describing the source and the radiation field and its effect in matter	r. The next section	n discusses in
	ribing the interaction of ionizing radiation (IR) with the matter, the effects of ionizing radiation and microdosimetric variables. Th	•	
of the radiation protection	on system, biological effects of IR and secure management of IR resources in the workplace. Lectures are complemented by	an overview of cu	rrent legislation
1	diation protection (RP) and IR in practice. Lectures are supplemented with practical exercises that address the basic models a	•	
	of IR. Successful students will obtain a certificate required for being registered for an exam leading to receiving a qualification	of a Radiation sa	fety officer
following the Czech legi	slation.		
15EXK1	Excursion 1	Z	1
The excursion aims at r	nediating the students the acquaintance with various radiochemical and radiation methods used in practice.		
15FCHN2	Physical Chemistry 2	Z,ZK	5
Lecture of Physical Che	mistry 2 focuses on thermodynamics of solutions, particularly on electolytes. Basics of colloidal chemistry extend the theory of	solvents in the er	nd of the lecture.
15INSN1	Instrumental Methods 1	ZK	3
Overview of selected m	odern instrumental methods of research and analysis, theoretical fundamentals, instrumental technique, utilization and applic	cation.	
15JACH2	Nuclear Chemistry 2	Z,ZK	4
The following topics are	discussed in detail in the course: Nuclear reactions yield, reaction cross section, excitation function. Fission reaction, spontal	neous fission. Che	emistry of atoms
formed in a nuclear rea	ction, local temperature, atomic recoil and recoil energy, recoil of atom bound in a molecule, hot atom chemistry, retention, Sz	ilard Chalmers re	action.

12NMEA	Numerical Methods for Scientists and Engineers	KZ	3
There are explained	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technolog	y. Methods for solut	tion of tasks very
important for physic	sists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated comp	outational environm	ent MATLAB is
used as a demonst	ration tool. The seminars are held in computer laboratory and PASCAL is used as a principle programming language and MATL	AB is also used.	
15DEIZ	Practical Exercises in Detection of Ionizing Radiation	KZ	3
This laboratory exe	rcise is a practical introduction to fundamental principles of detection of ionizing radiation (IR), interaction of IR with matter, and fu	nctionality and sett	ings of particular
types of detectors a	and detection systems.		
15PFCH		Z	6
Principles of fundar	nental physico-chemical phenomena are demonstrated in ten exercises. Basic thermodynamic, kinetic and electrochemical chara	acteristics, as equili	brium constants,
rate constant, buffe	r capacity etc., are determinated. Required data are obtained by means of chemical analysis (e.g. titration, extraction) and by com	mon instrumental r	nethods (UV-VIS
spectrophotometry,	polarography, potentiometry, conductometry, electrolysis, viscosimetry). Emphasis is given on appropriate interpretation of mea	sured data and the	eir mathematical
and statistical evalu	ation.		
15PINS	Laboratory Practice in Instrumental Methods	KZ	2
Practical training of	students in the use of selected modern instrumental methods and techniques for determination of required parameters	,	'
15RATEC	Practical Exercises in Radiochemical Techniques	KZ	2
The exercise is orie	ented on the training of students in laboratory praxis and work with open radioactive sources through basic lab operations such	as pipetting, extrac	tion and
chromatography tec	chniques. Training is also focused on decontamination of surfaces and clean-up of the accident, work behind shielding and in a	glove box.	
15SBP	Bachelor Thesis Seminar	Z	1
The aim is to prepa	re students to write and defend bachelor thesis, including work with information sources and to acquire basic presentation skills	i.	I
15ZKJE	Nuclear Power Plants Design and Operation	ZK	3
Target of lecture is t	o create basic knowledge of physics of nuclear reactors utilizing fission. Further explains arrangement of nuclear fuel, purpose, tec	hnological and mate	erial construction
of core. Function ar	nd construction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material s	cience, chemistry, I	neat transfer and
dosimetry. Creates	knowledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison wi	th 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	ıclear power statior	ns. Informs about
high level nuclear w	vaste and spent fuel and their management.		

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 0

The role of the block: PV

Code of the group: BSSPOLVEDY

Name of the group: BS - Social Sciences

Requirement credits in the group:

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

Credits in the group: 0

Note on the group:

Only one of these courses is obligatory.

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

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

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

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:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04AMZK	English for Intermediate Students Examination Jana Ková ová, Slav na Brownová, Hana ápová 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 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 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. English for Advanced Students Examination 04APZK ZK 5 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 ZK 04CESMZK Czech for Intermediate Students Examination The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 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. Czech for Foreign Students - Advanced Examination ZK 5 The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. French for Intermediate Students Examination ZK 04FM7K The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The consists of a written and oral part and is organized according to Examination Instructions, a document available on the web. 04FPZK ZK 5 French for Intermediate Students Examination The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized according to Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. ZK French for Beginners Examination The content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is ruled by the document Instruction for examination. Its content covers the levels FZ1 - FZ5. 04NMZK German for Intermediate Students Examination 7K The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. More detailed information is to be obtained from the teacher. 04NPZK German for Advanced Students Examination ZK The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed information is to be obtained from the teacher. Russian for Intermediate Students Examination 04RMZK ZK. The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RM1 - RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher 04RPZK Russian for Intermediate Students Examination 5 The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RP1 - RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions by the teacher.

04RZZK	Russian for Beginners Examination	ZK	3
The course content is	the examination as given by the study plan. The course is completed by taking a written and oral examination testing the know	vledge and skills a	cquired in RZ1
- RZ5. Students are e	ligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructi	ons by the teacher	r.
04SMZK	Spanish for Intermediate Students Examination	ZK	4
The course content is	the examination as given by the study plan. 04SMZK examination consists of two parts - written and oral; to be eligible for the	written part, stude	ents will have
obtained non-graded	assessment for course 04SM3.Oral examination follows the written part.		
04SPZK	Spanish for Advanced Students Examination	ZK	5
The course content is	the examination as given by the study plan. Examination 04SPZK consists of two parts, namely oral and written. The prerequi	site for admission	to oral part is
having passed the wr	itten test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan of the student.		
04SZZK	Spanish for Beginners Examination	ZK	3
The course content is	the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral	examination only if	f he/she has
passed the written ex	amination test.		

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

The role of the block: V

Code of the group: 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:

Note on the g	•					
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
12AUX	Administration of UNIX System Milan Ši or Milan Ši or (Gar.)	KZ	2	2+0	L	V
01ALG	Algebra Pavel Š oví ek	ZK	4	4+0	Z	V
01ALGE	Algebra Zuzana Masáková Zuzana Masáková 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 (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	٧
04AP3	English for Advanced Students P3	Z	1	0+2	Z	٧
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 (Gar.)	ZK	2	2	Z	V
02AMS	Atomic and Molecular Spectroscopy Svatopluk Civiš Svatopluk Civiš Svatopluk Civiš (Gar.)	Z,ZK	4	2+2	Z	V
04CESM1	Czech for foreigners - Intermediate Jana Ková ová	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 Jana Ková ová	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 Jana Ková ová	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	٧
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
12EGS1	English Graduate Standard 1	KZ	4	0+4	L	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 Ratai	KZ	2	2+1	L	V
04FM1	French for Intermediate Students M1	Z	1	0+2	Z	V
04FM2	French for Intermediate Students M2 V ra Šlechtová	Z	1	0+2	L	V
04FM3	French for Intermediate Students M3 V ra Šlechtová (Gar.)	Z	1	0+2	Z	V
04FP1	French for Advanced Students P1 Michal Beneš	Z	1	0+2	Z	V
04FP2	French for Advanced Students P2 V ra Šlechtová	Z	1	0+2	L	V
04FP3	French for Advanded Students P3 V ra Šlechtová (Gar.)	Z	1	0+2	Z	V
04FZ1	French for Beginners Z1 V ra Šlechtová	Z	1	0+4	L	V
04FZ2	French for Beginners Z2 Michal Beneš	Z	1	0+4	Z	V
04FZ3	French for Beginners Z3 V ra Šlechtová	Z	1	0+4	L	V
04FZ4	French for Beginners Z4 V ra Šlechtová (Gar.)	Z	1	0+4	Z	V
04FZ5	French for Beginners Z5 V ra Šlechtová V ra Šlechtová (Gar.)	Z	1	0+4	L	V
01FKP	Functions of Complex Variable Severin Pošta, Pavel Š oví ek Pavel Š oví ek (Gar.)	ZK	2	2+0	Z	V
01FKPB	Functions of Complex Variable B Pavel Š oví ek	Z	2	2+0	Z	V
01FAN1	Functional Analysis 1 Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	4	2+2		V
01FA1	Functional Analysis 1 Pavel Š oví ek	Z,ZK	3	2+1	Z	V
01FA2	Functional Analysis 2 Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	4	2+2	L	V
02PRA1	Experimental Laboratory 1 Libor Škoda, Katarína K ížková Gajdošová, Barbara Antonina Trzeciak, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	Z	V
02PRA2	Experimental Laboratory 2 Libor Škoda, Jaroslav Biel ík Jaroslav Biel ík (Gar.)	KZ	6	0+4	L	V
02FYS1	Physical Seminar 1 Vojt ch Svoboda (Gar.)	Z	2	0+2	Z	V
02FYS2	Physical Seminar 2 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 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	Z,ZK	3	2P+1C	Z	V
02LCF1	Filip Petrásek Libor Śnobl (Gar.) Experimental Laboratory 1	Z	2	0+2	Z	V
02LCF2	Jaroslav Biel ik Jaroslav Biel ik (Gar.) Experimental Laboratory 2	Z	2	0+2	L	V
12LT1	Jaroslav Biel ík Jaroslav Biel ík (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					-
	Helena Jelínková Laser Systems	Z,ZK	2	2+0	L	V
12LAS	Václav Kube ek Václav Kube ek Václav Kube ek (Gar.)	Z,ZK	3	2+1	L	V
01LIP	Linear Programming Jan Volec estmír Burdík Jan Volec (Gar.)	Z,ZK	3	2+1	Z	V
18MAK1	Macroeconomics 1 Quang Van Tran Quang Van Tran (Gar.)	Z,ZK	4	2+2	L	V
18MAK2	Macroeconomics 2 Quang Van Tran Quang Van Tran (Gar.)	Z,ZK	4	2+2	Z	V
01MAPR	Markov processes Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	4	2+2		V
18EKO1	Mathematical Economics 1	Z,ZK	5	2+2	Z	V
18EKO2	Mathematical Economics 2	Z,ZK	5	2+2	L	V
01MASC	Mathematical Statistics - Seminar 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 i Mikyška Ji i Mikyška (Gar.)	KZ	2	2+0	L	V
01MMF	Methods of Mathematical Physics Pavel S 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	ZK	2	2+0	Z	V
02NSAD	Jan Proška, Eduard Hulicius Jan Proška Eduard Hulicius (Gar.) Simulations and Data Analysis Tools	Z	2	2+0	_	V
04NM1	Jan epila German for Intermediate Students M1	Z	1	0+2	Z	V
04NM2	German for Intermediate Students M2	Z	1	0+2	L	V
04NM3	Miloslava echová Miloslava echová (Gar.) German for Intermediate Students M2	Z	1	0+2	Z	V
04NP1	Miloslava echová Miloslava echová (Gar.) German for Advanced Students P1	Z	1	0+2	Z	V
04NP1	German for Advanced Students P2	Z	1	0+2	L	V
04NP3	Miloslava echová German for Advanced Students P3	Z	1	0+2	Z	V
UHINE O	Miloslava echová Miloslava echová (Gar.)		'	0+2		v

01NME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	V
15CH1	General Chemistry 1 Petr Distler, Ond ej Holas, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Petr Distler, Ond ej Holas, 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 Miroslav Minárik (Gar.)	Z	2	1+1	L	V
01POPR	Advanced Probability Tomáš Hobza	Z	2	2+0		V
12PEL1	Practical Electronics 1	Z,ZK	2	2+0	L	V
12PEL2	Practical Electronics 2	Z,ZK	2	2+0	Z	V
12PIN1	Practical Informatics for Technics 1 Richard Liska, 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 Václav K s	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 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
01PROP	Programmer's Practicum Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	0+2	Z	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 Zden k ulik (Gar.)	Z	2	2+0	Z	V
18PRC1	Programming in C++ 1 Miroslav Virius, Vladimír Jarý Miroslav Virius Miroslav Virius (Gar.)	Z	4	2+2	Z	V
18PRC2	Programming in C++ 2 Jakub Klinkovský, Miroslav Virius, Vladimír Jarý 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 Michal Beneš	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 Michal Beneš	Z	1	0+2	Z	V
04RP2	Russian for Advanced Students P2	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	Z	1	0+4	Z	V
04RZ5	Zhanna Isaeva (Gar.) Russian for Beginners Z5	Z	1	0+4	L	V
01RSWP	Zhanna Isaeva Žhanna Isaeva (Gar.) 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	Z	2	0+2	L	V
16SED1	Václav Klika Dosimetry Seminar 1	Z	2	0+2		V
16SED2	Kate ina Pila ová Kate ina Pila ová (Gar.) Dosimetry Seminar 2	Z	2	0+2		V
01SMB1	Kate ina Pila ová Seminar on Calculus B1	Z	2	0+2	Z	V
01SMB2	Milan Krbálek Seminar on Calculus B2	Z	2	0+2	L	V
01SOS1	Milan Krbálek Software Seminar 1	Z	2	0+2	Z	V
01SOS2	Zden k ulík Zden k ulík Zden k ulík (Gar.) Software Seminar 2	Z	2	0+2	L	V
	Zden k ulík Zden k ulík Zden k ulík (Gar.) Special Practicum 1			-		-
02SPRA1	Lukáš Novotný, Jan epila Jan epila Jan epila (Gar.) Special Practicum 2	KZ	6	0+4	Z .	V
02SPRA2	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 Igor Jex, Jaroslav Novotný Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	V
01TOP	Topology estmír Burdík 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 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	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 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 Ivo Kraus	Z	2	0+2	Z	V
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 Ivan Procházka Ivan Procházka Ivan Procházka (Gar.)	Z	2	1+1	L	V
12VFT	High Frequency and Impulse Circuitry Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	2	2+0	L	V
17VYR	Research Reactors	ZK	2	2	L	V
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 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 Miroslav Virius, Vladimír Jarý, Petr Pauš, František Vold ich, František Gašpar, Zuzana Pet í ková Vladimír Jarý Miroslav Virius (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	Z,ZK	4	2+2	L	V

	Alena Doubková, Šimon Vaculín, Josef Stingl Alena Doubková Alena Doubková (Gar.)					
16ZDOZ2	Fundamentals of Radiation Dosimetry 2 Tomáš Trojek Tomáš Trojek (Gar.)	ZK	2	2+0	L	V
16ZDOZ1	Fundamentals of Radiation Dosimetry 1 Tomáš Trojek Tomáš Trojek (Gar.)	Z,ZK	4	2+2		V
17ZEH	Basics of Economic Assessment	ZK	2	2+0	Z	V
17ZEL	Basics of Electronics Martin Kropík Martin Kropík (Gar.)	KZ	3	2+2	Z	V
12ZEL1	Basic Electronics 1 Jaroslav Pavel Jaroslav Pavel (Gar.)	Z,ZK	3	2+1	Z	V
2ZEL2	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 Ji í Limpouch, Martin Jirka 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, Jakub Klinkovský, Miroslav Virius, Vladimír Jarý, Petr Pauš, František Vold ich, Zuzana Pet í ková, Jan Tomsa Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	V
16ZRAO	Basics of Radiation Protection Aneta Dušková Aneta Dušková (Gar.)	Z	2	2+0		V
D2ZSM	Introduction to the Standard Model Zden k Hubá ek Zden k Hubá ek Zden k Hubá ek (Gar.)	ZK	2	2+0		V
16ZEDB	Basics of Experimantal Data Processing Kate ina Pila ová Kate ina Pila ová (Gar.)	ZK	2	2+0	Z	V
14ZZKS	Testing and Processing of Metals and Alloys	KZ	4	4	6	V
2ZDP	Data Processing for Publishing Antonín Novotný Antonín Novotný (Gar.)	Z	2	2	Z	V
12ZMD	Measurement and Data Processing Ivan Procházka	KZ	2	1+1	Z	V

