## Study plan

## Name of study plan: Doctoral studies, combined studies

Algorithms and Structures of Neurocomputers

Petra Juna Jennings Petra Juna Jennings (Gar.)

Petra Juna Jennings Petra Juna Jennings (Gar.)

Jan Voves Jan Voves Jan Voves (Gar.) Applied Electroacoustics

Petr Honzík Petr Honzík Petr Honzík (Gar.) Applied Cryptography Tomáš Van k Tomáš Van k Tomáš Van k (Gar.)

**Applied Optoelectronics in Medicine** 

Petra Juna Jennings, Markéta Havlí ková Petra Juna Jennings Petra Juna

Petra Juna Jennings, Markéta Havlí ková, Dana Saláková Petra Juna Jennings

Ji í Jakovenko

**English Language** 

**English Language** 

English Language 2

English language 1 English language 1

English language 2

English language 2 TCAD Tools Applications

Jan Vrba

Petra Juna Jennings (Gar.)

Jennings (Gar.)

**Electric Circuit Analysis** 

XP31ASN

XP34AIC

XP31AEO

XP04AZK

XP04MIN

XP04A1ZK

XP04A1

XP04A2

XP34AT

XP37AEA

XP32AKR

XP17APL

XP04A2ZK

XP04A2SZK

Department: Branch of study g Garantor of the st Program of study Type of study: Do Required credits: Elective courses of Sum of credits in	: Electrical Engineering and Information Technolog ctoral combined 20 credits: 10		ndividu	áln .\\		
	k: Compulsory elective courses of credits of the block: 20 ock: S					
0	p: Compulsory facultativetudy dits in the group: In this group you have to gain at rses in the group: up: 20		,	at most	30)	
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		Scope	Semester	Role
XP02AME	Active Methods in Acoustics Ond ej Ji í ek	ZK		2P	L	S
XP02AMA	Active Methods in Acoustics Ond ej Ji í ek Ond ej Ji í ek Ond ej Ji í ek (Gar.)	ZK	4	2P	L	S
XP37AEM	Acoustic and Electroacoustic Measurements Libor Husník Libor Husník (Gar.)	Z,ZK	4	2P+1S	L	S
XP37APF	Acoustics and Electroacoustics of Solid State Libor Husník	Z,ZK	4	3P+1L	Z	S
XP37AR	Speech Acoustics	ZK	4	2+0s	L	S

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4

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2P+2S

1P+2C

2P+2S

0C

0C

4C

4C

2P+2C

2P+2L

4P + 0S

2P+2C

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XP36ASP	Architecture of Symbolic Computers	ZK	4	2P+2S	L	S
XP37ARA	Josef Kolá Josef Kolá Neur en (Gar.) Architectural Acoustics	ZK	4	2P+2S	L	S
XP31ART	Libor Husník Libor Husník Libor Husník (Gar.) Architectures for Real Time Implementation	ZK	4	2P+2S	L	s
XP38ATM		ZK	3	2P+2D		s
XP02BFY	Pionhygiag	Z,ZK	4	2P+2C	Z	s
XP33BID	Biophysics Bionics	ZK	4	2P+2S	Z	S
XEP33CML		Z,ZK	4	1P+1S	L	s
	Computational Intelligence Techniques for Machine Learning Computational Methods for Materials Science		-	-		_
XEP35CMS	Antonio Cammarata Antonio Cammarata Antonio Cammarata (Gar.)	Z,ZK	4	2P+2C	Z,L	S
XP04 1	Czech language 1 Dana Saláková	NIC	0	4C	Z,L	S
XP04C1ZK	Czech language 1 Markéta Havlí ková	ZK	0		Z,L	S
XP04C2ZK	Czech language 2 Markéta Havlí ková	ZK	0		L,Z	S
XP04 2	Czech language 2 Dana Saláková	NIC	0	4C	Z,L	S
XP31DSP	Digital signal processing Pavel Sovka	ZK	4	2P+2S	Z	S
XP31CZS	Digital signal processing           Radoslav Bortel, Pavel Sovka, Petr Pollák Radoslav Bortel Radoslav Bortel (Gar.)	ZK	4	2P+2C	Z	S
XP33RG2	Reading Group Giulia D'Angelo, Jan Kybic, Karel Zimmermann, Miroslav Kulich, Michaela Valentová <b>Karel Zimmermann</b> Karel Zimmermann (Gar.)	ZK	4	2P+2S	Z,L	S
XP33RCV	Reading group in Pattern Recognition and Computer Vision Georgios Tolias, Torsten Sattler Georgios Tolias Georgios Tolias (Gar.)	ZK	4	2P+2S	Z,L	S
XP13DFD	Data and Functional Analysis of Production Systems Martin Molhanec	Z,ZK	4	2P+2S	L	S
XP13DEZ	Degradation processes of electridal equipment Karel Dušek, Ivan Kudlá ek, David Bušek Karel Dušek Karel Dušek (Gar.)	Z,ZK	4	2P+2L	Z	S
XP16HPH	History of Physic	ZK	4	2P+2S	Z,L	S
XP34ORD	Optical Radiation Detection and Detectors	ZK	4	2P+2C	, L	S
XP36DRO	Václav Prajzler, Vít zslav Je ábek Václav Prajzler Václav Prajzler (Gar.) Diagnostics and Reconfiguration of Programmable Circuits	ZK	4	2P+2S	Z	s
XP34DTM	DIAGNOSTICS AND TESTING IN MICROELECTRONICS	ZK	3	2P+2C	L	s
XP15DVN	Diagnostics of HV and EHV Insulating Systems	Z,ZK	4	2P+2S		s
XP02DP	Electric Discharges and their Applications	ZK	4	2P+2C		s
	Pavel Kubeš, Karel ezá Karel ezá Pavel Kubeš (Gar.)		-			
XP13DTF	Thin film diagnostics	Z,ZK	4	2P+2L	L	S
XP32DZS	Digital Signal Procesing in Telecommunications	ZK	4	4P + 0S 2P +	L	S
XP32DKS	Sizing of communications networks Petr Hampl Petr Hampl (Gar.)	ZK	4	2F + 2C+ 2D	L	S
XP33DID	Distributed Artificial Intelligence	ZK	4	2P+1S	Z	S
XP36DSV	Distributed Systems Jan Jane ek Jan Jane ek Jan Jane ek (Gar.)	ZK	4	2P	Z	S
XP36DSY	Distributed Systems	ZK	4	2P	Z	S
XP37DRS	Jan Jane ek Satellite communication and navigation systems	Z,ZK	4	2+2s	Z	s
XP14DSD	František Vejražka Dynamics of Electric Machines	ZK	4	4+0s		s
XP14DES	Dynamics of Electric Machines Miroslav Chomát Miroslav Chomát (Gar.)	ZK	4	2P+2C	Z	S
XP16EES	Economics of energy systems	ZK	4	2P+4D	Z,L	S
XP01EAL	Old ich Starý, Tomáš Králík Öld ich Starý Old ich Starý (Gar.) Effect algebras	ZK	4	2+1	_,_ L	s
XP01EKM	Mathematics Models for Economics	ZK	4	2P+1S	L	S
XP16ERU	Kate ina Helisová Accounting	ZK	4	2P+2S	L	S
XP16EKO	Economics	ZK	4	2P+2S	Z	s
XP16MES	Economics and Management of Energy Systems	ZK	4	2P+2S	 L	s
XP16EME	Economics and Management of Energetics	ZK	4	2P+2S	Z	s
XP16MEU	Economics and Management of Energetics	ZK	4	2P+2S	Z	s
XP16EPM	Economics of power markets Jaroslav Knápek	ZK	4	2P+4D	Z,L	5