02DEF1	History of Physics 1	Z	2
Physics and its pla	ce in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural r	ohilosophers, Arist	otle. Physics in
Helenistic period, A	urchimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galile	eo, Huygens. The I	oirth of physics
as experimental sc	ience. Newton and his work.		
15ZKJE	Nuclear Power Plants Design and Operation	ZK	3
Target of lecture is t	o create basic knowledge of physics of nuclear reactors utilizing fission. Further explains arrangement of nuclear fuel, purpose, tec	hnological and mat	erial construction
of core. Function ar	nd construction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material s	cience, chemistry,	heat transfer and
dosimetry. Creates	knowledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison wi	th other sources of	f energy, to
environment and to	strategic importancy of nuclear sources of energy. Gives basic knowledge of construction, operation and decommissioning of nu	uclear power statio	ns. Informs abou
high level nuclear v	vaste and spent fuel and their management.		
high level nuclear v	vaste and spent fuel and their management. Economy in Technology	Z	1
00EKOT		Z	1
00EKOT	Economy in Technology	Z	1 1
00EKOT The course introdu 00RET	Economy in Technology ces the basics of micro- and macroeconomics.	Z the composition of	1 1 f public speech
00EKOT The course introdu 00RET The course is focus	Economy in Technology ces the basics of micro- and macroeconomics. Rhetoric	•	
00EKOT The course introdu 00RET The course is focus	Economy in Technology ces the basics of micro- and macroeconomics. Rhetoric sed on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to	•	
00EKOT The course introdu 00RET The course is focus as well as to its not	Economy in Technology ces the basics of micro- and macroeconomics. Rhetoric sed on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to overbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are a	•	
00EKOT The course introdu 00RET The course is focus as well as to its nor 00UPRA	Economy in Technology ces the basics of micro- and macroeconomics. Rhetoric sed on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to exercise as strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the history of rhetoric are a strategies for coping with stage-fright and a short excursion into the strategies for coping with stage-fright and a short excursion in the strategies for coping with stage-fright and a short excursion in the strategies for coping with stage-fright and a short excursion in the	•	

01ALG			
5 17 LEO	Algebra	ZK	4
	the set theory standard algebraic structures are dealt with: groups, rings, fields, modules, linear algebras, lattices, Boolean a	llgebras, rings of p	olynomials over
commutative fields.		— — · · · ·	
01ALGE	Algebra	Z,ZK	6
=	s are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, the ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral do		-
	ent chapters are devoted to divisibility in integral domains and to finite fields.	omano, principal	dodi domano,
11ANEL	Linear Circuit Analysis	Z,ZK	4
	uction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especial		understanding
of the computer method	s of analysis. The second part gives a short list of most commonly used circuits in experimental equipment.		
15CHEM	Analytical Calculations and Chemometry Principals	ZK	2
	principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, ba		
ŭ	esting, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, sometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. pH calculations, calculations in pot	•	
-	separation methods, solving of complex forming equilibria.	terniomeny, codio	meu y,
04ABZK	English - State Examination	ZK	5
-	e examination as given by the study plan. Student is eligible for the State language examination (level C1 or B2 of CEFR) on	ı	-
respective courses and	examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the APIN programme covers also ex	camination subjec	ts. As required,
	comply with respective rules and regulations for state language examinations.		
04AM1	English for Intermediate Students M1	Z	1
-	for students who have successfully completed the full secondary school English language course at least at the A2 level of th	-	
•	iges (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals itten communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical i	•	, ,,
	e of grammar issues used in EAP.	mioroot. 7 ttoriaori	io aloo para to
04AM2	English for Intermediate Students M2	Z	1
The 04AM2 course expe	cts the student to have completed the 04AM1 course. It develops their skills for work with subtechnical texts, focusing also mo	re on specific gra	nmar, functions,
= :	of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guid	ded writing. If nece	essary, grammar
revision is included.			
04AM3	English for Intermediate Students M3	_ Z	1
•	eskills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtech sional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication		-
= :	also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentatio		
student's field.	, , , , , , , , , , , , , , , , ,		
04AP1	English for Advanced Students P1	Z	1
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 Europe	ean Framework
_	iges - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamen		-
	cal of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, and written communication on topics related to the undergraduate´s life and needs. It develops skills for free professional writing	•	
•	early, revision of selected grammar topics is included.	(writing a C v, lett	er or application,
04AP2	English for Advanced Students P2	7	1
-	sed on 04AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chose	en branches of sci	ence. According
	concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhe		
types of descriptions, ar	ed if nearlible a consected to be reasing amphasis is placed on the undergraduate's independent work with and reading of liv		0 ,
	nd, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of lin	nguistically more	demanding
materials. The course e	stends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused	nguistically more	demanding
materials. The course e sentence and paragrap	stends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused a structure, linking, cohesion and coherence in texts.	nguistically more of on formal writing	demanding
materials. The course easentence and paragraph 04AP3	stends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused a structure, linking, cohesion and coherence in texts. English for Advanced Students P3	nguistically more of on formal writing	demanding including the
materials. The course e sentence and paragraph 04AP3 The 04AP3 course is ba	stends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused a structure, linking, cohesion and coherence in texts.	nguistically more of on formal writing Z e text. It includes	demanding including the
materials. The course e sentence and paragraph 04AP3 The 04AP3 course is ba written communication s	stends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused a structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the	nguistically more of on formal writing Z e text. It includes ng, writing an abs	demanding including the 1 training oral and tract) and, if
materials. The course e sentence and paragraph 04AP3 The 04AP3 course is be written communication spossible, also preparing written communication.	stends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused a structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informations.	nguistically more of on formal writing Z e text. It includes ng, writing an abs	demanding including the 1 training oral and tract) and, if oth in oral and
materials. The course e sentence and paragraph 04AP3 The 04AP3 course is be written communication spossible, also preparing written communication. 16APLB	structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and infections of Ionizing Radiation in Analytical Methods	nguistically more of on formal writing Z e text. It includes ng, writing an abstormal language b	demanding including the 1 training oral and tract) and, if oth in oral and
materials. The course e sentence and paragraph 04AP3 The 04AP3 course is be written communication spossible, also preparing written communication. 16APLB Subject The application	structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and infections of Ionizing Radiation in Analytical Methods of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation.	nguistically more of on formal writing Z e text. It includes ng, writing an abstormal language b	demanding including the 1 training oral and stract) and, if oth in oral and
materials. The course esentence and paragraph 04AP3 The 04AP3 course is be written communication spossible, also preparing written communication. 16APLB Subject The application of technological process	strends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused a structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal informal informal and informal informal and informal informal and in	nguistically more of on formal writing Z e text. It includes ng, writing an absformal language by ZK ation in the analys	demanding including the 1 training oral and tract) and, if oth in oral and 5 is and diagnosis
materials. The course e sentence and paragraph 04AP3 The 04AP3 course is be written communication spossible, also preparing written communication. 16APLB Subject The application of technological process	structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal	e text. It includes ng, writing an absformal language batton in the analys	demanding including the 1 training oral and stract) and, if oth in oral and
materials. The course esentence and paragraph 04AP3 The 04AP3 course is be written communication spossible, also preparing written communication. 16APLB Subject The application of technological process 12APL Application of lasers in	structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and information of Ionizing Radiation in Analytical Methods of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation. Application of Lasers Industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and other branches	e text. It includes ng, writing an absformal language batton in the analys	demanding including the 1 training oral and stract) and, if oth in oral and 5 is and diagnosis
materials. The course esentence and paragraph 04AP3 The 04AP3 course is bawritten communication possible, also preparing written communication. 16APLB Subject The application of technological process 12APL Application of lasers in 11APLG	structure, linking, cohesion and coherence in texts. English for Advanced Students P3 sed on 04AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal	e text. It includes ng, writing an absformal language by ZK ation in the analys ZK	demanding including the 1 training oral and tract) and, if oth in oral and 5 is and diagnosis
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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 E evision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of	-	
	e of engineering and professional communication, both in spoken and written form. The topics include University Studies and		-
includes communication	n with teachers and faculty administrators.		
04CESP2	Czech for Foreigners - Advanced	Z	1
emphasis on individual	e student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical a	and specialist texts	s placing greater
04CESP3	Czech for Foreigners - Advanced	Z	1
	e student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation		esentation of the
	g skills necessary for professional communication are trained.		
15DALCH	History of Alchemy and Chemistry	ZK	2
•	e overview of crafts with chemical and/or metallurgical basis. Development of alchemy from ancient times in China, India, and is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approac		
advancement is illustrat			
02DEF2	History of Physics 2	Z	2
•	al mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	-	
-	m, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmar Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear e		-
	ncept of Nature and Universe of today.		, parasio
01DEM	History of Mathematics	Z	1
	n of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the field	d - give their talks	on varoius topics
from the history of math 02DRG		Z	4
	Differential Equations, Symmetries and Groups ure is to teach students computation of symmetries of the differential equations.		4
01DIM1	Discrete Mathematics 1	Z	2
The seminar is devoted	to elementary number theory and applications. It includes individual problem solving.	•	
01DIM2	Discrete Mathematics 2	Z	2
	to recurrence relations. It includes individual problem solving.	7	2
01DIM3 The subject is devoted to	Discrete Mathematics 3 to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the seminar	Z students present	2 a problem with
solution chosen from th		otadomo prodom	a problem with
11ELEA	Instrumentation and Measurement	Z,ZK	2
	uction to the instrumentation and measurement for physicists.		
14ELMI	Electron Microscopy	Z,ZK	3
	nts are introduced to the microscopic methods used for the characterization of materials, thin layers or nanoparticles. The int ctron microscopy and to various types of microscopes. An important part of the course is given to the interaction of different t		
	ons and tools used in microscopy and to the description of particular parts of the microscopes. Introduction to kinematic and d		
	ion and imaging techniques are also covered. A particular attention is given to analytical methods and imaging techniques in		
12EGS1	English Graduate Standard 1	KZ	4
18ESPG1	pe in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr 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	1	
•	is put on advanced functions of MS Excel (names, functions and expressions, pivot table and graph). Next, the VBA languag		
and user functions will b			
18ESPG2	European Computer Driving Licence 2 s are an important tool, especially for students and graduates in Software engineering in economics. Summer semester follows is	L Z	2 or with advanced
•	s are arrifiportant tool, especially for students and graduates in Soliware engineering in economics. Summer semester follows to cs (charts, objects, graphical user interface, add-ins programming) and introduces some applications in economics, mathema		
computer science.			
16EPAM	Exact Methods in Research of Historic Monuments	ZK	2
	storic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further rac		• • • • • • • • • • • • • • • • • • • •
photogrammetry.	nalytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence	analysis and othe	r methods),
02EXF1	Experimental Physics 1	Z	2
	ntroductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and me	l .	
02EXF2	Experimental Physics 2	ZK	2
•	ntroductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and me		
17ENF The lectures are mainly	Experimental Neutron Physics focused on detailed characteristics of neutron (reactor and non reactor) sources, pro	Nerties of prompt	2 and delayed
· · · · · · · · · · · · · · · · · · ·	ction methods, neutron induced nuclear reactions, modification and adjustment of neutron field, science and industry neutron		-
with experimental data p	processing and analysis. The lectures are supplemented with experimental practices in the field of neutron detection, determina	ition of delayed ne	utron properties,
	on in various materials, preparation and characterisation of photo-neutron source and neutron source calibration. Experimental	practices will be ru	ınning at training
reactor VR-1 and in the		7	1
04FM1 French - intermediate F	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	L Z oth written and ora	1 I form. Students
	cate in social interaction and in academic, scientific and professional environment. They will be able to use the language to tr		
	e problems. 04FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, s	=	
	study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, pe		-
04FM2	Iture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work French for Intermediate Students M2	Z	exts.
	French for intermediate Students M2 M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science		
	(passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French sci		
scientists, artists and ar	rchitects. Description of an object, device, shapes, dimensions, material.		

04FM3	French for Intermediate Students M3	Z	1
	n improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures		
	mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-c		
	specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w	· ·	n French articles
	ge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and French for Advanced Students P1		1
04FP1	French for Advanced Students P1 The objective of this three-semester course is to improve and further develop communication in the French language in both	Z	orm Students
	the objective of this three-semester course is to improve and further develop communication in the French language in both cate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit		
	04FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topi	-	
•	osé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of t	•	•
	wer to an advert, environmental issues, success of French science and technology, chosen topics from French regional cultu-		-
mathematics, internet,	physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.		
04FP2	French for Advanced Students P2	Z	1
With the link to P1 cont	ents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication o	on given topics. Fe	atures typical of
technical and scientific	communication are stressed (passive voice, nominalization, word formation).		
04FP3	French for Advanded Students P3	Z	1
	n systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in		
	ter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally co	vers a technical /a	applied science
•	ck compiled from 3 French sources. Preparation of several set topics for oral examination.	7	
04FZ1	French for Beginners Z1 e objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in	Z Z	nrofossional life
ŭ	e objective of this 3-level course is to be able to communicate in French draily and in writing in situations of everyday life , in ench for specific / technical communication and reading of popular science and scientific texts. 04FZ1 The objective is to be a	•	•
	knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravd		-
· · · · ·	te ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions		-
	nple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronuncia	-	-
04FZ2	French for Beginners Z2	Z	1
	with 04FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of	of the textbook: Pr	avda - Pravdová
: French for Beginners .	Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreer	ment - disagreeme	ent, apology,
thanking, travelling, map	of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral comm	nunication. Specific	c topics covered:
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		-
•	tuations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for in	nformation and lou	ud as part of
	Reading covers short adapted texts of general interest first, and later popular science texts.	_	
04FZ4	French for Beginners Z4 04FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The	Z Z	hly sovered with
The course builds up of	i 041 23. Dasic ilityuisiic kitowieuge ahu skiiis ale turthei uevelopeu. Otal confinutiication ahu reading skiiis ale placticeu. Th		
lessons 10 - 23 of the to		-	· · · -
	ktbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the le	cture notes French	n for Engineering
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02FYS2	Physical Seminar 2	Z	2
	to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic		
	rm. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physical	aboratory equipm	
01GTDR The seminar consists of	Geometric Theory of Ordinary Differential Equations the qualitative theory of ODEs dealing with the geometric and topological properties of the solution. In this context, we mentio	」 ∠ on suitably formula	2 ted basic results
	iqueness, continuous dependence on parameters and initial conditions. Main part is devoted to the autonomous systems.	II Sultably loringla	ica basic results
12INS1	Information Systems 1	Z,ZK	2
	architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to		rmation systems
12INS2	Information Systems 2	Z,ZK	2
Graduation of Information	on systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud appears to the databases of the databases.	plication Google,	Microsoft,
	nt, aproaches to solve task of information systems		
16ZJTB	Nuclear Energy Facilities and Accelerators	ZK	2
	ir reactor and nuclear power plant, chain fission reaction development, main components of nuclear energetic reactor, most i	•	
accelerators, targets.	rs, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons	s, electron and ion	i sources for
17JARE	Nuclear Reactors	ZK	2
	er issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety sy	1	_
•	ations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. F		
Western-type PWR (We	estinghouse, KWU, Framatom). VVER-type reactors, Temelin nuclear power plant. Boiling water reactors. Heavy water reactor	ors, fast breeder re	eactors,
	poled reactors. Second nuclear era. reactors of generation III (EPR, AP-1000, VVER 1200). Reactors of generation IV: GIF at		es. Evaluation
	ed systems. Six selected concepts. ICRP scenarios of word evolution, hydrogen power, role of nuclear power in long-term ou		
01JEPR	Simple Compilers ysis, code generation, simple optimizations, development environments, reflection.	Z	2
16KPR		ZK	2
	Clinical Propaedeutic r with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemi		_
04AKS	English Conversation	7	1
-	the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral commun	ication. The stude	nt will develop
	ous communication situations and will master their communication strategy. They will also practise their listening skills in order		
in discussions. The stud	lent will be trained to express their ideas clearly and according to current English usage, and become a more confident spea	ker.	
02KF	Quantum Physics	Z,ZK	3
· ·	function, postulates of quantum mechanics, Born s statistical interpretation, expectation values, Schrödinger equation, Heis	enberg uncertaint	y principle,
<u> </u>	momentum, solution of simple systems, hydrogen atom.		
02LCF1	Experimental Laboratory 1	Z	2
•	Elasticity.Thermal capacities. Electric measurements, Acoustic. Oscillations.	7	
02LCF2 Electric and magnetic fi	Experimental Laboratory 2 eld, microwaves, Xray and gamma rays, geometric optics	Z	2
12LT1	Laser Technique 1	Z,ZK	3
	ity. Transverse and Longitudinal Modes. Elements of Open Resonators. Threshold of laser oscillations. Gausian beam as an		-
=	ptical radiation propagation in resonant medium. Two-level approximation. Equations for polarisation and inversion, dispersio		
non-coherent pulse prop	pagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optical resonator.		
12LT2	Laser Technique 2	Z,ZK	2
	equation, the laser amplifier, Q-switching, mode-locking		
12LAS	Laser Systems	Z,ZK	3
	second lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers. conductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultr		-
	s. Infrared high power lasers. Submillimeter lasers. Lasers with high degree of coherence. Free electron lasers.	aviolet lasers. X-16	ay lasers. riigir
01LIP	Linear Programming	Z,ZK	3
-	ms about constrained extremum problems for multivariable functions (the function is linear and the constraint equations are g		-
inequalities).			
18MAK1	Macroeconomics 1	Z,ZK	4
· · · · · · · · · · · · · · · · · · ·	ides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroecono		-
•	rium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic		
	tions for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic pher e them under the conditions of modern economic life.	nomena and their i	Interconnections
18MAK2	Macroeconomics 2	Z,ZK	4
	inds theoretical knowledge acquired from Macroeconomics I of its students with the latest knowledge of contemporary macro		
	cially those with an emphasis on the role of human capital and technological progress. Furthermore, it introduces students to	-	
modeling, i.e., macroeco	onomic models derived from microeconomic behavior of subjects and economics and their rational expectations. It also provides	s students with mo	dern knowledge
of labor market modelin			
01MAPR	Markov processes	Z,ZK	4
18EKO1	Mathematical Economics 1	Z,ZK	5
	selected models and methods for economic decision making. The main attention is given to optimization models of linear prog	ramming, possibil	ities of their real
	Nothernatical Economics 2	7 71/	
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	ministic and stochastic demand, queuing theory and simulation models.	o, ook managemen	,
01MASC	Mathematical Statistics - Seminar	Z	2
	o practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation		
statistical models, finding	g unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihoo	od, derivation of cr	itical regions for
	the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density estimation.		
00MAM1	Essentials of High School Course 1	Z	1