XP16ERE	Economics of power generation from RES Jaroslav Knápek Jaroslav Knápek (Gar.)	ZK	4	2P+4D		S
XP37ELA	Elastoacoustics	ZK	4	2+0s	L	s
XP15ES	Electrical Lighting	Z,ZK	4	2P+2S	L	S
XP15ET	Electroheat	Z,ZK	4	2P+2S	L	s
	Jan Kyncl Jan Kyncl Jan Kyncl (Gar.)					
XP02EVA	Physics for Electroenergetics Pavel Kubeš Pavel Kubeš Pavel Kubeš (Gar.)	ZK	4	3P	Z	S
XP34ETS	Electrical Transport in Semiconductors Jan Voves Jan Voves Jan Voves (Gar.)	ZK	4	2P+2C	Z	S
XP17ELD	Electrodynamics Lukáš Jelínek	ZK	4	2P+2C	Z	s
XP14EMC	Electromagnetic Compatibility Zden k e ovský Zden k e ovský (Gar.)	ZK	4	2P+2C	Z	S
XP14ECD	Electromagnetic Compatibility Zden k e ovský	ZK	4	4+0s	Z	S
XP38EMC	Electromagnetic Compatibility of Data Acquisition Systems Jan Holub Jan Holub Jan Holub (Gar.)	ZK	4	2P+2C	Z	s
XP15EH	Energy Economy	Z,ZK	4	2P+2S	L	S
XP15EZP	Zden k Müller Control in Power Engineering	Z,ZK	4	2P+2S	L	s
XP33ECD	Ivo Doležel	ZK	4	2P+1S	Z	s
XP15EXE	Evolutionary Computing	Z,ZK	4	2P+13 2P+2S	Z,L	s
XP16FVT	Expert Systems in Electrical Power Engineering	Z,ZK	4	0P+4S	L,L	-
	Philosophical Problems of Science and Technology					S
XP16FIM	Financial Management Old ich Starý	ZK	4	2P+2S	Z	S
XP31FSK	Phonetic signals and their coding	ZK	4	2P+2S	L	S
XP31FON	Speech Phonetics and Advanced Voice Technologies Petr Pollák Petr Pollák Petr Pollák (Gar.)	ZK	4	2P+4D		s
XP15FAK	Photometry and Colorimetry	Z,ZK	4	2P+2S	L	S
XP37FOS	Photonic Imaging Systems Petr Páta Petr Páta Petr Páta (Gar.)	ZK	4	2P+2L+4D	Z	S
XP13FCD	Photovoltaics systems Jakub Holovský, Vít zslav Benda Vít zslav Benda Vít zslav Benda (Gar.)	Z,ZK	4	2P+2L	L	S
XP04F1ZK	French language 1	ZK	0		Z,L	S
XP04F1	French language 1	NIC		4C	Z,L	S
XP04F2ZK	French language 2	ZK	0		Z,L	S
XP04F2	French language 2	NIC		4C	L,Z	S
XP01FA1	Functional Analysis 1 Jan Hamhalter Jan Hamhalter Jan Hamhalter (Gar.)	ZK	4	2P+2S	L	s
XEP33FLO	Fuzzy Logic Mirko Navara Mirko Navara Mirko Navara (Gar.)	ZK	4	2P+0S	L	S
XP33FLO	Fuzzy Logic Mirko Navara	ZK	4	2P+0S	L	S
XP35FMD	Fuzzy Modelling and Control	ZK	4	2P+2C	L	S
XP35FMC1	Fuzzy modeling and control	ZK	4	2P+2C		S
XP37FZS	Fuzzy Signal Processing	Z,ZK	4	2+2s	L	S
XP37PAC	Physiological Acoustics	ZK	4	2P+4D	Z	S
XP13FDD	Petr Maršálek, Václav Vencovský Václav Vencovský Petr Maršálek (Gar.) Physic of Dielectrics	Z,ZK	4	2P+2S	Z	s
XP02FPL	Pavel Mach Pavel Mach Pavel Mach (Gar.) Solid State Physics	ZK	4	2P+2C	L	s
XP34ASD	Antonio Cammarata Antonio Cammarata Antonio Cammarata (Gar.)           Physics of Advanced Semiconductor Devices and Materials	ZK	4	1P+3C+3D	Z,L	s
XP13FPD	Jan Voves Jan Voves Jan Voves (Gar.) Semiconductor Physics	Z,ZK	4	2P+2S	_,_ Z	s
XP02FPT	Vít zslav Benda Vít zslav Benda Vít zslav Benda (Gar.)	Z,ZK	3	2P+1C	L	
XP02FP1 XP37FHA	Physics for Therapy	Z,ZK ZK	4	2P+1C 2+2s	L	S S
XP37FHA XP37FHA1	Physiological, Psychological and Musical Acoustics	ZK	4	2+2S 2P+0S	Z	
XP37FHA1 XP37FHA2	Physiological, Pychologycal and Musical Acoustics 1	ZK	4		L	S
	Physiological, Psychological and Musical Acoustics 2			2P+2S		S
XP37GAB	Genesis and Analysis of Biosignals	ZK	4	3P+1S	L	S
XP33GAD	Geometrical Algebras Pavel Pták	ZK	4	2+0s	L	S
XEP33GMM	Graphical Markov Models	ZK	4	2P+1S	Z	S

XP16HKA	Historical structures and technologies in architecture	NIC	2	0P+4S	Z,L	S
XP16HDS	History of Transport Systems and Communications Marcela Efmertová	ZK	2	0P+4S	Z,L	S
XP16HEL	History of Electrical Engineering Marcela Efmertová	NIC	2	0P+4S	Z,L	S
XP16HIS	Historiography of the Development of Science, Technology and the Methodology Zden k Beneš, Zden k Beneš Zden k Beneš Zden k Beneš (Gar.)	ZK	4	2P+2S	Z,L	S
XP02HS	Noise Surveys Ond ej Ji í ek	ZK	4	1P	L	S
XP36HS	Hypermedia Systems and Internet Computing Ivan Jelínek Ivan Jelínek Ivan Jelínek (Gar.)	ZK	4	2P+2S	L	S
XP37IAR	Implementation algoritms in radioelecronics	Z,ZK	4	2P+2S	Z	S
XP33IMD	Informatics in Clinical Medicine	ZK	4	2P+0S	L	S
XP01ITZ	Integral Transforms and Z Transform	ZK	4	2+1	Z	S
XP34IO	Integrated Optics Václav Prajzler, Vít zslav Je ábek, David Mareš Vít zslav Je ábek Vít zslav Je ábek (Gar.)	ZK	4	2P+2C	Z	S
XP12IMM	Engineering Methods in Mechanics	Z,ZK	4	2+2s	L	S
XP36JAI	Languages for Artificial Intelligence Josef Kolá	ZK	4	2P+2S	Z	S
XP33CHM	Chapters in higher mathematics Mirko Navara, Pavel Pták Pavel Pták Pavel Pták (Gar.)	ZK	4	2P		S
XP01KAS	Complexity and Combinatorical Algorithms Marie Demlová	ZK	4	2+1	L	S
XP36KP	Communication Protocols Jan Jane ek	ZK	4	2P	L	S
XP35CCM1	Cooperative control of multi-agent systems Kristian Hengster-Movric Kristian Hengster-Movric Kristian Hengster-Movric (Gar.)	ZK	4	2P+2C		S
XP34CNO	Integrated Optics Vít zslav Je ábek, Ji í tyroký <b>Ji í tyroký</b> Ji í tyroký (Gar.)	ZK	4	2P+2C	Z,L	S
XP16ECM1	Quantitative research methods in economy 1 Lubomír Lízal Lubomír Lízal Lubomír Lízal (Gar.)	ZK	4	2P+4D	Z	S
XP16ECM2	Quantitative research methods in economy 2 Lubomír Lízal	ZK	4	2P+4D	L	S
XP16KVM	Quantitative Research Methods in Management	ZK	4	2P+2S	L	S
XP01KVP	Quantum Computing	ZK	4	2+2	Z	S
XP17LAE	Medical Applications of Electromagnetic Field Jan Vrba Jan Vrba Jan Vrba (Gar.)	ZK	4	2P+2C	L	S
XP37LN	Aircraft Navigation František Vejražka František Vejražka František Vejražka (Gar.)	ZK	4	2P+2S	L	S
XP35LMI	Linear Matrix Inequalities Didier Henrion	ZK	4	2P+2C	L	S
XP35LMI1	Linear matrix inequalities Didier Henrion Didier Henrion Didier Henrion (Gar.)	ZK	4	2P+2C		S
XP35LSD	Linear Systems	ZK	4	2P+2C	L	S
XP36LSM	Logical Simulation	ZK	4	2P+2S	Z	S
XP33LPD	Logic and Logic Programming	ZK	4	2P+2S	L	S
XP38MPX	Magnetism in Engineering Practice Pavel Ripka Pavel Ripka Pavel Ripka (Gar.)	ZK	4	2P+2C	Z	S
XP02MHD	Magnetohydrodynamics Pavel Kubeš Pavel Kubeš (Gar.)	ZK	4	2P	Z	S
XP16MAN	Management	ZK	4	2P+2S	L	S
XP16MAV	Production Management	ZK	4	2P+2S	L	S
XP33MZT	Management of Knowledge and Information Technologies	ZK	4	2P+1S	L	S
XP16MAU	Accounting for management	ZK	4	2P+2S	L	S
XP16MAR	Marketing	ZK	4	2P+2S	Z	S
XP16MAS	Marketing Strategies	ZK	4	0P+4S	Z	S
XP33MAD	Mathematical Analysis of Dempster-Shafer Theory	ZK	2	2P+0S	Z	S
XP01MST	Mathematical Statistics	ZK	4	2+1	L	S
XP01MTS	Mathematical Methods in Signal Theory	ZK	4	2+1	Z	S
XP01MKR	Mathematics for cryptography	ZK	4	2+1	Z	S
XP33MKD	Mathematics for Cybernetics - Selected Topics	ZK	4	2P+2S	L	S

	Václav Prajzler Václav Prajzler Václav Prajzler (Gar.)					
XP01MTP	Matrix Calculus Pavel Pták	ZK	4	2P+1S	L	S
XP15MPE	Mechatronics in Electrical Power Engineering	Z,ZK	4	2P+2S	L	S
XP38MMN	Measurement of Nonelectric Quantities Pavel Ripka Pavel Ripka Pavel Ripka (Gar.)	ZK	4	2P+2L	L	s
XP15MVN	High Voltage Measurement	Z,ZK	4	2P+2S	L	S
XP37MVP	Scientific Work Methodology Stanislav Vítek Miloš Klíma	ZK	4	4P+0S	Z	s
XP17MVP	Methodology of Science Stanislav Vitek Stanislav Vitek (Gar.)	ZK		2P+2C	Z	s
XP33MMD	Analysis and visualization methods for medical data	Z,ZK	4	2P+2C	L	s
XP17MAPP	Jan Kybic Analysis Methods for Passive Elements of Microwave and Millimeter-wave Technique Jan Machá, Vít zslav Pankrác Jan Machá Jan Machá (Gar.)	ZK	4	2P+2C	Z	S
XP38MDR	Methods of Signals Digitalization and Reconstruction Josef Vedral Josef Vedral Josef Vedral (Gar.)	ZK	4	2P+2C	L	s
XP38MPM	Methods for Precision Measurement of Electrical Quantities	ZK	4	2P+2C	Z	s
XP38MET	and Measurement Data Processing Metrology	ZK	3	2P+2L		s
XP14MID	Microprocessor Control of Electric Drives	ZK	4	4+0s	Z,L	S
XP14MIP	Microprocessor Control of Electric Drives	ZK	4	4+0s	Z,L	S
XP14MIR	Microprocessor Control of Electric Drives	ZK	3	4+0s	Z,L	S
XP34MSY	Microsystems Miroslav Husák <b>Miroslav Husák</b> Miroslav Husák (Gar.)	ZK	4	2P+2C	Z,L	s
XP34MSA	Microsystems and Microactuators Miroslav Husák Miroslav Husák Miroslav Husák (Gar.)	ZK	3	2P		s
XP17MT	Microwave Technique Jan Vrba, Karel Hoffmann Jan Vrba Karel Hoffmann (Gar.)	ZK	4	2P+2C	Z	s
XP32MOS	Mobile Networks Pavel Mach, Zden k Be vá, Robert Beš ák Zden k Be vá Zden k Be vá (Gar.)	ZK	4	2P + 2C	Z	s
XP33MOL	Modal Logics for Distributed Systems	ZK	4	2P+0S	Z	S
XP13MSD	Modelling and Simulation of Technological Systems Pavel Mach Pavel Mach (Gar.)	Z,ZK	4	2P+2C	Z	s
XP33ICT	Modern ICT for Industry and Smart Grids	ZK	4	2P+0S	L	S
XP02MPF		Z,ZK	2		Z	S
XP14RPD	Advanced Controlled Drives	ZK	3	4+0s	Z	S
XP14MPO	Advanced Controlled Drives	ZK	4	4+0s	Z	S
XP14MRP	Advanced Controlled Drives	ZK	3	4+0s	Z	S
XP37MSC	CNS Modern Systems	ZK	4	2+2s	Z,L	S
XP34APD	Advanced Power Semiconductor Devices and ICs Jan Vobecký Jan Vobecký Jan Vobecký (Gar.)	ZK	4	2P+2C	Z,L	S
XP14MZR	New Control Methods for Electric Drives           Ji í Lettl Ji í Lettl (Gar.)	ZK	4	2P+2C	Z	s
XP14MPD	Advanced Control Methods of Electric Drives	ZK	4	4+0s	Z	S
XP37MPS	Multimedia Signals Transmission	ZK	4	2P+2S	Z	S
XP37NAV	Václav Žalud Vácľav Žalud Navigation systems Pavel Ková	ZK	4	2P+2L		S
XP31NOS	Design and circuit structures of electronic systems	ZK	4	2P+2S	L	s
XP31DIF	Ji í Hospodka Ji í Hospodka Ji í Hospodka (Gar.) Digital filter synthesis	ZK	4	2P+2S	Z	S
XP34PIC	Pavel Sovka Programmable IC Design	ZK	4	2P+2C	Z	S
XP37NRO	Pavel Hazdra Pavel Hazdra Pavel Hazdra (Gar.) CAD for RF and Microwave Circuits	Z,ZK	4	3P+1S	Z	S
XP35NES1	Josef Dobeš Josef Dobeš Josef Dobeš (Gar.)	ZK	4	2P+2C		s
XP35NES	Nonlinear systems	ZK	4	2P+2C	L	s s
XP04N1	Nonlinear Systems	NIC	+	4C	Z,L	s
XP04N1ZK	German language 1	ZK	0	+0	Z,L Z,L	s S
XP04N1ZK	German language 1 German language 2	ZK	0		Z,L Z,L	s s
XP04N22N	German language 2 German language 2	NIC		4C	Z,L	s s
XP36NSN	Neural Networks and Neurocomputers	ZK	4	2P+2S	Z,L Z	s S