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are decaded for the case of a continuous term dan acceptance as well as Summ-Lauvelle operators on bounded intervals, and applications of the separation of war-tables method to the tertaint of a control to the surface of the control to the contro			_
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Architecture In-32. Data types and addressing, Memory segmentation and paging. Real and privileged mode, instruction set, Assembler, description. ZK 2	RISC processors - principles		0 0
12MOF	12MPR2 Microprocessors 2	ZK	2
Basic ideas on multi-atomic moleculars and molecular matter, and on structure-to-physical properties relations. Methods of molecular structure determination. YK 2	Architecture IA-32. Data types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assembler. descrip	tion.	
12NT Nanotechnology ZK 2	l ,	1	2
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different technologies (MBE, MOVPE, EBL, sol-get and colloidad solution) will be explained. Substantive attention will be deviced to epitaxial technologies which are substantial for manestructure growths will be discussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer preparation will be mentioned as well as soldering and encasement. ORNSAD Simulations and Data Analysis Tools Data analysis and simulations of high energy elementary particle collisions. ROOT and Pythia programs. ORAMM German for Interrmediate Students M1 German for Interrmediate Students M1 The objective of the course is to level of the students' sidils in the German language. The course focuses on revision of more difficult phenomena and structures (e.g., the passive) and word formation programace of verb prefixes). In the levicial part, it covers topics referring to higher education in both the Czech Republic and Germany, current environmental issues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physiciats, and the fundamartial of IT treiminology. It develops communication on releast optics and is aimed at correct pronunciation, grammatical correctness and understandability. ORAMINE German for Interrmediate Students M2 German for Interrmediate Students M2 The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, liquisitically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading about, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse porable language for various purposes in oral and written	1 2 2 2 2 3 3 3		_
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This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the beginning of the course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It revises and develops more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical everyday communication, i.e., telephoning. Variable Comman Comman	phenomena important for professional discourse (participles, relative clauses).		
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SUIVEU III EXEIUISES.		actical use are illustra	ited by examples
	SUIVEU III ENGLUSES.		

15CH2 General Chemistry 2	Z,ZK	3
The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes		,
the validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles	ciples are illustrated by e	xamples solved
in exercises. 020R General Relativity	ZK	3
02OR General Relativity Introduction to general theory of relativity: principle of equivalence and principle of general covariance, parallel transport and geodesic equation		_
Einstein's gravitational law. Schwarzschild solution of the Einstein equations, homogeneous and isotropic cosmological models.	n, gravitational reastint.	Our valure and
01POPJ1 Computers and Natural Language 1	Z	2
Basic course of computational processing and understanding of natural languages. Automatic methods of morphological and syntactic analysis		· -
of result disambiguation will be discussed. Two-level morphology, tagging and language models, Viterbi algorithm, grammars, chart parsing, pr	obabilistic grammars.	
01POPJ2 Computers and Natural Language 2	Z	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	- :	_
of systems as complex as natural languages. We cover several rather different approaches to the task as well as issues related to automatic a	nd manual evaluation of	translation
quality. 12POAL Computer Algebra	KZ	2
Lisp, representation of basic objects (integers, rational and algebraic numbers, polynomials, rational functions, radicals, algebraic functions), arith	1 1	_
divisor, resultant, derivation, series summation, integration, ordinary differential equations, factorization, equations solving, quantifier elimination		
algebraic programming, graphics, Maple - detailed introduction and solving of practical examples, applications, overview of other systems (Axior	n, Macsyma, Mathemati	ca), miniproject.
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 t		-
a survey of fundamental problems in 2D computer graphics is given together with their solutions. Focus is put on mathematical description of proble	•	
algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the application the process of authoring scientific documents and presentations.	s of computer graphics	approacnes in
01POGR2 Computer Graphics 2	Z	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		· -
graphics. Further, a well structured survey of fundamental problems in 3D computer graphics is given together with their solutions, from the de	•	
rendering. Focus is put on mathematical description of problems and explanation of the corresponding algorithms using knowledge previously of	btained in a variety of su	ıbjects 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	f theoretical concepts ar	e demonstrated
using Blender, an open-source 3D modeling and rendering software instrument.		
01SITE1 Computer Networks 1	tuvarly protected a processor	2
Understanding the history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Ne TCP/IP communications. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certificates, certificates.		
(PKI). Use in practice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest -	· · · · · · · · · · · · · · · · · · ·	=
01SITE2 Computer Networks 2	Z	2
Understanding the history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Ne	twork protocols, practical	al exercises with
TCP/IP communications. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certif	· · · · · · · · · · · · · · · · · · ·	=
(PKI). Use in practice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest		
01POPR Advanced Probability The subject is deveted to advanced Theory of probability and statistics on measure theoretic level for general distributions of random variables.	We deal with sample a	2 nd intogral
The subject is devoted to advanced Theory of probability and statistics on measure-theoretic level for general distributions of random variables characteristics of random variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for para	·	_
12PEL1 Practical Electronics 1	Z,ZK	2
Recapitulation of basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase	1 '	
digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser.		
12PEL2 Practical Electronics 2	Z,ZK	2
Noise analyses in electronics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit design.		
12PIN1 Practical Informatics for Technics 1	_ Z	2
Computer and operating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network Principles of operating systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles		
File system, file atributes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlli		
load a process priorities. Standard tools. Graphical user interface X-windows. Computer networks. Local computer networks. Global computer		
protocols TCP/IP. Network configutation of a computer. Network services: hardware sharing, mail, ftp, etc. Network applications		
12PIN2 Practical Informatics for Technics 2	Z	2
Practically oriented three semester course of basics and applications of informatics for science and engineering included as obligatory alternative seminary and the seminary an	tive course. Constituent	part is realized
in computer classrooms. The second part of the course is "Introduction to computer algebra systems?.		
12PIN3 Practical Informatics for Technics 3	Z	2
Practically oriented three semester course of basics and applications of informatics for science and engineering included as obligatory alternation computer classrooms. The third part of the course is "Introduction to scientific computing?.		part is realized
	tive course. Constituent	
		4
15INPR Laboratory Practice in Instrumental Methods	KZ	4 he training is
	KZ and others problems. T	•
15INPR Laboratory Practice in Instrumental Methods Practical training of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical	KZ and others problems. T	•
15INPR Laboratory Practice in Instrumental Methods Practical training of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytica carried out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of No. 01PRA1 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 dist	KZ I and others problems. T aclear Chemistry. Z,ZK ributions and general di	he training is 6 stributions of
15INPR Laboratory Practice in Instrumental Methods Practical training of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical carried out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of No. 01PRA1 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 dist random variables. We deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). To	KZ I and others problems. T aclear Chemistry. Z,ZK ributions and general di	he training is 6 stributions of
15INPR Laboratory Practice in Instrumental Methods Practical training of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical carried out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of No. 01PRA1 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 dist random variables. We deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). T statistical processing of observations and statistical parametric model estimation.	KZ I and others problems. Tuclear Chemistry. Z,ZK ributions and general dichis knowledge is further	he training is 6 stributions of applied to the
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15INPR Laboratory Practice in Instrumental Methods Practical training of students in the use of selected modern instrumental methods and techniques for solving some physico-chemical analytical carried out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of No. 01PRA1 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 dist random variables. We deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). The statistical processing of observations and statistical parametric model estimation. 01PRA2 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 likely tests, Goodness of fitness tests of models, confidence regions, etc. We focus on real practical applications of these statistical techniques in fractions.	KZ I and others problems. To the problems of the specific example of the problems of the problems. The problems of the specific example of the specif	he training is 6 stributions of applied to the 2 y most powerful ples. 4 e Kolmogorov

01PRSTB	Probability and Statistics B	KZ	4
	obability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition ar		e Kolmogorov
definition. The notions a	s random variable, distribution function of random variable and characteristics of random variable are treated and basic limit	theorems are stat	ed and proved.
On the basis of this the	ry the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testing are exp	olained.	
16UAZB	Principles of Ionizing-Radiation Applications	ZK	2
Historical outline of app	ications, review of interaction of radiation with a matter, radiation sources, detectors and instrumentation, evaluation of radio	nuclide measuren	nents, use of
penetration and scatteri	ng of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the use	of ionizing radiati	on.
16FNZB	Problems of Non-ionizing Radiation	ZK	2
I	ological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and me	thods used in field	ds of magnetic
	nd as applied in various types of technical or medical equipment are given as well.		
12PSEM	Problem Seminary	Z	2
	s from the region of solid materials engineering, physical electronics, materials science, nuclear reactors, dosimetry and app	plication of ionizat	
01PROP	Programmer's Practicum	Z	2
	rse is to acquire good programming habits which will help in writing of clean code, i.e. such that is easy to comprehend by ot		-
l	ific examples, the students get familiar with naming conventions, and continue through writing project documentation, princip	oles of defensive p	orogramming,
	g object-oriented design, design patterns and refactoring.		_
01PERI	Programming of Peripherals Devices	Z	2
	put and output ports, computer bus. Software libraries for computer peripherals, 3D graphic libraries. Principles of periphera		
01PW	Windows Programming	Z	2
	ms for MS Windows. Basic editing controls. File input and output. User defined components, dynamic type identification and		
18PRC1	Programming in C++ 1	Z	4
	ly the C programming language and non-object oriented features of the C++ language.		
18PRC2	Programming in C++ 2	KZ	4
This course covers the	object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard Template	e Library.	
18PJ	Programming in Java	Z,ZK	5
This course is devoted t	o the Java platform and to the development of the basic types of applications for this platform.		
18MTL	Programming in MATLAB	Z,ZK	5
Introducing Matlab envi	onment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic an	alysis, statistics, a	Igorithmization
and geometric represen	tation of results.		
18MPT	Programming in MATLAB	KZ	5
The subject acquaints s	tudents with various programming techniques in the Matlab environment. The emphasis is placed on the differences in progr	amming methodo	logy in Matlab
compared to classical la	nguages.		
18PAS	Pascal Programming	Z	4
This lecture is intended	mainly for students, with little or no experience in programming. It familiarizes the students with the basic concepts in progra	mming and with th	ne Pascal
programming language.			
12PDR1	Data Communication and Interfaces 1	Z	2
Principles of computer r	etworks, networks architectures and data transfer. Specification of existing network architectures.		
12PDR2	Data Communication and Interfaces 2	Z	2
Principles of Ethernet st	andards and basics of protocol suite TCP/IP.	,	
01PSL	LaTeX - Publication Instrument	Z	2
The course is devoted to	the basics and facilities of computer typography, particularly to the system LaTeX	'	
01RMF	The Equations of Mathematical Physics	Z,ZK	6
The subject of this cours	e is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integr	al transformations	, and solution of
partial differential equat	ons (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).		
02RQGP1	Seminar on Quark-Gluon Plasma 1	Z	1
The aim of the seminar	s discuss the selection of the most fundamental articles in heavy ion physics.	,	
02RQGP2	Seminar on Quark-Gluon Plasma 2		1
The aim of the seminar		Z	I I
	s discuss the selection of the most fundamental articles in heavy ion physics.	Z	Į.
04RM1		Z	1
04RM1 The course is designed	s discuss the selection of the most fundamental articles in heavy ion physics.	Z	1
The course is designed	s discuss the selection of the most fundamental articles in heavy ion physics. Russian for Intermediate Students M1	Z Det (both printed a	1 nd handwritten),
The course is designed basic vocabulary for cor	is discuss the selection of the most fundamental articles in heavy ion physics. Russian for Intermediate Students M1 for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphab	Z pet (both printed a ing the way and g	1 nd handwritten), iving directions),
The course is designed basic vocabulary for cor they can use basic gran	s discuss the selection of the most fundamental articles in heavy ion physics. Russian for Intermediate Students M1 for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphaten munication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, ask	Z pet (both printed a ing the way and g	1 nd handwritten), iving directions),
The course is designed basic vocabulary for cor they can use basic gran	s discuss the selection of the most fundamental articles in heavy ion physics. Russian for Intermediate Students M1 for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphate immunication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, ask immar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement	Z pet (both printed a ing the way and g	1 nd handwritten), iving directions),
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04RZ1 The course represer	Russian for Beginners Z1	Z	1
	ts the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in	. – .	ı s with mastering
•	t (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and sp	-	_
a short text with mar	ked stress, understand its contents and summarize it.		
04RZ2	Russian for Beginners Z2	Z	1
The second semeste	or of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and sho	ort subtechnical texts.	Students will be
able to communicate	using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They	will also develop their	vocabulary and
master further grami	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	•	•
- :	roduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They was a strain of the	will be able to respond	so as to be
	xpress their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04RZ4	Russian for Beginners Z4	Z	. 1
	on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer	=	_
	I communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g. modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travellin		
•	on on more specific topics (environment, addictions, the green movement). They become acquainted with various geograph		
	he information from the timetable, learn about Russian holidays and typical meals.	iodi data (o.g., olboria), loan now to
04RZ5	Russian for Beginners Z5	Z	1
	he student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. unde	-	nd summarizinc
-	pecialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the text		-
	dying grammar is based on professional and technical texts and only includes items typically used in professional communic		
	ents develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite re	,	, , ,
01RSWP	Project Management of Software Projects	KZ	2
-	anagement of software projects is dedicated to an explanation of general ideas, rules and procedures which are common to n		
•	corresponds to a lifecycle of typical projects including many other aspects which have to be taken into account in the course		
	oject management and to IT projects in general. Interdisciplinary view of project management is emphasized.	o o	
02SMF	Seminar of Mathematical Physics	7	2
	eminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics de	partment will present	
	ntific activities that could become the topics of the student?s bachelor theses in the next year		
01SSM1	Seminar of Contemporary Mathematics 1	Z	2
	s a different approach to those fields of mathematics that are included in curriculum but also to those that are not part of ba	asic courses of mather	natics.
01SSM2	Seminar of Contemporary Mathematics 2	Z	2
	s a different approach to those fields of mathematics that are included in curriculum but also to those that are not part of ba	. – .	
16SED1	Dosimetry Seminar 1	Z	2
	posed to motivate the student's interest in the field of dosimetry, especially in medical physics. Introductory lectures will be		
	he following lectures are given by the former students of DDAIR, who are currently employed in various organizations (SÚF		
MI, Hospital Na Ho	molce, FN v Motole, PTC Czech s.r.o.)		
16SED2	Dosimetry Seminar 2	Z	2
Dosimetry Seminary	2 follows-up SED1. In this seminary students will listen to the lectures of the older students of DDAIR. The older students gi	ve lectures about their	progress on the
research topic of the	r theses. The course also introduces the principles of creating good presentation and advice for working with scientific literative	ature.	
01SMB1	Seminar on Calculus B1	Z	2
The course is devote	d to support the lectures of Calculus B3.	'	
01SMB2	Seminar on Calculus B2	Z	2
The course is devote	d to support the lectures of Calculus B4.	1	
	Software Seminar 1	Z	2
01SOS1	Software Seminar 1	Z	2
01SOS1 Java, Java Beans, A	ssembly language programming for microprocessors Intel 80x86		
01SOS1 Java, Java Beans, A 01SOS2	Ssembly language programming for microprocessors Intel 80x86 Software Seminar 2	Z	2
01SOS1 Java, Java Beans, A 01SOS2 Graphical libraries G	ssembly language programming for microprocessors Intel 80x86 Software Seminar 2 TK+ and Qt. Development of graphical user interface using C and C++ programming languages. Portable applications for U	Z	2
01SOS1 Java, Java Beans, A 01SOS2 Graphical libraries G for Linux systems. Po	ssembly language programming for microprocessors Intel 80x86 Software Seminar 2 TK+ and Qt. Development of graphical user interface using C and C++ programming languages. Portable applications for U ortability to Microsoft Windows.	Z Inix like operating syste	2 ems, especially
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04SM3	Spanish for Intermediate Students M3	Z	1
The course books are s	upplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of acade	emic style. They w	vill be competent
"	net in Spanish and search for information of their specialization or field of interest. Students will use the information to write s	hort articles and s	summaries. The
	nme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination.		
04SP1	Spanish for Advanced Students P1	Z	1
of CEFR.	n more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communicati	on. Course prerec	quisites: level B2
04SP2	Chanish for Advanced Students D2	Z	1
1	Spanish for Advanced Students P2 Indicate the part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syn		•
written communication.	The part of the develoced openion course, exterioring openion for specific purposes topics. It comprises more granifical and syn	ntax and locuses	on macpendent
04SP3	Spanish for Advanced Students P3	Z	1
	al part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is	focused on written	communication
based on what students	s will need in their career.		
04SZ1	Spanish for Beginners Z1	Z	1
	st stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fund	_	
	cate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanis		
04SZ2	Spanish for Beginners Students Z2	Z	1
	on course 04SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures estand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countr		
	stand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countri nish-speaking countries are also included.	ies and others su	ch as the Czech
04SZ3	Spanish for Beginners Z3	Z	1
	course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of		•
	attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative		
communication on a give	ren general topic, for which the student is trained by reading texts or listening to them.		
04SZ4	Spanish for Beginners Z3	Z	1
	course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanis		-
1 ' '	to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of t	the imperative, an	d subjunctive),
	munication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.		
04SZ5	Spanish for Beginners Z5	Z	1
	upplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish sh course based on the course book will end with presentations and, finally, a written and oral examination.	1 for specific purp	oses. In its final
14TM	Engineering Mechanics	Z,ZK	4
	Engineering Mechanics a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with the stress and strain ana		
14TEM			-
		7 7K	6
	Engineering Mechanics presents a link-up between the theoretical mechanics of rigid bodies and engineering disciplines dealing with stress and strai	Z,ZK in analysis of real	6 structure parts
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16MCRB	Transport of Ionizing Radiation and Monte Carlo Method	Z,ZK	4
	ples of Monte Carlo method and its use for radiation transport simulation, selected concepts of probability theory and mathem	1 ' 1	•
nteraction of differen	t types of radiation and their use for stochastic modeling of their substance transport. Model description concepts, geometric	model layout, source	e term, scoring
	ng of measured variables and parameters. Statistical evaluation of reliability of modeling results, variance reduction methods, p	· -	
· -	MCNP program, its possibilities and use. Procedures for the practical use of the program for typical tasks in the field of dosime	etry, application of ior	nizing radiatio
	on systems, radiation protection and medical applications.	1/7	
I 8 INTA	Development of internet applications an overview of modern technologies for the development of web applications. Students will learn basic web languages and c	KZ	4
	d to relational database systems. The tutorials are dedicated to practical examples of building web applications, from the sim		
	owards backend technologies and using the Python languages, but covers also frontend frameworks and JavaScript.	ipiest to more advanc	ou. The court
D1DYK	Introduction to Continuum Dynamics	Z	2
	oduction to the mathematical description of continuum dynamics. It summarizes the necessary mathematical apparatus with	1 1	
alculus, differential f	orms, and integration on manifolds. It includes the basic concepts of continuum mechanics such as strain and stress tensors	or substantial deriva	tive, by mean
	to derive the fundamental laws of conservation of mass, momentum, angular momentum, and energy in integral and differential	ial form. In the last par	rt of the cours
	was are adapted to the case of viscous and inviscid fluid and linear and nonlinear elastic body.		
16ZIVB	Introduction to Ecology	KZ	2
	bout basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the	environment and eva	iluate econon
ndicators and sustain	•	7 7	
)2UFEC	Introduction to Elementary Particle Physics an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subjectives.	Z	2
			2
1UFPLN	Introduction to Solid State Physics ecture is to introduce the undergraduate students to the study of the solid state physics.	ZK	2
17UINZ		Z.ZK	3
	Introduction to Engineering d to an introduction to the engineering profession. Students will gradually learn the characteristics and specialties of enginee	1 ' 1	•
	d engineering disciplines, such as the basics of materials science, manufacturing technology, quality control and assurance a	-	
	s of R&D activities organization and on selected parts of technical drawings and the work with AutoCAD code.	and coolegy, r and on,	
2UKP	Introduction to Curves and Surfaces	Z	2
_	re is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concept		
-	explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essentia		
alculated by student	s		
2ULT	Introduction to Laser Technique	Z,ZK	3
Overview of electrom	agnetic radiation sources; laser principle; classification of lasers; characterization and rough application of various types of la	asers; laser safety pre	ecautions.
2UMF	Introduction to Modern Physics	Z	3
he course is intende	ed to be a concise introduction to modern / nonclassical physics for students who have already had basic classical physics cou	urse. A part of the cou	ırse is deliver
n a computational la			
AOU8	Introduction into Object Oriented Architecture	Z,ZK	4
)1UTIZ	Introduction to Theoretical Informatics	ZK	2
11UVOD	Introduction to Specialization	Z	2
he purpose of this le	ecture is to introduce the undergraduate students to the physical master degree study programmes.		
12VAK	Vacuum Physics and Technology	KZ	4
Rarefied gasses: bas	ic concepts and relations; flow of rarefied gas. Interaction of gas with surface of solid surface; sorption, desorption; evaporation	on, condensation; gas	s transport
_	Vacuum generation. Pumping process. Pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumpin	ng speed; gas flow, co	onductivity,
	Materials and vacuum instalation parts. Practical exercises.		
12PYTH	Scientific Programming in Python	Z	2
	e is to learn the fundamentals of the modern Python programming language with a focus on scientific computing. Emphasis is	•	
	e is performed in an interactive form of practical exercises, whose topics can be tailored to the content of other subjects or stu esearch. In the introductory part of the course, students learn the basic features of Python?from basic types to object oriente		
	urse focuses on specific features of Python for scientific programming. Presented are the main numerical libraries NumPy, So	· -	_
•	to generate efficient code, how to combine Python with other languages, what tools are available.	on y and the matploth	ib grapriios
2VTV	Scientific and Technical Computing	Z	2
	illar with methods of solving of computational problems in the scientific and technical practice, and with methods of their programmer.	. – .	
-	ng in the Fortran language.	gramming, the ecuted	0 10 011011104
2VFT	High Frequency and Impulse Circuitry	Z,ZK	2
	s to collect advanced knowledge in high frequency technics and high speed events. The course is focused on Maxwell equati	1 ' 1	
-	nicrowaves guidelines, striplines, oscillators, amplifiers and pulse generators.		, 0
7VYR	Research Reactors	ZK	2
	research reactors and their applications for the need of research and industry. Students get familiar with research reactor type	1	
long with experimen	atal equipment needed for particular applications and their specifics. The course is supported by technical visit to research rea	actor workplace.	
2EPR1	Basic Electronics Practicum 1	KZ	3
he aim of the praction	cum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formula	ation of the results. Th	he practicum
onsists of blocks las	ting 4 hours.		
OFFIC	Basic Electronics Practicum 2	KZ	3
2EPR2	cum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formula	ation of the results. Th	ne practicum
he aim of the praction	ting 4 hours.		
he aim of the praction	ting 4 hours. Basic Laser Technique Laboratory	KZ	6
The aim of the practionsists of blocks last 12ZPLT			_
The aim of the practionsists of blocks lase 2ZPLT asers, solid state No.	Basic Laser Technique Laboratory	monic, He-Ne glow di	_
The aim of the practionsists of blocks last 12ZPLT Lasers, solid state Notice, diode, diode pumped	Basic Laser Technique Laboratory d:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harr	monic, He-Ne glow di	_
The aim of the practic consists of blocks last 12ZPLT .asers, solid state Notifiede, diode pumped 12ZPOP	Basic Laser Technique Laboratory d:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harr Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acoust	monic, He-Ne glow di to-optic modulators.	ischarges, las
consists of blocks las 12ZPLT Lasers, solid state No diode, diode pumped 12ZPOP	Basic Laser Technique Laboratory d:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harr Nd:YAG laser, CO2 laser marking, laser materials properties, non-linear transmission, laser beam transverse profile, acoust Basic Optical Laboratory	monic, He-Ne glow di to-optic modulators.	ischarges, la