XEP33NEP	Neuroprosthetics	Z,ZK	4	2P+0S	Z	S
XP13NM	New Matherials and their Application	Z,ZK	4	2P+2S	L,Z	S
XP14MEN	<b>New Trends in Converter Technology</b> Zden k e ovský, Ji í Lettl <b>Ji í Lettl</b> Ji í Lettl (Gar.)	ZK	4	2P+2C	L,Z	S
XP14MTD	New Trends in Converter Technology Zden k e ovský	ZK	4	4+0s	L	s
XP14APR	New Trends in Electric Device Apply	ZK	3	4+0s	L	S
XP14NAP	New Trends in Electric Device Apply	ZK	4	4+0s	L	S
XP14APD	New Trends in Electric Device Applications	ZK	4	4+0s	L	S
XP14NTP	New Trends in Electric Device Theory	ZK	4	4+0s	Z	S
XP14TPR	New Trends in Electric Device Theory	ZK	3	4+0s	Z	S
XP14TPD	New Trends in Electric Device Theory	ZK	4	4+0s	Z	S
XEP33NUM	Numerical Analysis Mirko Navara	Z,ZK	4	2P+2S	L	S
XP33NUM	Numerical Analysis Mirko Navara	Z,ZK	4	2P+2S	L	S
XP01NLA	Numerical Linear Algebra	ZK	4	2P+1S	L	S
XP32NMR	Numerical Methodes of Electromagnetic Tasks Solution	ZK	4	4P + 0S	L	S
XP17NME	Numerical Methods in Electromagnetic Field Jan Machá Jan Machá Jan Machá (Gar.)	ZK	4	2P+2C	L	S
XP34EHA	Renewable Energy Microsources for Electronics - Energy Harvesting Miroslav Husák Miroslav Husák (Gar.)	ZK	4	2P		S
XP37IPP	Image Processing and Photonics Petr Páta Petr Páta (Gar.)	ZK	4	2P+2L	Z	S
XP32ODV	Intellectual property protection Ji í Hájek <b>Ji í Hájek</b> Ji í Hájek (Gar.)	ZK	4	2P + 0S	L	S
XP35OFD	Estimation and Filtering Vladimír Havlena	ZK	4	2P+2C	Z	S
XP35ESF1	Estimation and filtering Vladimír Havlena Vladimír Havlena (Gar.)	ZK	4	2P+2C		S
XP33OSD	Real Time Operating Systems	ZK	4	2P+1S	L	S
XP37ODS	Optical Design and Simulation	ZK	4	2P+2C		S
XP17OV	Optical Fibers Stanislav Zvánovec Stanislav Zvánovec (Gar.)	ZK	4	2P+2C	L	S
XP32OSY	Optical Systems	ZK	4	4P + 0S	L	S
XP35ORC1	Optimal and robust control Zden k Hurák Zden k Hurák Zden k Hurák (Gar.)	ZK	4	2P+2C		S
XP36PSV	Parallel Systems and Algorithms	ZK	4	3P+2S	L	S
XP01PDR	Partial Differential Equations	ZK	4	3P+0S	L	S
XP34PED	Advanced Electronic Devices	ZK	4	2P+2C	Z	S
XP13PED	Plastics in Electrical Engineering Ivan Kudlá ek Ivan Kudlá ek Ivan Kudlá ek (Gar.)	Z,ZK	4	2P+2S	Z	S
XP02PT	Plasma Technologies	ZK	4	2P	L	S
XP33VTP	Computer Vision Theory and Practice Ond ei Chum Ond ei Chum Ond ei Chum (Gar.)	ZK	4	2S	L	S
XP01POA	Advanced theory of operator algebras	ZK	4	2+1	L	S
XP39CG	Advanced Computational Geometry Petr Felkel Petr Felkel (Gar.)	ZK	4	2P+1C+4D	Z	S
XEP36AGT	Advanced Computational Game Theory Branislav Bošanský, Viliam Lisý Branislav Bošanský Branislav Bošanský (Gar.)	ZK	4	2P+0C+4D		S
XP37CAD	Advanced methods for circuit analysis and optimization using computer-aided design Josef Dobeš Josef Dobeš (Gar.)	Z,ZK	3	2P+3D	Z	S
XP16AFM	Advanced Financial Management Methods Old ich Starý	ZK	4	2P+4D	Z,L	S
XP39UID	Advanced methods of UI design Zden k Míkovec Zden k Míkovec Zden k Míkovec (Gar.)	ZK	4	2P+2S		S
XP39VIZ	Advanced Visualization Methods Ladislav molík, Pavel Slavík Ladislav molík (Gar.)	ZK	4	2P	Z	S
XP39PMV	Advanced Methods of Visualization Pavel Slavík Pavel Slavík Pavel Slavík (Gar.)	ZK	4	2P+2S	Z	S
XP36POA	Advanced Parallel Algorithms	ZK	4	2P+2S	Z	S
XP37NOS	Advanced Computational Tools for Imaging and Radio Systems Stanislav Vítek Stanislav Vítek Stanislav Vítek (Gar.)	ZK	4	2P+2L	L	S