16AMMB	Fundamentals of Analytical Measurement Methods	ZK	2
	nical performance and utilization of methods of chemical analysis. Basic methodology of analytical determination, gravimetry, t metry, polarimetry, UV-VIS spectroscopy, atomic emission and absorption spectroscopy, infrared and Raman spectroscopy, X-		
1	spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography.	ray Structural aria	iyaia, riucieai
16ZBAF1	Fundamentals of Human Biology, Anatomy and Physiology 1	Z,ZK	4
	systems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecul	Ü	
_	ral human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system	n and its physiolo	gy. Respiratory
system and physiology	y of respiration. Excretory and genital tract. Fundamentals of Human Biology, Anatomy and Physiology 2	Z.ZK	4
_	Fundamentals of numan blology, Anatomy and Physiology 2 of cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, blo	,	
1	nd physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, endocrine gla	-	
16ZDOZ2	Fundamentals of Radiation Dosimetry 2	ZK	2
	gical effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Princip	les and methods of	of measurements
	nation of activity and neutron source emission. Measurements of absorbed dose and exposure.		
16ZDOZ1	Fundamentals of Radiation Dosimetry 1	Z,ZK	4
	and objectives of dosimetry. Quantities and units used for description of sources, fields, interactions of ionizing radiation, ioniz ntals of the effects of ionizing radiation.	ations, energy tra	nsier and
17ZEH	Basics of Economic Assessment	ZK	2
	n the economic evaluation of Nuclear power plants. Introductory lectures are concerned with an introduction to economy and the	l	
	ures continued with insight into the business and managerial economics, explanation of the concepts of incomes, expenses, etc	and their applica	tions in electrical
	uation. Second part of lectures is focused on evaluation of nuclear power plants - the fuel cycle and operations of NPP.	177	
17ZEL	Basics of Electronics	KZ	ical circuits with
The state of the s	c information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and eal with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor compo		
1	ontinue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/o		, , ,
completed with electro	onic laboratory exercises.		
12ZEL1	Basic Electronics 1	Z,ZK	3
	primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circuits in both stationary and harmonic stable state. Circuits in both stationary and harmonic stable state.		
	lic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effective of the subject of th		
12ZEL2	Basic Electronics 2 with the Basic Electronics 1. Semiconductor elements basic properties are explained. Thecourse's final part deals with basic	Z,ZK	circuits field
02ZFM1	Foundations of Physical Measurements 1	Z	2
	d for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however,	_	
other branches. The go	oal of the lecture is to introducethe basics of physical measurements, the methods of processing and evaluation of acquired de	ata on a PC. Stud	entslearn the
basic habits of work in			,
02ZFM2	Foundations of Physical Measurements 2	Z	2
	se is devoted to the essentials of measurements of the most important physical quantities. It is especially recommended to thos rricula - Physical engineering and Nuclear engineering. Also the methods of evaluation of statistical data using PC and practica		
1	earn main rules connected with experimental work in physical laboratory.		
11ZFPL	Basic to Solid State Physics	KZ	2
1	ental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bor	_	
1	forestals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and be a properties at the crystalline lattice in introduced and its relation to the following model describing the approximation and its relation to the following model describing the approximation of electrons.		
1	dic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons ad. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to	-	
	nomenological basis of physical properties of crystalline solids	oyeternaneany m	
12ZFP	Principles of Plasma Physics	Z,ZK	4
Basic physics of high t	emperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants,	linear theory of v	vaves in plasmas
	ectromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and par		es are explained.
	iduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas are introduced.		
02ZJF This scientific field are	Nuclear Physics Nuclear Physics Nuclear Physics sents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic do	Z,ZK	h of our classical
1	behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.	, #11010 11100	5. 541 014551041
02ZJFB	Nuclear Physics B	KZ	3
	sents formidable challenges both experimentally and theoretically, simply because we are dealing with the submicroscopic do	main, where muc	h of our classical
	behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics.		
16MEZB	Fundamentals of Ionizing-Radiation Metrology	Z,ZK	4
	es the basic objectives and content of ionizing radiation metrology. It deals with the interpretation of radiation quantities and un mental foundations of metrology, the determination of basic parameters of radiation. Lectures are supplemented with basic sur		
regulations.	nemai foundations of methology, the determination of basic parameters of radiation. Lectures are supplemented with basic sur	illiary or relevan	legisiation and
01ZOS	Introduction to Operating Systems	Z	2
	re of operating systems. Processes, thread, memory management. Synchronization of multi=threaded applications. Memory m	l	' -
12ZAOP	Fundamentals of Optics	Z,ZK	2
	very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geo	· · · · · · · · · · · · · · · · · · ·	- 1
	, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with resp		
	are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves om material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next	•	٠.
· ·	explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interferen		
1	ce and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a grap		
1	ased on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics		e on geometrical
	ostitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical instrumen		
LU1 / D D 1	Introduction to Computer Security 1	Z	2
01ZPB1	1		1

16ZPSP	Basic Work with PC	Z	2
The aim of the course is	to acquaint students with the basic skills related to working on a personal computer. The introductory part of the course is de-	voted to informati	ion systems and
resources available at th	e CTU in Prague and the FNSPE. Emphasis is placed on effective handling of work with office productivity software (text edi	tor, spreadsheet a	and presentation
software) with exercises	in MS Office. The practical content focuses mainly on further use during studies (laboratory reports, research work, bachelo	r's and diploma th	neses) and in
specific practice (hospita	lls, state administration, companies). Other sections summarize basic information about computer hardware, software, and se	curity. Completion	n of independent
home exercises and par	ticipation in exercises above 60% is a necessary condition for passing the course.		
18ZPRO	Basics of Programming	Z	4
This course is intended	mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	nming and with the	e Python
programming language.			
16ZRAO	Basics of Radiation Protection	Z	2
The aim of the course is	to familiarize students with the general principles of radiation protection. The main emphasis is put on basic mechanisms and	concepts, in orde	r to allow critical
orientation in this field. T	he course provides answers to the cardinal questions: What is ionizing radiation (IR), where it comes from, whether and how	it is dangerous fo	or people, what
is the meaning of protect	tive units (Gray, Sievert), how to prevent malicious effect of IR and many others. The content of the lectures does not require	any prior knowled	dge.
02ZSM	Introduction to the Standard Model	ZK	2
Particles, leptons, hadro	ns, baryons, mesons, symmetry, symmetry group, quarks, gluons, partons, standard model of electroweak and strong intera	ctions, quantum c	hromodynamics:
(QCD), cross section, so	cattering cross section.		
16ZEDB	Basics of Experimantal Data Processing	ZK	2
Statistical analysis of ex	perimental data; univariate data; calibration; regression; multivariate data.	'	
14ZZKS	Testing and Processing of Metals and Alloys	KZ	4
Abstract: Tension tests, I	nardness, impact toughness, technological testing, fatigue testing, creep testing. Light microscopy, preparation of specimens	for macro- and mi	cro-observation.
Casting, forming, weldin	g, soldering, brazing, powder metallurgy, mechanical machining. Copper alloys, aluminium alloys, titanium alloys, special alloy	s of non-ferrous n	netals. Technical
drawing and CAD.			
12ZDP	Data Processing for Publishing	Z	2
Typography, computer c	omputer-assisted publishing, coding of text, OCR (optical code recognition), DTP (desk top publishing), programming langua	ges for typesettin	g (TeX, LaTeX,
HTML, XML,, publishir	ng into www pages, cloud computing,commonly used graphical formats, formatting of typical data (PDF, PS, DOC, DOCX, PI	PS, PPSX, RFT, X	(LS, XLSX),
multimedial presentation	s, multimedial formats.		
12ZMD	Measurement and Data Processing	KZ	2
Basic knowledge for the	measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its properly	es, data fitting, se	paration of the

List of courses of this pass:

signal from the noise.