XP37MSP	Advanced Multimedia Signal Processing	Z,ZK	4	2P+2L+3D	L	s
XP17PEM	Karel Fliegel Karel Fliegel (Gar.)         Advanced Electromagnetism	ZK	3	2P+2D		s
XP34SDS	Lukáš Jelínek Lukáš Jelínek Lukáš Jelínek (Gar.) Semiconductor Structures	ZK	-	2P	1	_
XP345D5	Pavel Hazdra Pavel Hazdra Pavel Hazdra (Gar.)	2K	3	2P	L	S
XP34SRS	Semiconductor Radiation Sources Vít zslav Je ábek, Zden k Burian Vít zslav Je ábek Vít zslav Je ábek (Gar.)	ZK	4	2P+2C	L,Z	s
XP33PPD	Practical Data Mining Problems	ZK	4	2P+2S	L	s
XP33PAD	Probabilistic Algorithms	ZK	2	2P+0S	L	S
XP33PMD	Probabilistic Models of Uncertainty in Al	ZK	4	2P+0S	L	S
XP34ADM	Principles and Applications of Device Models Jan Voves Jan Voves Jan Voves (Gar.)	ZK	4	1P+3C+3D	Z,L	s
XP37PKP	Biomedical Engineering in Clinical Practice	ZK	4	2P+0S	L	S
XP36PAS	Algebraic Specifications Prototyping Karel Richta Karel Richta Karel Richta (Gar.)	ZK	4	2P+2S	Z,L	s
XP33PAM	Industrial application of multi-agent systems	ZK	4	1P+0S	L	S
XP13PSD	Flexible Production Systems	Z,ZK	4	2P+2S	Z	S
XP15PEE	Transmission of Electricity Zden k Müller Zden k Müller	Z,ZK	4	2P+2S	L	s
XP38PSL	Aircraft Instrumentation	ZK	4	2P+2L	Z	s
XP38PUC	Jan Rohá <b>Jan Rohá</b> Jan Rohá (Gar.)	ZK	2		L	s
XP37RAD	Radioelectronics	ZK	4	2P+2S	L	s
XP36RSY	Pavel Ková Pavel Ková Pavel Ková (Gar.)	ZK	4	2P+2S	L	s
	Reconfigurable Systems Robust Control					_
XP35RRD	Zden k Hurák	ZK	4	2P+2C	Z	S
XP33RSK	Robust Statistics for Cybernetics Jana Nosková Jana Nosková Jana Nosková (Gar.)	ZK	4	2P+0S	L	s
XP33ROD	Pattern Recognition	ZK	4	2P+2S	L	s
XP04R1	Russian language 1	NIC		4C	Z,L	S
XP04R1ZK	Russian language 1	ZK	0		L,Z	S
XP04R2ZK	Russian language 2	ZK	0		Z,L	S
XP04R2	Russian Language 2	NIC		4C	Z,L	S
XP35FSC1	Flexible structures control Martin Hrom ik Martin Hrom ik Martin Hrom ik (Gar.)	ZK	4	2P+2C		S
XP35FSC	Flexible Structure Control Martin Hrom ík	ZK	4	2P+2C	Z	s
XP16JAK	Quality Management	ZK	4	2P+2S	Z	s
XP33RMD	Control of Mobile Robots	ZK	4	2P+2S	L	s
XP35CCM	Cooperative Control of Multi-agent systems Kristian Hengster-Movric	ZK	4	2P+2C		S
XP33RSP	Management of Software Projects	ZK	4	2P+1S	L	S
XP32RTS	Telecommunications Systems Management	ZK	4	2P + 2C	Z	S
XP15RE	Control of Power Systems Zden k Müller Zden k Müller (Gar.)	Z,ZK	4	2P+2S	Z,L	s
XEP17SWR	Scientific Writing	ZK	4	2P+2S	*	S
XPE04SCWR	Scientific Writing	Z	4	2C	L,Z	s
XP15SPS	Dana Saláková Coupled Problems in Heavy Current and Power Engineering	Z,ZK	4	2P+2S	Z	s
XEP33VKR	Ivo Doležel Selected Topics in Pattern Recognition and Computer Vision	ZK	4	2P+2S	Z	s
XP01SPJ	Mirko Navara Syntax and semantics of a formal language	ZK	4	2+1	Z	S
XP39SCG	Seminar in Comnuter Graohics	ZK	4	2P	L	s
XP39SPG	Computer Graphics Seminar	Z,ZK	4	2P+2S	L	s
XP36SEP	Ji í Bittner, Daniel Sýkora Daniel Sýkora Ji í Bittner (Gar.) Seminars on Architectures of Parallel Computers	ZK	4	2P	L	S
XP38SSB	Sensors and Buses	ZK	4	2P+2L	Z,L	s
	Antonín Platil Antonín Platil Antonín Platil (Gar.)		0			s
XP38SSA	Jií Novák <b>Jií Novák</b> Jií Novák (Gar.)	ZK	3	2P+1C		5

XP13SSD	Special Methods of Devices Quality Evaluation Václav Papež Václav Papež Václav Papež (Gar.)	Z,ZK	4	2P+2L	Z	S
XP37SRP	Radio Receivers Special Technology           Václav Žalud Václav Žalud Václav Žalud (Gar.)	ZK	4	2P+2S	Z	S
XP13SAV	Statistic analysis and technological data evaluation Martin Molhanec Martin Molhanec Martin Molhanec (Gar.)	Z,ZK	4	2P+2S	L	S
XP02SF	Statistical Physics Petr Kulhánek, Antonín Krpenský Antonín Krpenský Petr Kulhánek (Gar.)	Z,ZK	4	3P+1S	L	S
XP37SZS	Statistical Signal Processing Pavel Sovka, Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	4	4P+0S	L	S
XP16SDE	Building heritage of the industrial era	NIC	2	4P+0S	Z,L	S
XP16STV	Product Strategy	ZK	4	0P+4S	L	S
XP36STR	Stringology	ZK	4	2P+2S	Z,L	S
XEP33SML	Structured Model Learning Vojt ch Franc Vojt ch Franc Vojt ch Franc (Gar.)	ZK	4	2P+1S	L	S
XP34STV	VLSI Structures and Technologies Ji í Jakovenko Ji í Jakovenko Ji í Jakovenko (Gar.)	ZK	4	2P+2C	Z	S
XP15ZSS	Light sources and Equipment	Z,ZK	4	2P+2S	L	S
XP33SCD	Man-Machine Systems	ZK	4	2P+1S	Z	S
XP33SDD	Discrete Event Systems	ZK	4	2P+2S	Z	S
XP38SYS	Measurement and Data Acquisition Systems	ZK	4	2P+2L	Z,L	S
XP13SRD	Real Time Systems for Process Control	Z,ZK	4	2P+2C	L	S
XP13SJD	Quality Control Systems Pavel Mach, Martin Molhanec Pavel Mach Pavel Mach (Gar.)	Z,ZK	4	2P+2S	L	S
XP04S1ZK	Spanish language 1	ZK	0		Z,L	S
XP04S1	Spanish language 1	NIC	0	4C	Z,L	S
XP04S2ZK	Spanish language 2	ZK	0		Z,L	S
XP04S2	Spanish language 2	NIC	0	4C	Z,L	S
XP37TMP	Medical Instrumentation	ZK	4	2+2s	L	S
XP13TND	Technology of Low Temperatures and Superconductivity	Z,ZK	4	2P+2S	L	S
XP17TVC	Technique of Highly Sensitive Receivers Miloš Mazánek, Jan Kra ek <b>Miloš Mazánek</b> Miloš Mazánek (Gar.)	ZK	4	2P+2C	L	S
XP13TMD	Technological Aspects of Microcomputer Design	Z,ZK	4	2P+2S	Z	S
XP13TPD	Technological Processes in Electronic Manufacturing Karel Dušek, Pavel Mach Karel Dušek Karel Dušek (Gar.)	Z,ZK	4	2P+2L	L	S
XP34TOS	Technology of Optical Devices Václav Praizler, Vít zslav Je ábek Václav Praizler Václav Praizler (Gar.)	ZK	4	2P+2C	Z,L	S
XP37TEA	Theoretical Eletroacoustics Libor Husník, Zden k Škvor Libor Husník Libor Husník (Gar.)	Z,ZK	4	3P+1S	Z	S
XP37TEM	Theoretical Electroacoustics and Measurement Libor Husník Libor Husník Libor Husník (Gar.)	Z,ZK	3	2P+2L	L	S
XP02TF1	Theoretical Physics 1 Petr Kulhánek, Antonín Krpenský Petr Kulhánek Petr Kulhánek (Gar.)	Z,ZK	4	3P+1C	Z	S
XP02TF2	Theoretical Physics 2 Antonín Krpenský Antonín Krpenský (Gar.)	Z,ZK	4	3P+1C	L	S
XP17TOM	Theoretical Optoelectronics in Medicine Jan Vrba, Vladimír Blažek <b>Jan Vrba</b> Jan Vrba (Gar.)	ZK	5	2P+2C+4D		S
XP37RUP	Radio determination of position, theory and practice, experience František Vejražka František Vejražka (Gar.)	Z,ZK	5	2P+2L+2D	Z	s
XP37TAS	Acoustic signal processing and theory           Václav Vencovský, František Rund, František Kadlec Václav Vencovský           František Rund (Gar.)	Z,ZK	4	2P+2L	Z	s
XP01TGR	Graph Theory Marie Demlová Marie Demlová (Gar.)	ZK	4	2P+1S	Z	s
XP01TJA	Languages, Automata and Grammars Marie Demlová	ZK	4	2P+1S	L	S
XP15TOS	Theory of Light field	Z,ZK	4	2P+2S	L	S
XP32TPZ	Teletraffic Theory Petr Hampl	ZK	4	3P + 0S	L	S
XP31TSS	Signal and system theory Pavel Sovka	ZK	4	2P+2S	L	S
XP02TZP	Theory of Sound Field Ond ej Ji í ek, Milan ervenka <b>Ond ej Ji í ek</b> Ond ej Ji í ek (Gar.)	ZK	4	2P	Z	S
XP17TAM	Evaluation of Applicators for Microwave Thermotherapy Jan Vrba Jan Vrba Jan Vrba (Gar.)	ZK	4	2P+2C	Z	S
XP33TTM	Text mining	ZK	4	2P+0S	Z	S

VDOULT	Ultrasound and Quantum Acoustics	71/		0.0	-	
XP02UZ	Rudolf Bálek <b>Rudolf Bálek</b> Rudolf Bálek (Gar.)	ZK	4	2P	Z	S
XP33UID	Artificial Intelligence	ZK	4	2P+1S	Z	S
XP01UAG	Introduction to Algebraic Geometry	ZK	4	2+1	L	S
XP02UEF	Introduction to Electrophysiology	Z,ZK	4	2+2s	Z	S
XP02UFL	Introduction to Laser Physics Jan Píchal Jan Píchal Jan Píchal (Gar.)	ZK	4	2P	L	S
XP37ISS	Introduction to space science and technology René Hudec, Martin Urban <b>René Hudec</b> René Hudec (Gar.)	ZK	4	2P+2L	Z	S
XP01UKS	Introduction to Quantum Structures	ZK	4	2+1	Z	S
XP01UNA	An introduction to nonassociative algebras	ZK	4	2+1	Z	S
XP01USA	An introduction to superalgebras.	ZK	4	2+1	L	S
XP15UEE	Electric Energy Use and Conservation Zden k Müller	Z,ZK	4	2P+2S	Z,L	S
XP13VTK	Vacuum technology and cryogenics	Z,ZK	4	2P+2S	Z	S
XP16HKC	Science, Technics and Technology in the Historic Landscape of the Czech Lands Eva Semotanová, Eva Semotanová Eva Semotanová (Gar.)	ZK	4	2P+2S	Z,L	S
XP16VTK	Everyday Science and Technology Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)	ZK	4	2P+2S	Z,L	S
XP37VRA	Research Seminars in Radioelectronics and Acoustics Jan Sýkora	Z,ZK	4	1P+1S	Z,L	S
XP16VPB	Science, Technology and Industrial Boom Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)	ZK	4	2P+2S	Z,L	S
XP39VR	Virtual reality David Sedlá ek, Ji í Žára <b>David Sedlá ek</b> Ji í Žára (Gar.)	ZK	4	2P+2S	L	S
XP02VNP	Plasma Waves and Instabilities Petr Kulhánek, Antonín Krpenský Petr Kulhánek Petr Kulhánek (Gar.)	Z,ZK	4	3P+1C	Z	S
XP16DEL	History of technology and economic Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	ZK	2	0P+4S	L	S
XP37VKF	Selected Parts from Photonics Miloš Klíma Miloš Klíma Miloš Klíma (Gar.)	ZK	4	4P+0S	L	S
XP37FOT	Selected Parts from Photonics Miloš Klíma František Rund Miloš Klíma (Gar.)	Z,ZK	3	2P+2L	L	s
XP38VKP	Selected Parts of Instrumentation Jan Holub Jan Holub Jan Holub (Gar.)	ZK	4	2P+2L	Z,L	S
XP01TEM	Selected chapters of the measure theory Pavel Pták	ZK	4	2+1	L	S
XP33KSI	Sotware Engineering - Selected chapters	ZK	4	2P+0S	L	S
XP38VKZ	Selected Chapters of Signal Processing Jan Holub Jan Holub	ZK	4	2P+2C	L	S
XP38VDI	Selected Chapters of Diagnostics Radislav Šmíd Radislav Šmíd	ZK	4	2P+2C	L	S
XP36VPD	Selected Parts of Data Mining	ZK	4	2P+2S		S
XP01VPS	Selected topics in probability and mathematical statistics Kate ina Helisová Kate ina Helisová Kate ina Helisová (Gar.)	ZK	4	2P+1S	*	s
XP33PUD	Artificial Intelligence	ZK	4	2P+2S	Z	S
XP17ANS	Selected Chapters from Antennas and Propagation Miloš Mazánek, Jan Kra ek Miloš Mazánek Miloš Mazánek (Gar.)	ZK	4	2P+2C	L	s
XP02VPA1	Selected Topics of Physics 1 Viktor Hruška, Petr Koní ek <b>Petr Koní ek</b> Viktor Hruška (Gar.)	ZK	4	2P	Z	S
XP02VPA2	Selected Topics of Physics B Viktor Hruška Viktor Hruška Viktor Hruška (Gar.)	ZK	4	2P	L	s
XP02VPB	Selected Topics of Physics B Viktor Hruška Viktor Hruška (Gar.)	Z,ZK	4	2+2s	L	S
XP02VPO	Selected Topics of Optics Antonín Krpenský, Josef Kravárik Josef Kravárik (Gar.)	Z,ZK	4	2P+2S	Z	s
XP33ROZ	Selected Topics in Pattern Recognition	ZK	4	2P+2S	L	S
XP16MVE	Selected Problems of Economy and Management of Energy	ZK	4	2P+2S	L	S
XP37SFA	Fundamentals of Physical Acoustics	ZK	4	1+0s	L	S
XP16STM	Selected Statistical Methods Šerzod Tašpulatov Šerzod Tašpulatov (Gar.)	ZK	4	2P+2S	L,Z	s
XP36VAV		ZK	4	2P+2C		S
XP39VPG	Computational Geometry Petr Felkel Petr Felkel (Gar.)	ZK	4	2P+2S	Z	s
XP36VAP	Advaced Computer Architecture	ZK	4	2P+2S	Z	S
XP12VVM	Development and Research of Materials	Z,ZK	5	3+2s	L,Z	S