DOEKOT Economy in Technology The course introduces the basics of micro- and macroeconomics.	Credits
ODETV Ethics of Science and Technology Z ODMAM1 Essentials of High School Course 1 Z ODMAM2 Essentials of High School Math Course 2 Z Review of basics of high school mathematics. OPT Preparatory Week Z OORET Rhetoric Z The course is focused on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the composition of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of a composition of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of a composition of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of a composition of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of as the current of the set theory standard algebraic structures are dealt with: groups, rings, fields, modules, linear algebras, lattices, Boolean algebras, rings of promittive fields. O1ALGE Algebra Algebra Firstly, the Peano axioms are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, the axiom of choice statements, definition of ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral domains, principal fields, lattices. Independent chapters are devoted to divisibility in integral domains and to finite fields. O1DEM History of Mathematics O1DEM Algebra Algebra Algebra Algebra Algebra Algeb	1
DOMAM1 Essentials of High School Course 1 Z	'
Besentials of High School Math Course 2 Review of basics of high school mathematics. OOPT Preparatory Week Z OORET Rhetoric The course is focused on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the composition of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of as well as to its nonverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an integral part of OOUPRA Introduction to Law Z OOUPSY Introduction to Psychology Z O1ALG Algebra Algebra ZK After an introduction into the set theory standard algebraic structures are dealt with: groups, rings, fields, modules, linear algebras, lattices, Boolean algebras, rings of procommutative fields. O1ALGE Algebra Algebra Z,ZK Firstly, the Peano axioms are treated in detail. Elements of the set theory cover only: equivalence and subvalence, the Cantorov-Bernstein theorem, the axiom of choice statements, definition of ordinals and cardinals. Further standard algebraic structures are addressed: semigroups, monoids, groups, rings, integral domains, principal fields, lattices. Independent chapters are devoted to divisibility in integral domains and to finite fields. O1DEM History of Mathematics The subject has the form of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the field - give their talks of from the history of mathematics. O1DIM1 Discrete Mathematics 1 The seminar is devoted to elementary number theory and applications. It includes individual problem solving. The seminar is devoted to recurrence relations. It includes individual problem solving.	1
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01DIM2 Discrete Mathematics 2 Z The seminar is devoted to recurrence relations. It includes individual problem solving.	2
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	2
DISCIPLE MALITERIALICS 3	2
The subject is devoted to elementary proofs of non-trivial combinatoriwal identities and to generating functions and their applications. In the seminar students present	_
solution chosen from the given literature.	PIODICIII WILI
01DYK Introduction to Continuum Dynamics Z	2
This course is an introduction to the mathematical description of continuum dynamics. It summarizes the necessary mathematical apparatus with emphasis on vectors	_

of which it is possible to derive the fundamental laws of conservation of mass, momentum, angular momentum, and energy in integral and differential form. In the last 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 7K 3 The course provides an introduction to system theory with emphasis on control theory and understanding of the fundamental concepts of systems and control theory. First, we build up the understanding of the dynamical behavior of systems as well as provide the necessary mathematical background. Internal and external system descriptions are described in detail, including state variable, impulse response and transfer function, polynomial matrix, and fractional representations. Stability, controllability, observability, and realizations are explained with the emphasis always being on fundamental results. State feedback, state estimation, and eigenvalue assignment are discussed in detail. All stabilizing feedback controllers are also parameterized using polynomial and fractional system representations. The emphasis in this primer is on linear time-invariant systems, both continuous and discrete time. Functional Analysis 1 Continuing course of mathematical analysis and algebra introduction to the basics of functional analysis. There are the concepts that students need to understand the various physical and technical disciplines. 01FA2 Functional Analysis 2 Z,ZK 4 The course aims to present selected fundamental results from functional analysis including basic theorems of the theory of Banach spaces, closed operators and their spectrum, Hilbert-Schmidt operators, spectral decomposition of bounded self-adjoint operators. 01FAN1 Functional Analysis 1 Z,ZK 4 Basic notions and results are addressed concerning successively topological spaces, metric spaces, topological vector spaces, normed and Banach spaces, Hilbert spaces. 01FKP **Functions of Complex Variable** ZK The course develops advanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings, transcendental and meromorphic functions. Basic properties of complex functions of several complex variables together with improper line integrals and its applications are presented. 01FKPB Functions of Complex Variable B 2 The course develops advanced properties of systems of holomorphic functions, Ascoli-Vitali's theorem, advanced properties of conformal mappings, transcendental and meromorphic functions. Basic properties of complex functions of several complex variables together with improper line integrals and its applications are presented. 01GTDR Geometric Theory of Ordinary Differential Equations 2 The seminar consists of the qualitative theory of ODEs dealing with the geometric and topological properties of the solution. In this context, we mention suitably formulated basic results of the existence and uniqueness, continuous dependence on parameters and initial conditions. Main part is devoted to the autonomous systems. 01JEPR Simple Compilers 2 Lexical and syntax analysis, code generation, simple optimizations, development environments, reflection. 01LIP 3 Linear Programming Z.ZK We study special problems about constrained extremum problems for multivariable functions (the function is linear and the constraint equations are given by linear equations and linear inequalities). 01MAPR Markov processes 4 01MASC 2 Mathematical Statistics - Seminar 7 The subject is devoted to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation of Fisher information matrix of statistical models, finding unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for hypothesis testing using the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density estimation. 01MAT1 Mathematics 1 7 4 The course is devoted to the study of the basics of calculus of one variable. It includes an introduction to differential and integral calculus, with particular emphasis on applications in practical problems. 01MAT2 Mathematics 2 7 4 The course, which is the continuation of Mathematics 1, is devoted to the integration techniques, improper Riemann integral, introduction to parametric curves (especially in polar coordinates), the basics of sequences and infinite series, and finally to the Taylor and power series and their applications. 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 Z.ZK Mathematics 4 4 Linear and non-linear differential equations of the first order. Linear differential equations of higher order with constant coefficients. Multivariable calculus and its applications. 01MATZ1 Mathematics, Examination 1 ZK 2 01MATZ2 Mathematics, Examination 2 ZK 2 Methods of Mathematical Physics The course provides an introduction to the theory of distributions with applications to solutions of partial differential equations with constant coefficients, further the Fredholm theorems are discussed for the case of a continuous kernel on a compact set as well as Sturm-Liouville operators on bounded intervals, and applications of the separation of variables method to the solution of some boundary value problems and mixed problems. 01MMPV Mathematical Models of Groundwater Flow 2 The course provides an overview of computational methods for selected groundwater flow problems. The first part of the course is devoted to mathematical formulations of these problems. The second part is aimed at selected numerical methods, emphasizing implementation issues related to these methods. 01NME2 2 Numerical Methods 2 The course is devoted to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations. It explains methods converting boundary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equations. 01PERI Programming of Peripherals Devices 2 Memory organization, input and output ports, computer bus. Software libraries for computer peripherals, 3D graphic libraries. Principles of peripherals device drivers. 01POGR1 Computer Graphics 1 7 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 the art technologies. Further, a survey of fundamental problems in 2D computer graphics is given together with their solutions. 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 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 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.

	Computers and Natural Language 1 omputational processing and understanding of natural languages. Automatic methods of morphological and syntactic analysis including	•	
	disambiguation will be discussed. Two-level morphology, tagging and language models, Viterbi algorithm, grammars, chart parsing, pro	babilistic gramma	
01POPJ2	Computers and Natural Language 2	Z	2
-	urse is to get acquainted with the broad topic of machine translation (MT). Machine translation is a challenging task that can serve as	-	- 1
of systems as co	omplex as natural languages. We cover several rather different approaches to the task as well as issues related to automatic and man	ual evaluation of tr	anslation
	quality.		
01POPR	Advanced Probability	Z	2
The subject is d	evoted to advanced Theory of probability and statistics on measure-theoretic level for general distributions of random variables. We de	al with sample and	d integral
characteristics of	of random variables and convergence criteria. Further, the theory of statistical model estimation and testing is extended for parametric	and nonparametri	ic cases.
01PRA1	Probability and Mathematical Statistics 1	Z,ZK	6
The subject is de	voted to the introduction to Theory of probability and statistics on measure-theoretic level for discrete models, continuous distributions	and general distri	ibutions of
	We deal with sample an integral characteristics of random variables and variants of limit theorems are derived (LLN, CLT). This know		
	statistical processing of observations and statistical parametric model estimation.		
01PRA2	Probability and Mathematical Statistics 2	ZK	2
	oted to the statistical techniques for estimation and testing within parametric and nonparametric models such as Maximum likelihood prin		
	ess of fitness tests of models, confidence regions, etc. We focus on real practical applications of these statistical techniques in frame (
01PROP		7	2
	Programmer's Practicum		
	is course is to acquire good programming habits which will help in writing of clean code, i.e. such that is easy to comprehend by other		-
runctionality. Usin	ig specific examples, the students get familiar with naming conventions, and continue through writing project documentation, principle	s or deterisive prog	gramming,
0.155.07	debugging, up to creating object-oriented design, design patterns and refactoring.	7.71	
01PRST	Probability and Statistics	Z,ZK	4
	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and or	_	-
	ions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the		and proved.
	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testin	· · ·	
01PRSTB	Probability and Statistics B	KZ	4
It is a basic course	e of probability theory and mathematical statistics. The probability theory is build gradually beginning with the classical definition and o	continuing till the K	Colmogorov
definition. The noti	ions as random variable, distribution function of random variable and characteristics of random variable are treated and basic limit the	orems are stated a	and proved.
On th	e basis of this theory the basic methods of mathematical statistics such as estimation of distribution parameters and hypothesis testir	ng 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
-	graphical programs for MS Windows. Basic editing controls. File input and output. User defined components, dynamic type identificat	_	_
01RMF	The Equations of Mathematical Physics	Z,ZK	6
	course is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integral transfer in the course is solving integral equations, theory of integral transfer		-
The subject of this	partial differential equations (boundary value problem for eliptic PDE, mixed boundary problem for eliptic PDE).	ansionnations, and	a solution of
04 D O W D		1/7	
01RSWP	Project Management of Software Projects	. KZ	2
	management of software projects is dedicated to an explanation of general ideas, rules and procedures which are common to many pro		
The course structu	re corresponds to a lifecycle of typical projects including many other aspects which have to be taken into account in the course of their m		ific attention
	is paid to software project management and to IT projects in general. Interdisciplinary view of project management is emphasi.		
01SITE1	Computer Networks 1	Z	2
-	history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network prof	-	
	ations. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification autho		
	actice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the se	rial control lines, n	nodems)
01SITE2	Computer Networks 2	Z	2
Understanding the	history and present network (LAN, WAN, use the principles and technologies). Architecture of reference model ISO/OSI. Network projections and technologies.	ocols, practical ex	ercises with
TCP/IP communica	ations. Internet services - mail, remote access, www. Secure communication, tunneling. Directory services, certificates, certification autho	orities, public key in	frastructure
(PKI). Use in pra	actice. Network security - firewalls (packet filters, proxies, gateways, NAT, DMZ), practical exercises. (According to the interest - the se	rial control lines, n	nodems)
01SMB1	Seminar on Calculus B1	Z	2
	The course is devoted to support the lectures of Calculus B3.	ı	'
01SMB2	Seminar on Calculus B2	Z	2
0.022	The course is devoted to support the lectures of Calculus B4.	_	_
01SOS1	Software Seminar 1	Z	2
013031	1	۷	
0.10000	Java, Java Beans, Assembly language programming for microprocessors Intel 80x86		
01SOS2	Software Seminar 2	Z	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	Z	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 mather	matics.
01SSM2	Seminar of Contemporary Mathematics 2	Z	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 mather	matics.
01STR	Statistical Decision Theory	ZK	2
	oted to the statistical techniques for general decision procedures based on optimization of suitable stochastic criterion, their mutual cor	I	
,	properties and applicability.		
01TKO	Theory of Codes	ZK	2
01110	Algebraic methods used in error detecting and error correcting codes.	۵۱۱	-
04TOD		ZK	2
01TOP	Topology The aim of lecture is the systematization and deepening the knowledge of general topology.	۷n	2
0411777	The aim of lecture is the systematization and deepening the knowledge of general topology.	71/	
01UTIZ	Introduction to Theoretical Informatics	ZK	2

01ZOS	Introduction to Operating Systems	Z	2
	tion to structure of operating systems. Processes, thread, memory management. Synchronization of multi=threaded applications. Me		
01ZPB1	Introduction to Computer Security 1	Z	2
02AMS	Atomic and Molecular Spectroscopy	Z,ZK	4
	The lecture is devoted to atomic and molecular spectroscopy.		
02DEF1	History of Physics 1	Z	2
	ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo	-	-
neieriistic period,	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, I as experimental science. Newton and his work.	auygens. The birth	oi priysics
02DEF2	History of Physics 2	Z	2
-	f classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	_	ļ.
· ·	vanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann.		
and relativistic p	hysics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear er	nergy, Elementary	particles,
	standard model. The concept of Nature and Universe of today.		
02DRG	Differential Equations, Symmetries and Groups	Z	4
	The purpose of the lecture is to teach students computation of symmetries of the differential equations.		
02ELMA	Electricity and Magnetism	Z,ZK	6
_	pulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors anddielectrics. Electric current and circuits, cond	=	he relativity
_	Electrodynamic forces,magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, ac currents. Electromagnetic waves, N		_
02EXF1	Experimental Physics 1	Z	2
· · · · · · · · · · · · · · · · · · ·	an introductory course in experimental physics. Students will learn methods of measurement of basic physical quantities and method		
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 levoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physic:	Z	2
	nics. The problems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical labora	•	course or
02FYS2	Physical Seminar 2	7	2
	levoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical	s presented in the	ļ.
	d Magnetism. The problems are chosen studied and presented by the students themselves, with the possibility to use PC and physical	- ·	
02KF	Quantum Physics	Z,ZK	3
State description	n, wave function, postulates of quantum mechanics, Born's statistical interpretation, expectation values, Schrödinger equation, Heise		principle,
	quantization of angular momentum, solution of simple systems, hydrogen atom.		
02LCF1	Experimental Laboratory 1	Z	2
	Cavendish experiment. Elasticity.Thermal capacities. Electric measurements, Acoustic. Oscillations.		
02LCF2	Experimental Laboratory 2	Z	2
	Electric and magnetic field, microwaves, Xray and gamma rays, geometric optics	_	
02MECH	Mechanics	Z	4
	ics, physical quantities and units. Particle kinematics, basic types of motion and their superposition. Particle dynamics, one-dimension		
in central force fi	eld, forces innoninertial reference frames. Mechanics of system of free particles, two-body problem, collisions. Mechanics ofrigid bod continuum mechanics, elasticity, hydrodynamics. Sound.	y, rotation. Fundan	nentals of
02MECHZ	Mechanics - Examination	ZK	2
UZIVIECI IZ	The content of the subject is the examination according to the plan of studies.	ZK	
02NSAD	Simulations and Data Analysis Tools	Z	2
02110/12	Data analysis and simulations of high energy elementary particle collisions. ROOT and Pythia programs.	_	_
02OR	General Relativity	ZK	3
	peral theory of relativity: principle of equivalence and principle of general covariance, parallel transport and geodesic equation, gravita		l
_	Einstein's gravitational law. Schwarzschild solution of the Einstein equations, homogeneous and isotropic cosmological mode	els.	
02PRA1	Experimental Laboratory 1	KZ	6
	d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E	0 0,	
<u> </u>	ts interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with the		
of the measuremer	nt (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation	on of results. At the	e same time
0000040	practically extendthe knowledge gained in lectures on physics.	1/7	
02PRA2	Experimental Laboratory 2 d especially for students who intend to study some of the physical specializations of FNSPE(branch Physical Engineering, Nuclear E	KZ	6
	is interested in the otherspecializations. In Experimental laboratory students learn how to prepare for experiments (including work with the		
<u> </u>	at (acquire of different experimental procedures and routines), willteach writing the records of measurement, processing and evaluation		
	practically extendthe knowledge gained in lectures on physics.		
02PRAK	Experimental Laboratory	KZ	4
Lecture is intended	primarily for students who study branch Nuclear Chemistry engineering, or practically oriented bachelor's specializations of branch I	Nuclear engineerin	g. But it can
_	students interested in the other specializations. During Experimental laboratory, students learn how to prepare for experiments (inclu	_	•
tne implementation	of the measurement (acquire of different experimental procedures and routines), will teach writing the records of measurement, proce	ssing and evaluation	on of results.
0200004	At the same time practically extend the knowledge gained in lectures on physics.	Z	1
02RQGP1	Seminar on Quark-Gluon Plasma 1 The aim of the seminar is discuss the selection of the most fundamental articles in heavy ion physics.		l i
02RQGP2	Seminar on Quark-Gluon Plasma 2	Z	1
UZNQGFZ	The aim of the seminar is discuss the selection of the most fundamental articles in heavy ion physics.	_	'
02SMF	Seminar of Mathematical Physics	Z	2
	ne seminar is to iluminate mathematical physics by virtue of solved examples. It is supposed that the teachers of the physics departm	_	ļ.
	concerning their scientific activities that could become the topics of the student?s bachelor theses in the next year	•	
		_	

02SPRA1 Special Practicum 1 ΚZ 6 Physics measurement focused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chosen so that students can familiarize with advanced pats of experimental physics and metrology. Special Practicum 2 ΚZ Physics measurement focused on instrumental techniques that are mainly used in physics and technical professions. Topics of each parts are chosen so that students can familiarize with advanced pats of experimental physics and metrology. 02TEF1 Theoretical Physics 1 Z.ZK 4 The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalism as well as diferent approaches to description of dynamics (Newton's, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is the first part of the course of classical theoretical physics (02TEF1, 02TEF2). 02TFF2 Theoretical Physics 2 Tensors and transformations in physics. Mechanics of point mass, rigid body and continuum. The special theory of relativity: relativistic mechanics and classical field theory in the Minkowski space-time. Classical electrodynamics: Maxwell's equations in the Minkowski space-time, electromagnetic waves in dielectric media, electromagnetic radiation in the dipole approximation. 02TER Heat and Molecular Physics 7.7K Thermal expansion of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynamic principle, ideal and real gas, entropy; non-chemical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity distribution, equipartition theorem. Thermodynamics and Statistical Physics Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy, Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena. 02UFEC Introduction to Elementary Particle Physics Ζ 2 The course provides an easily accessible introduction to elementary particle physics. Development, methods, goals and perspectives of the subject are presented 02UKP Introduction to Curves and Surfaces 2 The goal of the lecture is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts for the curves are introduced Frenets formulae are explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential part of the lecture are the examples calculated by students Foundations of Physical Measurements 1 The lecture is designed for students of physical specializations (Experimental particle physics, Physical engineering, Nuclear engineering), however, it can be attended by students of other branches. The goal of the lecture is to introducethe basics of physical measurements, the methods of processing and evaluation of acquired data on a PC. Studentslearn the basic habits of work in a physics lab. 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 those students who are going to study one of the physicas curricula - Physical engineering and Nuclear engineering. Also the methods of evaluation of statistical data using PC and practical work with measurement devices 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 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 K7 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 intuition regarding the behaviour of objects fails us. The lecture is a basic introduction to very interesting regions of subatomic physics Introduction to the Standard Model Particles, leptons, hadrons, baryons, mesons, symmetry, symmetry group, quarks, gluons, partons, standard model of electroweak and strong interactions, quantum chromodynamics (QCD), cross section, scattering cross section. **English - State Examination** The course content 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 respective courses and examinations (04AP3KK, 04APAK, 04API, and 04APRK). From its first semester, part of the APIN programme covers also examination subjects. As required, examination conditions comply with respective rules and regulations for state language examinations. 04AKS **English Conversation** The course will develop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication. The student will develop their vocabulary for various communication situations and will master their communication strategy. They will also practise their listening skills in order to better follow and participate in discussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more confident speaker. 04AM1 English for Intermediate Students M1 The course is designed for students who have successfully completed the full secondary school English language course at least at the A2 level of the Common European Framework of Reference for Languages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of vocabulary and style typical of professional oral and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical interest. Attention is also paid to extending the knowledge of grammar issues used in EAP. English for Intermediate Students M2 The 04AM2 course 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, and lexical items typical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided writing. If necessary, grammar revision is included. English for Intermediate Students M3 The course develops the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnical vocabulary and independent understanding of professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication and their appropriate Czech equivalents. The course also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation on a chosen topic related to the student's field. 04AMZK English for Intermediate Students Examination 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 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. English for Advanced Students P3 04AP3 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. 04APZK English for Advanced Students Examination ZK 5 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. Ζ 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 7 1 The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especially focused on stylistics and lexicology and on developing the student's writing skills. 04CESMZK ZK 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 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. 04CFSP7K Czech for Foreign Students - Advanced Examination ZK 5 The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. Ζ 04FM1 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 Ζ 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. 04FMZK French for Intermediate Students Examination ZK 4 The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination consists of a written and oral part and is organized according to Examination Instructions, a document available on the web. 04FP1 French for Advanced Students P1 7 04FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Students will be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general and technical information and to solve problems. 04FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repeated and expanded: subjonctif, passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics of specialization: mathematics, internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.