XP13VVM	Development and Research of Materials	Z,ZK	4	2P+2S	L,Z	S
XP16VTS	Development of Technical Universities Martina Be vá ová Martina Be vá ová Martina Be vá ová (Gar.)	ZK	4	0P+4S	Z,L	S
XP13VNM	Research of new materials Pavel Ctibor Pavel Ctibor (Gar.)	Z,ZK	4	2P+2L	Z	S
XP15VME	Research Methods in th Use of Electrical Energy Jan Kyncl, Ivo Doležel Ivo Doležel (Gar.)	Z,ZK	4	2P+2S	L	S
XP02ZFP	Fundamentals of the Plasma Physics Stanislav Pekárek Stanislav Pekárek (Gar.)	ZK	4	3P	Z	S
XP33KHD	Introduction to Game Theory	ZK	4	2P+1S	Z	S
XP33ZPM		ZK	4	1P+1S	L	S
XP33ZVD	Introduction to Computer Vision	ZK	4	2P+2S	Z	S
XP33POS	Fundamentals of Possibilistic Measures	ZK	4	2P+0S	L	S
XP33TPS	Foundations of the Possibilistic Measures	ZK	4	2P+0S	L	S
XP01ZOA	Fundamentals of the theory of operator algebras Jan Hamhalter	ZK	4	2+1	Z	S
XP16ZVP	Fundamentals of Scientific Work Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)	ZK	4	2P+2S	Z,L	S
XP01ZWT	Wavetet Transform. Jan Hamhalter	ZK	4	2P+1S	L	S
XP37ZI	Information recording František Kadlec	Z,ZK	4	2P+2S	L	S
XP34RSD	Radiation Saurces and Photodetectors for Integration Vít zslav Je ábek Vít zslav Je ábek Vít zslav Je ábek (Gar.)	ZK	4	2P	L	S
XP33ZDD	Processing of Biological Data	Z,ZK		2P+0S	Z	S
XP31ZBS	Biological Signal Processing Roman mejla, Jan Rusz, Radek Jan a, Jan Sedlák, Petr Ježdík <b>Pavel</b> Sovka Roman mejla (Gar.)	ZK	4	2P+2C	Z	S
XP37ZSN1	Signal processing in satellite navigation systems 1 František Vejražka František Vejražka (Gar.)	Z,ZK	4	1P+3S	Z	s
XP37ZSN2	Signal processing in satellite navigation systems 2 František Vejražka František Vejražka (Gar.)	Z,ZK	4	1P+3L	L	S
XP33VID	<b>3D Computer Vision</b> Radim Šára <b>Radim Šára</b>	ZK	4	2P+2S	Z	S
Characteristics	of the courses of this group of Study Plan: Code=PKKPPP Name=C	Compulsorv f	acultativ	/etudy		·
XP02AME	Active Methods in Acoustics				ZK	
XP02AMA	Active Methods in Acoustics				ZK	4
	nte <sup>r</sup> ference, Huygens principle, sound field in ducts, vawe-guides and enclosures. Active nois tic coupling, modes, local control. Feedback and feedforward strategy, analog adn digital realis					

in enclosures, acoustic coupling, modes, local control. Feedback and feedforward strategy, analog adn digital realisations, algorith	ms based on LMS, stability of algorith	ms, multichannel
algorithms. Practical realisations of active systems. Active control of vibrations, transducers for active control.		
XP37AEM Acoustic and Electroacoustic Measurements	Z,ZK	4
Measurement of acoustic pressure, measuring microphones. Measurement of acoustic impedance. Foundamental audiometric r	neasurements, artificial ear. Measurer	ment of acoustic
power. Methods of calibration of measuring microphones. Method of reciprocity. Method of reciprocity in the field of the spherical	wave, in the diffusion sound field. Cali	bration methods
for accelerometers and sensors of velocity and displacement. Measurement of mechanical impedance, impedance head, artifici	al mastoid. Electrostatic transducer ar	nd its application
for electroacoustic measurements. Measurement of thin membranes and air-gaps. Acoustic intensity measurement. Measurement	nts of acoustic transmitters.	
XP37APF Acoustics and Electroacoustics of Solid State	Z,ZK	4
Waves in elastic isoptropic unbounded continuum. Wave equation. Scalar and vector potential. Plane harmonic uniform and non	-uniform wave. Energy and power in p	lane harmonic
wave. Plane wave in half-space, reflection and refraction of a plane wave at an interface between too solids. P-wave, SV and SH	I waves. Rayleigh waves. Waves in wa	ve -guides in
solids. Wave propagation in cylindrical wave-guide. Solid-state waveguides of non-uniform cross-section. Piezoelectricity. Equiva	lent circuits of piezoelectric transduce	rs for generation
of volume and surface waves.		
XP37AR Speech Acoustics	ZK	4
Vocal tract, anatomy, physiology. Vocal cords, production of speech. Types of phonems. Speech analysis and synthesis. Automat	tic recognition of speech.	1
XP31ASN Algorithms and Structures of Neurocomputers	ZK	4
Information about the basic principles and possibility of the application of the neural informative technology for the signal proces	sing are the main topic. The lectures a	are devoted to
the introduction into the artificial neural networks (ANN) theory and applications, to the choice and the optimisation of the structu	ures and the neural network applicatio	ns at the signal
processing are investigated in detail. Some neural network applications in the biomedical engineering and hardware realization	of the KSOM are described.	
XP34AIC	ZK	3
Functional structures of the IC's. Bipolar and unipolar structures. BiCMOS structures. 3D structures. Sub-micron structures. Men	nory structures. Testing structures. VL	SI technological
processes. Advanced semiconductor technology. IC design, design of technology. Design rules. Reliability, yield. Outlooks and lii	mitations of IC development	
XP31AEO Electric Circuit Analysis	ZK	4
Circuit models of devices and structures. Methods of analysis and algorithms for linearized circuit models in time domain and free	equency domain. Transient analysis. P	eriodic steady
state analysis. Analysis of nonlinear circuits in time and frequency domains. Parametric models. Circuits with non-linear energy	storing elements. Circuit analysis with	the help of
professional software packages.		
XP04A2SZK English Language	ZK	0
XP04AZK English Language	ZK	0
http://www.fel.cvut.cz/anketa/aktualni/courses/XP04AZK	•	
XP04MIN English Language 2	ZK	0
English exam in form of defense of professional study in English. The task of the doctoral student before the committee to defend	his professional work drafted and pres	ented in English.

As part of the subsequent discussion. PhD student is evaluated in presentation skills, mastery of the language in continuous speech and language skills quickly and correctly respond during the debate. Account is also the linguistic correctness of written text.