04FP2	French for Advanced Students P2	Z	1
	contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on g	_	•
With the limit to 1 1	technical and scientific communication are stressed (passive voice, nominalization, word formation).	von topico. i oatare	oo typioar or
04FP3	French for Advanded Students P3	Z	1
	FIGURIOF Advanced Students F3 sed on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in eng		ont Special
	f shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cover	-	
Skiii - translation o	topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.	s a tecrimoar/appir	eu science
04FPZK	French for Intermediate Students Examination	ZK	5
	program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part		_
THE WHOLE I TELLCH	Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination gr	_	cording to
04FZ1	French for Beginners Z1	Z Z	1
	reflict for Degrifflets 21 rs The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life , in soc	_	l accional life
•	s French for specific / technical communication and reading of popular science and scientific texts. 04FZ1 The objective is to be able		
	ising the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravd		·
	za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, pe		-
	firections, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronu		
04FZ2	French for Beginners Z2	7	1
-	g 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, agreements)		
	map of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral communi-		
	How does the machine work? A few expressions concerning the study. Name of University and Faculty.		
04FZ3	French for Beginners Z3	7	1
	pon 04FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - Pi		Beginners
	and situations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for inf		-
100100, 10110110110	pronunciation practice. Reading covers short adapted texts of general interest first, and later popular science texts.		ao pa o.
04FZ4	French for Beginners Z4	Z	1
-	p on 04FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The co		overed with
	he textbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the lectur		
	The course covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, shopp		0 0
	country and in France, how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet	_	,
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 pre-	_	
	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)		
,	subjunctive clauses, gerund, passive.		,
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 examin		
	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 st		assive) and
	processes (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repu		
	sues together with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicists	•	
	terminology. It develops communication on related topics and is aimed at correct pronunciation, grammatical correctness and unders		
04NM2	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	٠,	
	information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati		
	phenomena important for professional discourse (participles, relative clauses).	, ,	
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		and society.
	peginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and	٠,	
	information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systemati		
-	phenomena important for professional discourse (participles, relative clauses).		
04NMZK	German for Intermediate Students Examination	ZK	4
	is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination of		
	er the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessn		
	is to be obtained from the teacher.		
04NP1	German for Advanced Students P1	Z	1
	es good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be level	_	
· · · · · · · · · · · · · · · · · · ·	ie is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for d	_	-
	nar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on pra		
	i.e., telephoning.		
04NP2	German for Advanced Students P2	Z	1
The course develop	s the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending	their general and s	subtechnical
vocabulary range. It	t introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and pro-	actising formal com	munication,
b	oth written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indi	rect speech).	
04NP3	German for Advanced Students P3	Z	1
The course consis	ets of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a varie	ety of less common	situations
(traffic problems ar	nd car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the voca	bulary range in fie	lds such as
nuclear power en	gineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used.	By means of a pre	sentation,
students are trained	to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The c	ourse also includes	s translation
	practice to and from German.		
		·	

04NPZK	German for Advanced Students Examination	ZK	5
	t is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination of		
and oral, which cov	er the courses 04NM1 - 04NM3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungrad	ed assessment. Mo	ore detailed
	information is to be obtained from the teacher.		
04RM1	Russian for Intermediate Students M1	Z	1
_	gned for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (•	
-	or communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking		
tney can use bas	sic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement I		ırse. I ne
04DM0	contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetab		
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 th	Z	1
04RM3	Russian for Intermediate Students M3	Z	1
-	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	- 1	I ime allotted
The course develop	in the timetable.	ver, for riall of the t	inic anottou
04RMZK	Russian for Intermediate Students Examination	ZK	4
	t is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled		=
	ents are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given insti	-	
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	ticing more difficult	grammar
	structures, understanding the fundamentals of technical language and training writing skills.		
04RP2	Russian for Advanced Students P2	Z	1
The course is bas	ed on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, verbal adjectives), participles, passives, verbal adjectives, participles, passives, passiv	rb aspects, specific	syntactic
	structures). Stress is put on independent oral and written communication.		
04RP3	Russian for Advanced Students P3	Z	1
	ed on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing		
	od previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The	•	-
	er study is aimed at professional and technical skills (reading technical literature according to the students´ specialization, oral and wi chnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write acci		
develop their subte	technical topics.	diately and with col	iliderice on
04RPZK	Russian for Intermediate Students Examination	ZK	5
-	It is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowled	l l	-
- RP3. Stud	ents are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instr	uctions by the teac	her.
04RZ1	Russian for Beginners Z1	Z	1
The course represe	ents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian	Thus it begins with	n mastering
the Russian alphab	pet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking)	Students will be a	hle to read
•		. Otaderits will be e	ibic to icad
	a short text with marked stress, understand its contents and summarize it.		
04RZ2	a short text with marked stress, understand its contents and summarize it. Russian for Beginners Z2	Z	1
04RZ2 The second semes	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 subte	Z chnical texts. Stud	1 ents will be
04RZ2 The second semes	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 subtete using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also	Z chnical texts. Stud	1 ents will be
04RZ2 The second semes able to communica	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in	Z chnical texts. Stud develop their voca writing.	1 ents will be
04RZ2 The second semes able to communica	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3	Z chnical texts. Stude develop their voca writing.	1 ents will be abulary and
04RZ2 The second semes able to communica 04RZ3 The course is base	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in	Z chnical texts. Stude of develop their voca writing. Z various forms of re	1 ents will be abulary and 1 eading skills
04RZ2 The second semes able to communica 04RZ3 The course is base	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training	Z chnical texts. Stude of develop their voca writing. Z various forms of re	1 ents will be abulary and 1 eading skills
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4	Z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so	1 ents will be abulary and 1 eading skills o as to be
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts	Z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so	1 ents will be abulary and 1 eading skills of as to be 1 entage of
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba unfamiliar words, of	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreg	Z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so Z with a certain percular verbs, difference	1 ents will be abulary and 1 eading skills of as to be 1 entage of ces in verb
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba unfamiliar words, of patterns from Cze	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free	z chnical texts. Stude develop their voca writing. Z various forms of re able to respond so Z with a certain percular verbs, difference time), and practice	1 ents will be abulary and 1 eading skills of as to be 1 entage of ces in verberoral and
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba unfamiliar words, of patterns from Cze	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, freeation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical date.	z chnical texts. Stude develop their voca writing. Z various forms of re able to respond so Z with a certain percular verbs, difference time), and practice	1 ents will be abulary and 1 eading skills of as to be 1 entage of ces in verbe oral and
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba unfamiliar words, or patterns from Cze written communica	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreg ech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical dat fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals.	Z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), les	1 ents will be abulary and 1 eading skills of as to be 1 entage of ces in verberoral and
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba unfamiliar words, of patterns from Czi written communica	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregent, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5	Z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), les	1 ents will be abulary and 1 eading skills of as to be 1 entage of ces in verber or and arn how to
04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is ba unfamiliar words, or patterns from Cze written communica 04RZ5 The course expects	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 subte te using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training d introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreg ech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free ation on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 sthe student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding	Z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so Z with a certain percular verbs, differentime), and practice a (e.g., Siberia), leading g, extracting and si	1 ents will be abulary and 1 eading skills of as to be 1 entage of ces in verberoral and arn how to 1 ummarizing
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04RZ2 The second semes able to communica 04RZ3 The course is base and listening) an 04RZ4 The course is base unfamiliar words, or patterns from Czd written communica 04RZ5 The course expects information from a severyday topics. Severyday topic	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 subte to using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in Russian for Beginners Z3 d on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training di introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. Russian for Beginners Z4 sed on 04RZ3. It improves and expands the knowledge of general language in all flour skills (reading and understanding longer texts or communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irreg sch, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free attion on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical dat fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. Russian for Beginners Z5 sthe student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understandin specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication (see voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, pc Russian for Begin	z chnical texts. Stude of develop their voca writing. Z various forms of reable to respond so able to respond so able to respond so all the control of the	1 ents will be abulary and 1 rading skills to as to be 1 entage of ces in verb to oral and arn how to 1 cummarizing to trained on oparticiples, 3 red in RZ1 her. 1 standard rative, and to order to be 1 competent maries. The

			·
04SP1	Spanish for Advanced Students P1	Z	1
ourse concentrate	s on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication.	Course prerequis	ites: level B
	of CEFR.	_	
04SP2	Spanish for Advanced Students P2	Z	1
ourse SP2 is the	second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and synta:	x and focuses on	ınaepenaen
04000	written communication.	Z	1
04SP3	Spanish for Advanced Students P3 e final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focu	_	1 -
0436 0436 3 13 111	based on what students will need in their career.	ised on written co	IIIIIuiiicalio
04SPZK	Spanish for Advanced Students Examination	ZK	5
	it is the examination as given by the study plan. Examination 04SPZK consists of two parts, namely oral and written. The prerequisit		_
	ving passed the written test. Examination content is based on syllabi of courses SP1, SP2, and SP3 or on an individual study plan o		oral part is
04SZ1	Spanish for Beginners Z1	Z	1
	e first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundam		
	communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spa	-	
04SZ2	Spanish for Beginners Students Z2	Z	1
Course 04SZ2 is t	ased on course 04SZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures a	ı and lexis will be ch	nosen so as
enable them to u	nderstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries	and others such a	as the Czec
	Republic. Realia of Spanish-speaking countries are also included.		
04SZ3	Spanish for Beginners Z3	Z	1
	d on course SZ2, and develops the student's vocabulary and grammar structure. The course covers realia (history and culture) of the		_
mainly of Spain. I	t pays attention to further grammar topics (pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund and the imperative)). It includes writte	en and oral
	communication on a given general topic, for which the student is trained by reading texts or listening to them.		1
04SZ4	Spanish for Beginners Z3	Z	1
	d on course SZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish		
	tion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	=	subjunctive),
	o written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening		
04SZ5	Spanish for Beginners Z5	Z	1 1
ne course books	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish fo part, the general Spanish course based on the course book will end with presentations and, finally, a written and oral examina		es. In its fina
04SZZK		ZK	3
	Spanish for Beginners Examination nt is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral ex		-
The course come	passed the written examination test.	ariii attori oriiy ii i	ic/sile ilas
11ANEL	Linear Circuit Analysis	Z.ZK	1
ı	ntroduction to the linear electronics for physicists. In the first part it describes basic methods of linear circuit analysis. It is especially	,	l
	of the computer methods of analysis. The second part gives a short list of most commonly used circuits in experimental equipment of the computer methods of analysis.		
11APLG	Applications of Group Theory in Solid State Physics	ZK	2
	tomic system symmetry allows, without any quantitative calculations, rigorously and precisely determine how many energy states the		
and transitions bet	ween them may occur. Therefore, the main purpose of this course is to describe the methods by which we can extract the information	n on the object tha	at symmetry
lone will provide. T	he application of these methods is illustrated by an example of molecular orbitals, inner orbitals of ions in the crystal field environment	nt, normal modes	of molecula
	vibrations, and selection rules for optical absorption transitions.	1	
11ELEA	Instrumentation and Measurement	Z,ZK	2
	The course is the introduction to the instrumentation and measurement for physicists.		
11MIK	Logical Circuits and Microprocessors	Z,ZK	4
The course is the	introduction to the digital electronics for physicists. It describes the function principles of combination circuits, simple sequential circu	uits and complex	circuits like
	microprocessors. The microcomputer architecture and principles of interfacing is shown.		1
11SFBM	Structure and Function of Biomolecules	Z,ZK	3
nowledge of macr	omolecular structure is crucial for the understanding of its function. The subject is focused on the introduction to building blocks of many	cromolecules, ove	erall structure
	and its structure:function relationship including macromolecular complexes.		
11UFPLN	Introduction to Solid State Physics	ZK	2
	The purpose of this lecture is to introduce the undergraduate students to the study of the solid state physics.		_
11UVOD	Introduction to Specialization	Z	2
	The purpose of this lecture is to introduce the undergraduate students to the physical master degree study programmes.		
11ZFPL	Basic to Solid State Physics	KZ	2
-	mental properties of solids following the regular long distance ordering of atoms in a crystal lattice. Based on the introduced bonding	=	
	of crystals and their properties are defined. The model of crystalline lattice dynamics in harmonic approximation is described and basic		-
are derived the c	eriodic potential of the crystal lattice is introduced and its relation to the following model describing the energetic state of electrons in		
-			oduce and
-	olained. The special consequences of band approach to the physical properties of solids are elucidated. The aim of the course is to see interpret a broad phenomenological basis of physical properties of crystalline solids	systematically intro	
energy bands ex	interpret a broad phenomenological basis of physical properties of crystalline solids		2
energy bands ex	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers	Z,ZK	2
energy bands ex	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot	Z,ZK her branches.	1
energy bands ex	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System	Z,ZK	2
12APL App	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dilication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system	Z,ZK her branches. KZ	2
12APL Appl 12AUX 12EGS1	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dilication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system English Graduate Standard 1	Z,ZK her branches. KZ	2
12APL Appl 12AUX 12EGS1 Improving the k	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system English Graduate Standard 1 nowledge in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr	Z,ZK her branches. KZ KZ oceedings to be p	2 4 published
12APL Appl 12AUX 12EGS1 Improving the k 12EPR1	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system English Graduate Standard 1 nowledge in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr Basic Electronics Practicum 1	Z,ZK her branches. KZ KZ oceedings to be p	2 4 published 3
12APL Appl 12AUX 12EGS1 Improving the k 12EPR1	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system English Graduate Standard 1 nowledge in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr Basic Electronics Practicum 1 cticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation	Z,ZK her branches. KZ KZ oceedings to be p	2 4 published 3
12APL Appl 12AUX 12EGS1 Improving the k 12EPR1 The aim of the pra	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system English Graduate Standard 1 nowledge in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr Basic Electronics Practicum 1 cticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation consists of blocks lasting 4 hours.	Z,ZK her branches. KZ KZ oceedings to be p KZ of the results. The	2 4 published 3 appracticum
12APL Appl 12AUX 12EGS1 Improving the k 12EPR1 The aim of the pra	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers Dication of lasers in industrial technologies, medicine, remote sensing, energetics, telecommunication, military, entertainment and ot Administration of UNIX System Basic and more advanced administration of Unix operating system English Graduate Standard 1 nowledge in English, English Presentation, English Discussions, creation of the technical text, structures of important documents, Pr Basic Electronics Practicum 1 cticum is 1) to acquire basics skills in electronics and 2) to learn independent problem solving, formulation of a task and formulation	Z,ZK her branches. KZ KZ oceedings to be p KZ of the results. The	2 4 published 3 e practicum 3
energy bands ex	interpret a broad phenomenological basis of physical properties of crystalline solids Application of Lasers	Z,ZK	Τ

12INS1	Information Systems 1	Z,ZK	2
Information technol	ogy, architecture of the databases, network databases, cloud application Google, Microsoft, information managament, aproaches to so	lve task of informat	ion systems
12INS2	Information Systems 2	Z,ZK	2
Graduation of In	formation systems 1 is required. In more details: Information technology, architecture of the databases, network databases, cloud ap information managament, aproaches to solve task of information systems	plication Google, N	Aicrosoft,
12LAS	Laser Systems	Z,ZK	3
	e nanosecond lasers. Picosecond lasers. High energy laser systems. Laser fusion. Diode-pumped solid state lasers. Tunable lasers. C		1
and raman lasers.	Semiconductor lasers for pumping of solid state lasers and diode pumped solid state lasers Amplified spontaneous emission. Ultravi	iolet lasers. X-ray la	asers. High
	power continuous lasers. Infrared high power lasers. Submilimeter lasers. Lasers with high degree of coherence. Free electron I		T
12LT1	Laser Technique 1	Z,ZK	3
I -	Stability. Transverse and Longitudinal Modes. Elements of Open Resonators. Threshold of laser oscillations. Gausian beam as an app ethod. Optical radiation propagation in resonant medium. Two-level approximation. Equations for polarisation and inversion, dispersio		
	non-coherent pulse propagation. Optical solitons. Photon echo. Superradiation. Amplified spontaneous emission Lasers without optical		ordin and
12LT2	Laser Technique 2	Z,ZK	2
'	Laser oscillator, the rate equation, the laser amplifier, Q-switching, mode-locking	,	'
12MOF	Molecular Physics	ZK	2
	deas on multi-atomic molecules and molecular matter, and on structure-to-physical properties relations. Methods of molecular structure-to-physical properties relations.		
12MPR1	Microprocessors 1	ZK	4
	nd microcomputer, microprocessor types, memory types CPU, memory, Input output. Code and data, addressing modes(direct, indir e calls, IO devices - program control, interrupt. Microprocessor Microchip PIC16F877A, Instruction codes- Assembler and Macroassem	-	
7,7	RISC processors - principles	3	, 55.
12MPR2	Microprocessors 2	ZK	2
Arc	chitecture IA-32. Data types and addressing. Memory segmentation and paging. Real and privileged mode. Instruction set, Assemble	er. description.	
12NMEA	Numerical Methods for Scientists and Engineers	KZ	3
1	d the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Me		- 1
	icists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computat a demonstration tool. The seminars are held in computer laboratory and PASCAL is used as a principle programming language and N		
12NT	Nanotechnology	ZK	2
	duce students mainly to modern technological methods of preparation of semiconductor, metal and dielectric nanostructures. Physica	1	
	gies (MBE, MOVPE, EBL, sol-gel and colloidal solution) will be explained. Substantive attention will be devoted to epitaxial technolog	=	
1	paration. Particular emphasis will be focused on detail characterization of "in situ" and "ex situ" techniques, their applications for hete		
growths will be disc	cussed as well. Some supportive technical methods - lithography, diffusion, evaporation, ion implantation, contact and dielectric layer as well as soldering and encasement.	preparation will be	e mentioned
12PDR1	Data Communication and Interfaces 1	Z	2
121 01(1			
	Principles of computer networks, networks architectures and data transfer. Specification of existing network architectures.		_
12PDR2	Principles of computer networks, networks architectures and data transfer. Specification of existing network architectures. Data Communication and Interfaces 2	Z	2
			2
12PEL1	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1	Z,ZK	2
12PEL1	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo	Z,ZK	2
12PEL1 Recapitulation of	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser.	Z,ZK gue to digital conve	2 erters and
12PEL1	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo	Z,ZK gue to digital conve	2
12PEL1 Recapitulation of	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2	Z,ZK gue to digital conve	2 erters and
12PEL1 Recapitulation of 12PEL2 12PIN1 Computer and o	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 Noise analyses in electronics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit de Practical Informatics for Technics 1 perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interface.	Z,ZK gue to digital converse z,ZK esign. Z ce. Hardware and s	2 erters and 2 2 software.
12PEL1 Recapitulation of 12PEL2 12PIN1 Computer and o Principles of operati	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 Noise analyses in electronics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit desperating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaing systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, kernel, kernel, kernel.	Z,ZK gue to digital conversesion. Z,ZK esign. Z ce. Hardware and sernel services. Doc	2 erters and 2 2 software.
12PEL1 Recapitulation of 12PEL2 12PIN1 Computer and o Principles of operati File system, file atri	Data Communication and Interfaces 2 Principles of Ethernet standards and basics of protocol suite TCP/IP. Practical Electronics 1 basics electronic, mathematical analyses of circuit solving. Measurement in electronic, measurement of frequency and phase. Analo digital signal processing. Function of voltmeter, ampermeter, oscilloscope, spectral analyser and logical analyser. Practical Electronics 2 Noise analyses in electronics, low noise electronics system design. Noise measurement. Time measurement. Printed circuit desperating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfaing systems. Requirements on operating system for research and technical computing. Operating system UNIX. Basic principles, kernel, kibutes, working with files. Text editors: vi, emacs. Command interpreter (shell) sh, csh and its programming (scripts). Controlling processor.	Z,ZK gue to digital converse z,ZK esign. Z ce. Hardware and sernel services. Docses, process statu	2 erters and 2 esoftware. cumentation. ss, computer
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12UMF			
The course is into	Introduction to Modern Physics Inded to be a concise introduction to modern / nonclassical physics for students who have already had basic classical physics course. A	Z	3
The course is line	in a computational laboratory.	part of the course	e is delivered
12VAK	Vacuum Physics and Technology	KZ	4
_	s: basic concepts and relations; flow of rarefied gas. Interaction of gas with surface of solid surface; sorption, desorption; evaporation, c	_	-
through solid m	natter; Vacuum generation. Pumping process. Pumps. Vacuum measurements: vacuum gauges of total and partial pressure; pumping sp searching for leaks. Materials and vacuum instalation parts. Practical exercises.	peed; gas flow, co	onductivity,
12VFT	High Frequency and Impulse Circuitry	Z,ZK	2
The goals of co	urse is to collect advanced knowledge in high frequency technics and high speed events. The course is focused on Maxwell equation s	olution, Gunn's d	iodes, high
	frequency technics, microwaves guidelines, striplines, oscillators, amplifiers and pulse generators.		
12VTV	Scientific and Technical Computing	Z	2
The students ge	et familiar with methods of solving of computational problems in the scientific and technical practice, and with methods of their programi mainly to programming in the Fortran language.	ming. The course	is oriented
12ZAOP	Fundamentals of Optics	Z,ZK	2
	rs the very basics of optics - electromagnetic theory, linear optical physics and material effects, basics of nonlinear effects, and geometric	•	_
	obtain, on the bachelor level, broad and general information on optics, giving an essential orientation in the field, especially with respec		
	pics are further elaborated during departmental masters program. The lecture stems from the electrodynamic notion of plane waves in v Irther from material medium. It explains basics of linear and nonlinear response in material medium and dispersion properties. It next in	-	
* *	a, it explains processes induced by boundary conditions at interfaces. It also discusses the consequences of statistics on interference p		
of two-wave interfe	erence and their applications in interferometers. Based on the Fresnel diffraction integral, diffraction processes are presented in a graphical	al form, including f	undamentals
	on. Based on this diffraction principle, basic functioning of holography is clarified. Finally, the lecture unravels the geometrical optics limit.		n geometrical
	oproach imaging, substitutive schema of a paraxial imaging system, and optical aberrations. It shows fundamentals of imaging in optical		1 -
12ZDP	Data Processing for Publishing puter computer-assisted publishing, coding of text, OCR (optical code recognition), DTP (desk top publishing), programming languages	Z	2
,, , , , , , , , , , , , , , , , , , , ,	puter computer-assisted publishing, coding or text, OCR (optical code recognition), DTP (desk top publishing), programming languages publishing into www pages, cloud computing,commonly used graphical formats, formatting of typical data (PDF, PS, DOC, DOCX, PPS).	,, ,,	
TTTIVIE, XIVIE,,	multimedial presentations, multimedial formats.	5, 1 1 5%, 1(1 1, %)	-O, ALOA),
12ZEL1	Basic Electronics 1	Z,ZK	3
	rides primary knowledge of circuit theory concerning principles of electronic circuits in both stationary and harmonic stable state. Circuit	,	ds for linear
circuits inclu	de symbolic and complex method are explained. Proper circuit analysis is also lectured. The subject's final part deals with transient effe	ects inside linear	circuits.
12ZEL2	Basic Electronics 2	Z,ZK	3
<u>-</u>	ows 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
· ·	igh temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants, line	=	-
	of electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and parame t comprises brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas ar		re explairieu.
	t comprised billor introduction into magnetory arough armos and nacious racions. Baciles of atomic physics of manapy formed placings are	e introduced	
127MD	Measurement and Data Processing		2
12ZMD Basic knowledge	Measurement and Data Processing for the measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propeties,	KZ	2 ration of the
		KZ	_
Basic knowledge	for the measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propeties, signal from the noise. Basic Laser Technique Laboratory	KZ data fitting, separ	ration of the
Basic knowledge 12ZPLT Lasers, solid state	For the measurements and data processing and result interpretation: errors, precision, accuracy, normal distribution and its propeties, signal from the noise. Basic Laser Technique Laboratory Nd:YAG laser, laser crystal, laser discharge lamp, laser cavity, resonator, free-running, Q-switching, laser amplifier. second harmonic,	KZ data fitting, separ KZ He-Ne glow discl	ration of the 6 harges, laser
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15ANCH2	Inorganic Chemistry 2	Z,ZK	5
	urse is devoted to systematical chemistry of elements. The properties of representative elements, transition elements and chemistry of		
characterised. Sele	ected chapters in the second part of course deal with catalysis, organometallic compounds and chemistry of solid state. The role of meta	l ions in biological	environment
	is discussed at the end of course.		1 -
15ANP	Practical Training in Inorganic Chemistry	Z	4
Basic practical co	purse dealing with synthesis and characterization of inorganic compounds. Students get practical training in syntheses of inorganic compounds.	mpounds by acid	- base and
4500014	oxidation-reduction reactions, complex formation reactions and reactions in melt.		
15BPCH1	Bachelor Thesis 1	Z	5
4500000	Background research and results of research	7	10
15BPCH2	Bachelor Thesis 2 Background research and results of research	Z	10
15CH1	General Chemistry 1	7	3
	ן General Chemistry ו It concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical נ	-	-
The most importan	solved in exercises.	ise are illustrated	ру ехапірісэ
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	'	_
-	e principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are	•	
,	in exercises.	•	•
15CHEM	Analytical Calculations and Chemometry Principals	ZK	2
Lecture deals with	basic principles of chemometry including errors in classical and instrumental analysis, probability theory, propagation of errors, basi	1	s, one- and
two-tailed significa	ance testing, hypothesis testing, least squares regression and correlation, calibration and fitting methods, non-parametric testing, sem	inar part consists	of equation
solving, titration	on stoichiometry of redox, acid-base, complex and precipitation reactions, gravimetric stoichiometry. pH calculations, calculations in p	otentiometry, coul	lometry,
	spectrophotometry and separation methods, solving of complex forming equilibria.		_
_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 F		
The last part of	course is dedicated to Alchemy in Arabic world and various aspects of alchemy in Latin Europe. The influence of alchemical approach	ies development o	onto crafts
450517	advancement is illustrated.	1/7	
15DEIZ	Practical Exercises in Detection of Ionizing Radiation	KZ	3
This laboratory exe	ercise is a practical introduction to fundamental principles of detection of ionizing radiation (IR), interaction of IR with matter, and functio types of detectors and detection systems.	namy and semings	oi particular
15DIZ	Detection of Ionizing Radiation	ZK	2
_	e course deals with the definitions, properties, and application of the detectors of ionising radiation (IR). In the second part, a detailed		I
	ctors, detectors for high energy IR, semiconductor detectors, and integrating solid state detectors is given. The last part of the course	_	
	statistical treatment of data, and limits of detection.		
15EXK1	Excursion 1	Z	1
	The excursion aims at mediating the students the acquaintance with various radiochemical and radiation methods used in practice.	ctice.	ı
15FCHN1	Physical Chemistry 1	Z,ZK	5
The introductive pa	irt is devoted to the recapitulation of the thermodynamic systems and thermodynamic properties of ideal and real gases. Next chapters	are devoted to the	first, second
and third law of the	rmodynamics and their applications. Last but not least, attention is devoted also to the thermodynamic, phase and chemical equilibriur	ns as well as to the	e elementals
	of nonequilibrium thermodynamics.		
15FCHN2	Physical Chemistry 2	Z,ZK	5
	Chemistry 2 focuses on thermodynamics of solutions, particularly on electolytes. Basics of colloidal chemistry extend the theory of so		
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 other states of the state of the s		
	out in the laboratories of Czech Academy of Sciences (Institute of Physical Chemistry) and partly in laboratory at the Department of		_
15INSN1	Instrumental Methods 1	ZK	3
	view of selected modern instrumental methods of research and analysis, theoretical fundamentals, instrumental technique, utilization		
15JACH1	Nuclear Chemistry 1	Z,ZK	3
	ory of nuclear chemistry and radiochemistry, nuclear entities, nuclear reactions, natural and artificial radioactivity. Kinetics of nuclear reactions, of nuclear reactions, mass and energy balance of nuclei and energy of alpha, beta decay, gamma deexcitation in nuc		radioactive
15JACH2	Nuclear Chemistry 2	Z,ZK	4
	s are discussed in detail in the course: Nuclear reactions yield, reaction cross section, excitation function. Fission reaction, spontaneo	· '	1
	iclear reaction, local temperature, atomic recoil and recoil energy, recoil of atom bound in a molecule, hot atom chemistry, retention, \$		-
15LABT	Practical Training in Laboratory Technique	Z	3
	basic laboratory training and is designed for students of "Chemistry in Science", "Teaching of Chemistry", and "Biology". The course	l	_
	ined at secondary school to an equal level and gets them ready for all following laboratory trainings. After absolving of the course, the		
including handling	the most frequently used laboratory equipments (pH-meter, UV-Vis spectrophotometer, vacuum rotary evaporator) and have the nece	ssary information	about safety
	out writing laboratory diaries. The training is organized in blocks of four hours a week. The students work in groups of two according t		
group absolve the	e complete set of (all) 10 exercises during semester. In the exercises, measurements of properties of unknown samples, basic synthetics of the complete set of (all) 10 exercises during semester. In the exercises, measurements of properties of unknown samples, basic synthetics.	ic and purification	operations
	and basic methods of analyses are involved.		
15MZD	Measurement and Data Handling	Z,ZK	3
Characteristics	of statistical distribution functions (one-dimensional data), hypotesis testing, analysis of variance (ANOVA), correlation analysis, regre		analysis of
4500::	multidimensional data; chemometrics; testing of analytical methods; numerical methods and computers in data processing		
15OCH	General Chemistry	Z,ZK	6
	ry, classification of substances, concentrations, chemical reactions and equations, stoichiometric calculations, atoms and molecules,		
matter, chemical th	ermodynamics, first law of thermodynamics, thermochemistry, second law of thermodynamics, entropy, Gibbs energy, phase and chemi	cai equilibria, elec	u ocnemistry,
15ODC1	pH, reaction kinetics, kinetic equation, Arrhenius' equation.	7 71/	4
15ORC1	Organic Chemistry 1 iic compounds, properties of covalent bond, reactions on covalent bonds. Nomenclature of organic compounds (main chain, group, lo	Z,ZK	I
_	of organic compounds, double bond isomers, chirality, enantiomers and diastereomeric compounds. Configuration and conformation, i		
1 -	cidity, hard and soft acids and bases. Resonance, aromaticity, classification of substituents, reactivity of polycyclic arenes. Intermediat	· ·	
1		,	,

15ORC2 Introduction to the	compounds of sulfur, nitrogen, phosphorus, silicon, other elements and carbonyl compounds chemistry.	, alcohols and ethe	ers, organic
	Organic Chemistry 2	Z,ZK	4
	second group of organic compounds, carboxylic acids and their derivatives, heterocyclic compounds, important natural compounds, and pharmaceuticals - industrial and natural. Introduction to the metods of structural analysis.		· -
15PFCH		Z	6
	nental physico-chemical phenomena are demonstrated in ten exercises. Basic thermodynamic, kinetic and electrochemical characteris		_
rate constant, buffe	r capacity etc., are determinated. Required data are obtained by means of chemical analysis (e.g. titration, extraction) and by common	instrumental metho	ods (UV-VIS
	polarography, potentiometry, conductometry, electrolysis, viscosimetry). Emphasis is given on appropriate interpretation of measure and statistical evaluation.		
15PINS	Laboratory Practice in Instrumental Methods	KZ	2
	Practical training of students in the use of selected modern instrumental methods and techniques for determination of required part	rameters	
15POCH	Organic Chemistry Practical	Z	5
Practical courses s	nould allow students to become familiar with some basic organic chemistry laboratory techniques and methods of organic chemistry. S	Synthetic problems	are chosen
so that student get	s acquainted with basic chemical operations, properties of selected organic compounds, and acquire basic skills to synthesize a rang	ge of organic comp	ounds. The
	course complements the theoretical knowledge of organic chemistry.		
15POLE	Theory of Electromagnetic Field and Waves	Z,ZK	4
The course compri	ses of three parts: the first part contains selected passages of the theory of the electromagnetic field, the second part is dedicated to the	ne wave motion and	d the optics,
	and the third part is the introduction to the atomic physics.		
15RATEC	Practical Exercises in Radiochemical Techniques	KZ	2
The exercise is	oriented on the training of students in laboratory praxis and work with open radioactive sources through basic lab operations such a	s pipetting, extract	ion and
	atography techniques. Training is also focused on decontamination of surfaces and clean-up of the accident, work behind shielding a	nd in a glove box.	
15SBP	Bachelor Thesis Seminar	Z	1
	ne aim is to prepare students to write and defend bachelor thesis, including work with information sources and to acquire basic prese		
15ZBCH	Fundamentals of Biochemistry	Z,ZK	4
Whole area of gen	eral biochemistry is covered by the lecture. Structures of metabolites are discussed together with basic metabolic processes in which	they participate. L	ectures - in
Czech - Exercises	: Practical course in biochemistry is provided by Helena Ryšlavá, Helena Ryšlavá, Veronika Doubnerová, Helena Dra ínská, Petr Mai	n, Petr Novák, Peti	Pompach,
	dents are dealing with basic biochemical methods. There are methods used for protein and nucleic acid isolation and their characteriza		•
precipitation, dialy	sis). Ion exchange chromatography and gel filtration are used for protein purification from a complex mixture. The students have to de	termine the relative	e molecular
	mass of a protein by SDS polyacrylamide electrophoresis comparing the mobility of it with those of proteins with		
15ZKJE	Nuclear Power Plants Design and Operation	ZK	3
-	o create basic knowledge of physics of nuclear reactors utilizing fission. Further explains arrangement of nuclear fuel, purpose, technolo	-	
	nd construction of all components are defined wit regard to nuclear physics, physics of shielding, theory of regulation, material science		
-	tes knowledge for evaluation of nuclear safety and radiation protection in nuclear energy, reliability and economy for comparison with		
environment and it	strategic importancy of nuclear sources of energy. Gives basic knowledge of construction, operation and decommissioning of nuclear high level nuclear waste and spent fuel and their management.	power stations. in	iornis about
16AMMB		ZK	2
	Fundamentals of Analytical Measurement Methods echnical performance and utilization of methods of chemical analysis. Basic methodology of analytical determination, gravimetry, titra		
	actometry, polarimetry, UV-VIS spectroscopy, atomic emission and absorption spectroscopy, infrared and Raman spectroscopy, X-ray	ation motificas, pot	
		v structural analysi	=
	magnetic and electron spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography.	y structural analysi	=
16APLB	magnetic and electron spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography. Application of Ionizing Radiation in Analytical Methods		s, nuclear
16APLB Subject The applica	magnetic and electron spin resonance, mass spectrometry, thermometric methods, gas and liquid chromatography. Application of Ionizing Radiation in Analytical Methods ation of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation	ZK	s, nuclear
	Application of Ionizing Radiation in Analytical Methods	ZK	s, nuclear
	Application of Ionizing Radiation in Analytical Methods and ionizing radiation of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation	ZK	s, nuclear
Subject The application 16DRH	Application of Ionizing Radiation in Analytical Methods tion of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation of technological processes.	ZK n in the analysis ar Z,ZK	5 ad diagnosis
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Subject The application 16DRH Main part of the codetail the variables of the radiation properly relating to the use of doses and ship of the second	Application of lonizing Radiation in Analytical Methods tion of ionizing radiation in analytical methods is devoted to radioanalytical methods and the use of radionuclides and ionizing radiation of technological processes. Dosimetry and Radiation Protection burse deals with the interactions of ionizing radiation with matter describing the source and the radiation field and its effect in matter. Idescribing the interaction of ionizing radiation (IR) with the matter, the effects of ionizing radiation and microdosimetric variables. The citection system, biological effects of IR and secure management of IR resources in the workplace. Lectures are complemented by an of radiation protection (RP) and IR in practice. Lectures are supplemented with practical exercises that address the basic models and elding of IR. Successful students will obtain a certificate required for being registered for an exam leading to receiving a qualification following the Czech legislation. Exact Methods in Research of Historic Monuments of historic monument investigations, methods of age determination (radiocarbon, thermoluminescence and related methods, further radiation), analytical methods for determination of origin and production technologies of artefacts (activation analysis, X-ray fluorescence and photogrammetry. Problems of Non-ionizing Radiation on biological effects of non-ionizing radiation and its use in physical praxis. Information about principles, biological effects and method resonance and ultrasound as applied in various types of technical or medical equipment are given as well. Clinical Propaedeutic miliar with the basics of anamnesis, physical examination, examinational methods of different organs, hematological and biochemical or types of radiation and its use for radiation transport simulation, selected concepts of probability theory and mathematical ent types of radiation and their use for stochastic modeling of their substance transport. Model description concepts, geometric mode sing of measured variables a	ZK n in the analysis ar Z,ZK The next section divide is closed with overview of currend examples as the of a Radiation safe ZK on methods, dendronalysis and other results and other results are declared by the control of the contr	s, nuclear 5 ad diagnosis 3 scusses in an overview to legislation calculation ety officer 2 ochronology, nethods), 2 of magnetic 2 anaesthesia 4 al models of rm, scoring for radiation in gradiation, 4
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16SED1	Dosimetry Seminar 1	Z	2
	apposed to motivate the student's interest in the field of dosimetry, especially in medical physics. Introductory lectures will be devoted	to support for futu	
•	s. The following lectures are given by the former students of DDAIR, who are currently employed in various organizations (SÚRO, v.v.		
	MI, Hospital Na Homolce, FN v Motole, PTC Czech s.r.o.).		
16SED2	Dosimetry Seminar 2	Z	2
	ry 2 follows-up SED1. In this seminary students will listen to the lectures of the older students of DDAIR. The older students give lectures of the older students of DDAIR.		
,	search topic of their theses. The course also introduces the principles of creating good presentation and advice for working with scien		31000 011 1110
16UAZB	Principles of Ionizing-Radiation Applications	ZK	2
	of applications, review of interaction of radiation with a matter, radiation sources, detectors and instrumentation, evaluation of radionum		
	and scattering of radiation beams, selected radioanalytical methods, tracer methods, radionuclide dating, further possibilities for the u		
16ZBAF1		Z,ZK	4
	Fundamentals of Human Biology, Anatomy and Physiology 1	′ '	
•	ving systems, non-cellular and cellular organisms, prokaryotic and eukaryotic cell. Molecular and cell biology. Biopolymers. Molecular		
their regulation. G	eneral human anatomy. Basics of medical terminology. Overview of tissues. Skeleton. Muscle anatomy in general. Digestive system a	na its priysiology. F	Respiratory
	system and physiology of respiration. Excretory and genital tract.		
16ZBAF2	Fundamentals of Human Biology, Anatomy and Physiology 2	Z,ZK	4
· ·	logy of cardiac activity. General anatomy of blood vessels, main arteries of the body, overview of veins and physiology of blood, blood	-	of nerves.
	S. Visual system and physiology of the visual system. Auditory and vestibular system and physiology of hearing and balance. Skin, en	docrine glands.	
16ZDOZ1	Fundamentals of Radiation Dosimetry 1	Z,ZK	4
History, develop	pment, and objectives of dosimetry. Quantities and units used for description of sources, fields, interactions of ionizing radiation, ionizi	ations, energy tran	sfer and
	absorption. Fundamentals of the effects of ionizing radiation.		
16ZDOZ2	Fundamentals of Radiation Dosimetry 2	ZK	2
Fundamentals of bi	lological effects of ionizing radiation. Quantities and units used in radiation protection. Recommendations of ICRP and ICRU. Principles	and methods of me	asurements
	in dosimetry. Determination of activity and neutron source emission. Measurements of absorbed dose and exposure.		
16ZEDB	Basics of Experimental Data Processing	ZK	2
102200	Statistical analysis of experimental data; univariate data; calibration; regression; multivariate data.	213	-
16ZIVB		KZ	2
	Introduction to Ecology		
The Subject inform	about basic of the ecologic principles, terms and ideas. It covers overview information regarding to particular components of the enviro	ililielii aliu evaluai	e economic
107.170	indicators and sustainable development.	717	
16ZJTB	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		
nign-voitage acce	elerators, linear high-frequency accelerators, accelerators based on cyclotron, microtron, betatron, electron and proton synchrotrons,	electron and ion s	ources for
	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		-
	e 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 (h	ospitals, state administration, companies). Other sections summarize basic information about computer hardware, software, and secur	ity. Completion of it	ndependent
	home exercises and participation in exercises above 60% is a necessary condition for passing the course.		
16ZRAO	Basics of Radiation Protection	Z	2
	rse is to familiarize students with the general principles of radiation protection. The main emphasis is put on basic mechanisms and con	-	I
	field. The course provides answers to the cardinal questions: What is ionizing radiation (IR), where it comes from, whether and how it		
	ng of protective units (Gray, Sievert), how to prevent malicious effect of IR and many others. The content of the lectures does not requ		
17ENF	Experimental Neutron Physics	KZ	2
The lectures are	mainly focused on detailed characterisation of neutron properties, characteristics of neutron (reactor and non reactor) sources, properties,	erties of prompt an	d delayed
neutrons, neutron	i detection methods, neutron induced nuclear reactions, modification and adjustment of neutron field, science and industry neutron ap	plications. Last led	cture deals
with experimental of	data processing and analysis. The lectures are supplemented with experimental practices in the field of neutron detection, determination	of delayed neutron	properties,
study of neutron dif	ffusion in various materials, preparation and characterisation of photo-neutron source and neutron source calibration. Experimental prac	tices will be runnin	g at training
	reactor VR-1 and in the neutron laboratory.		
17JARE	Nuclear Reactors	ZK	2
Introduction. World	power issue. Previous evolution of power reactor. Nuclear fission reactors, fuel assemblies, active core, control systems, safety system	ns, containment. C	lassification
of reactors into IV g	generations. Standard types of nuclear power reactors: concept, description, layout, previous evolution, world share, perspectives. Pres	surized water reac	tors (PWR).
Western-type I	PWR (Westinghouse, KWU, Framatom). VVER-type reactors , Temelín nuclear power plant. Boiling water reactors. Heavy water react	ors, fast breeder re	eactors,
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 lo	ng-term outlook	
17UINZ	Introduction to Engineering	Z,ZK	3
	oted to an introduction to the engineering profession. Students will gradually learn the characteristics and specialties of engineering v	vork, including an	overview of
the basics of selec	cted engineering disciplines, such as the basics of materials science, manufacturing technology, quality control and assurance and ec	ology. Further, the	course will
	focus on some issues of R&D activities organization and on selected parts of technical drawings and the work with AutoCAI	O code.	
17VYR	Research Reactors	ZK	2
	to research reactors and their applications for the need of research and industry. Students get familiar with research reactor types and		
	th experimental equipment needed for particular applications and their specifics. The course is supported by technical visit to research	•	1
17ZEH	Basics of Economic Assessment	ZK	2
	Ises on the economic evaluation of Nuclear power plants. Introductory lectures are concerned with an introduction to economy and th		
	ectures continued with insight into the business and managerial economics, explanation of the concepts of incomes, expenses, etc. and	=	- 1
	energy resources evaluation. Second part of lectures is focused on evaluation of nuclear power plants - the fuel cycle and operation		5.56.11641
17751			
17ZEL	Basics of Electronics Basics of Electronics Basic	KZ	3
· · · · · · · · · · · · · · · · · · ·	easic information of electronics. In the beginning, lectures are devoted to passive components - resistors, capacitors, inductors and so		
	is deal with semiconductor components (standard, Zener, capacitive, LED), bipolar, unipolar transistors and semiconductor componer ures continue with general amplifiers and operational amplifiers. Finally, lectures deal with digital circuits, digital/analog and analog/dig	-	
ana maos). Lecti	completed with electronic laboratory exercises.	nai conventera. Let	oraros are
	Completed with electronic laboratory exercises.		

18EKO1	Mathematical Economics 1	Z,ZK	5
	s selected models and methods for economic decision making. The main attention is given to optimization models of linear program	'	_
	applications and their solving by means of the current software products.		
18EKO2	Mathematical Economics 2	Z,ZK	5
The course introdu	ces selected models and methods for economic decision making. The main attention is given to optimization models in graphs, pro	ject managemen	t, inventory
4050504	management with deterministic and stochastic demand, queuing theory and simulation models.	_	
18ESPG1	European Computer Driving Licence 1	Z	2
	ors are an important tool, especially for students and graduates in Software engineering in economics. The winter semester introducent is put on advanced functions of MS Excel (names, functions and expressions, pivot table and graph). Next, the VBA language w		
omec tools. The acco	and user functions will be addressed.	viii be introduced	ana macros
18ESPG2	European Computer Driving Licence 2	Z	2
	ors are an important tool, especially for students and graduates in Software engineering in economics. Summer semester follows the	ı winter semester v	ith advance
VBA programming t	opics (charts, objects, graphical user interface, add-ins programming) and introduces some applications in economics, mathematic	cs, operational re	search, and
	computer science.		1
18INTA	Development of internet applications	KZ	4
•	an overview of modern technologies for the development of web applications. Students will learn basic web languages and concept the relational database systems. The traciple are dedicated to practical examples of building web applications, from the giral and		
ili also de introduce	d 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		i. The course
18MAK1	Macroeconomics 1	Z,ZK	4
	provides students with a fundamental theoretical basis for understanding how an economy works. It introduces main macroeconom	· ′	1
	ibrium theory, fundamentals of open economy theory, inflation, unemployment, economic growth, economic fluctuations, basic may		-
S-AD and their impli	cations for economic policies. The learning outcomes of the course is to equip students with ability to analyze macroeconomic phenomenations are considered as a constant of the course is to equip students with ability to analyze macroeconomic phenomenation of the course is to equip students with ability to analyze macroeconomic phenomenation of the course is to equip students with ability to analyze macroeconomic phenomenation of the course is to equip students with ability to analyze macroeconomic phenomenation of the course is to equip students with ability to analyze macroeconomic phenomenation of the course is to equip students with ability to analyze macroeconomic phenomenation of the course is to equip students.	nena and their inte	erconnection
	and subsequently to use them under the conditions of modern economic life.		
18MAK2	Macroeconomics 2	Z,ZK	4
	extends theoretical knowledge acquired from Macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of the latest knowledge of the latest knowledge of contemporary macroeconomics I of its students with the latest knowledge of th	-	
=	specially those with an emphasis on the role of human capital and technological progress. Furthermore, it introduces students to m		
nodeling, i.e., macroe	economic models derived from microeconomic behavior of subjects and economics and their rational expectations. It also provides stu of labor market modeling.	udents with mode	rn knowleag
18MIK1	Microeconomics 1	7 71/	5
IOIVIIIXI	MICIOECONOMICS I		
	set of theories, which help us to understand processes by which the scarce resources are allocated among alternative uses. Micro	Z,ZK	-
Microeconomics is a	set of theories, which help us to understand processes by which the scarce resources are allocated among alternative uses. Micro in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduct Consumer Theory.	economics explai	ns the role o
Aicroeconomics is a prices and markets	in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduc Consumer Theory.	economics explai	ns the role o nomics and
ficroeconomics is a prices and markets	in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduced in the economic agents.	economics explai etion in Microecor	ns the role on nomics and
licroeconomics is a sprices and markets 18MIK2 licroeconomics is a seconomics is a seconomics.	in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduction Consumer Theory. Microeconomics 2	economics explaination in Microeconomics Z,ZK s explain the role	ns the role on the role of prices and
ficroeconomics is a prices and markets 18MIK2 dicroeconomics is a seconomics is a seconomics.	in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduction Consumer Theory. Microeconomics 2 set of theories, helping us to understand process by which scarce resources are allocated among alternative uses. Microeconomics	economics explaination in Microeconomics Z,ZK s explain the role	ns the role on the role of prices and
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ficroeconomics is a prices and markets 18MIK2 ficroeconomics is a markets in the subject acquain	in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduct Consumer Theory. Microeconomics 2 set of theories, helping us to understand process by which scarce resources are allocated among alternative uses. Microeconomics his process and make clear economic agents behaviour. The lectures of Microeconomics II are oriented on Theory of Firm and Inc. Programming in MATLAB ts students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in program compared to classical languages.	economics explaintion in Microecor Z,ZK s explain the role lustrial Organisat KZ nming methodolo	ns the role of nomics and 5 of prices and ion. 5 gy in Matlab
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ficroeconomics is a prices and markets 18MIK2 ficroeconomics is a markets in the subject acquain the subject acquain for the subject acquain for the subject acquain for the subject acquain the subject acquain for the subj	in these processes, and makes more clear behaviour of the economic agents. This course of Microeconomics I consist of introduct Consumer Theory. Microeconomics 2 set of theories, helping us to understand process by which scarce resources are allocated among alternative uses. Microeconomics his process and make clear economic agents behaviour. The lectures of Microeconomics II are oriented on Theory of Firm and Inc. Programming in MATLAB ts students with various programming techniques in the Matlab environment. The emphasis is placed on the differences in program compared to classical languages. Programming in MATLAB invironment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic analysis and geometric representation of results.	z,ZK s explain the role lustrial Organisat KZ nming methodolo Z,ZK sis, statistics, alg	ns the role of nomics and 5 of prices and ion. 5 gy in Matlab 5 orithmization
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