XP04A1ZK	English language 1	ZK	0
-	nly for those postgraduate students studying in older study program valid up to Sept.2003 and did not ask for studying langua	iges according to	the newer study
program .			
XP04A1	English language 1		
-	eral English from previous studies, further develops speaking skills, listening and recalling spoken English as well as note-tak	king skills. Provide	s basic scientific
XP04A2	ect relationship, definitions, classification, basic information on composing written documents ).	NIC	
	English language 2 provide the second state of	- 1	formation): the
	eech in a foreign language ; selected parts of difficult grammar; selected items focused on practical skills (reading mathemati		
writing CV). Oral preser			mprecenci,
XP04A2ZK	English language 2	ZK	0
-	postgraduate students who study in older program valid up to Sept.2003 and did not ask for studying the new language pro		Ũ
XP34AT	TCAD Tools Applications	ZK	4
	mputer-aided technological design. Device simulators Atlas and Sentaurus: principle, applications. Basic equations. Boundar	y conditions. Num	erical methods.
Recombination models	Avalanche ionisation models. Mobility models. Hands-on exercises on SUN workstations according to the tasks of students'	individual theses.	
XP37AEA	Applied Electroacoustics	ZK	4
Review of basic equation	ins in acoustics, modeling of miniature acoustic elements in thermoviscous fluid, equivalent circuits based approximation, revi	iew of principles of	electroacoustic
	ransmitters and receivers, waveguides for transducers, membranes and plates in transducers, modeling of coupling between	mechanical and a	acoustical parts
	tatic microphones and their models, MEMS microphones.		
XP32AKR	Applied Cryptography	ZK	4
	raphy.Mathematics Foundations of Cryptography.Related Problems of Number Theory.Public Key Parameters. Pseudorandon		
	Public Key Enciphering. Hash Functions and Data Integrity. Entity Identification and Autentication.Digital Signatures. Key Manag	ement Protocols.K	ey Management
XP17APL	plementations of Supporting Algorithms. Patent Pendings and Standards.	ZK	4
	Applied Optoelectronics in Medicine -invasive measurement techniques in medical diagnostics. Fundamental physiology of the vascular system, hemodynamics,		-
	the cardiovascular system. UV, VIS and IR spectroscopy. Fundamental optics of the eye and color analysis. Optical parameter	-	
	al sensors, Optical visualisation principles of translumiscetion and tomography, Optoelectronic systems in medicine.		sue. Dispersion
XP36ASP	Architecture of Symbolic Computers	ZK	4
	nd abstract programs, lambda calculus, formal basis for abstract programming, self-interpretation, SECD abstract machine, mer	I I	-
	entations, predicate logic and its inference engine, Prolog inference engine and dynamic algebras, Warren abstract machine, opt		
parallel inference engin	es.		
XP37ARA	Architectural Acoustics	ZK	4
Wave theory, geometric	al and statistical acoustics. Acoustical lining and sound absorption. Objective room acoustic parametres. Subjective criteria for	or auditory quality	of halls. Room
acoustics measurement	technique. Physical modelling and numerical simulation of sound propagation. Electroacoustic sound reinforcement. Acoustical	properties of build	lings: absorption
of sound, sound insulat	ion. Simple and complex constructions. Criteria for sound insulation properties of building constructions. Measurement in acoustic	stics of construction	ns. Calculations
in room acoustics.			
XP31ART	Architectures for Real Time Implementation	ZK	4
	processing units and synthesis of data paths for DSP. Implementation strategies of DSP algorithms. Influence of algorithm m		
	ntial and parallel processing. Numerical characteristics of algorithms. Implementation alternatives, dedicated hardware and paragraphic pa		
special algorithms for c	signal processors with fixed point and floating points. Developments tools for real time processing. Analysis of real time impler	nentation of FF1,	aigital filters and
XP38ATM		ZK	3
	 the principles and technical means of data acquisition in the laboratory and industrial environment. Attention is paid to both h	I I	-
-	ns for data acquisition and process control. Laboratory exercises are designed in part in the form of classical tasks, partly in t		
	ning of automated measurement systems and control of measurement processes.		
XP02BFY	Biophysics	Z,ZK	4
	ted to blood flow, measurement of haemodynamic parameters in vivo, properties of blood vessels. Special attention will be g		pillary systems
and their application in	treatment of renal or lung insuficiency. The students will learn how to measure blood pressure under various degrees of load	and they will obse	rve their own
ventilation parameters.	Theoretical knowledge will be complemented by practical experience from excursions.		
XP33BID	Bionics	ZK	4
Relationship: biology +	technology = bionics. Bionics Classification. An overview of biological principles and its technological parallels: reproduction,	growth, movemer	t, breathing,
-	excrementation, thermoregulation, vision, hearing, taste, smell, sense of touch, speech, memory. Neural and neuronal system		
	ormation transfer in biotechnological systems. Biosystems modelling. Biosystems diagnostics. Orientation and navigation. Fu		
	protheses. Artificial organs and its control. Intelligent interaction and communication in biotechnical systems. Intelligent input	and output filters.	Support system
for creative thinking.		7 71	4
XEP33CML	Computational Intelligence Techniques for Machine Learning	Z,ZK	4
	me familiar with the theory and applications of computational intelligence methods in the context of systems capable of learning		
	nal intelligence. Supervised, unsupervised and reinforcement learning paradigms. Fuzzy systems, neural networks, neuro-fu for supervised learning. Fuzzy clustering methods for unsupervised learning. Reinforcement learning for single-agent and mu		-
	studies. The course will be connected with - a computer assignment with Matlab/Simulink and a literature assignment.		Examples of
XEP35CMS	Computational Methods for Materials Science	Z,ZK	4
	urse is to acquire advanced knowledge of Classical and Quantum Mechanics to design in-silico experiments within the Materi		
-	Il know: - the fundaments of thermodynamics, newtonian and statistical mechanics, and how the relative formalism is implem		
	erties; - how the Schrödinger equation is setup and solved in order to calculate physical quantities; - how to combine the class		
model experimental res	ults; and - a general protocol through which to design new materials at the atomic scale. By means of simulation laboratory expe	rience, the studen	ts will eventually
learn how to setup and	run simulations, and how to analyse and present the results by using post-processing softwares.		
XP04 1	Czech language 1	NIC	0
XP04C1ZK	Czech language 1	ZK	0
XP04C2ZK	Czech language 2	ZK	0
XP04 2	Czech language 2	NIC	0
XP31DSP	Digital signal processing	ZK	4
	basic courses of digital signal processing in master's degree, develops and deepens the knowledge corresponding to the r	I I	-
	is solve conversion equipments and constrain analysis, parametric methods, ontimal I TI filters frequency analysis, methods of analysis		

XP31CZS	Digital signal processing	ZK	4
XP33RG2	Reading Group	ZK	4
	type course, where the student should get acquainted with important scientific articles in their field through critical analysis a	1	ussion. Students
will each present one o			
XP33RCV	Reading group in Pattern Recognition and Computer Vision	ZK	4
	undamental results in computer vision and pattern recognition. It targets the detailed study of principles which substantially in ormed in the form of a reading group. Each time, a person in charge presents a paper and the reading group participants join		
discussion about the pa		r in with questions	, comments and
XP13DFD	Data and Functional Analysis of Production Systems	Z,ZK	4
	f production enterprise and its structure. Relationship of technological system to other systems. Tools of control and information	1 '	-
Methodology of analysi	s of enterprise. Date base of technical preparation of production. Methodology of functional analysis of enterprise. Methods o	f data and materia	al flows analysis.
-	user interface of enterprise IS. Object oriented methodology of analysis of enterprise. Methods of time analysis of enterprise.	Use of Petri nets	for analysis of
	tion and standards for data and functional analysis. Automation of analysis methods, CASE tools.	771	4
XP13DEZ The course familiarizes	Degradation processes of electridal equipment students with the basic processes of degradation, which is exposed to the electrical product in a production environment. The	Z,ZK	-
	a model operating environment. The student should try to verify the dominant degradation process of the product in the labo		-
simulation. Attention is	also paid to environmental aspects associated with the choice of materials (technology) that are able to limit the degradation	process.	-
XP16HPH	History of Physic	ZK	4
XP34ORD	Optical Radiation Detection and Detectors	ZK	4
	netic radiation, radiometric and photometric units. Detection of optical radiation. Ideal detectors, internal and external photo-effe		
	al photo-effect detectors, PN junction. PIN photodiode, physical principles, properties. Avalanche photodiode, physical princip		
	perties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. C cells, properties. Measurement methods, applications.	plical receivers, o	lesign principies,
XP36DRO	Diagnostics and Reconfiguration of Programmable Circuits	ZK	4
	help PhD students to understand better methods of reliability and availability improvement of SOC and NOC circuits built on		-
XP34DTM	DIAGNOSTICS AND TESTING IN MICROELECTRONICS	ZK	3
XP15DVN	Diagnostics of HV and EHV Insulating Systems	Z.ZK	4
	h, fault sources and mechanisms. Indoor and outdoor insulation of electrical equipment. Diagnostic methods, using in operation	. Choice of metho	ds for diagnostic
systems. Application of	database systems for electrical machines and equipment of HV and EHV. Application of systems with element of artificial interview.	elligence in electr	o diagnostics.
XP02DP	Electric Discharges and their Applications	ZK	4
	c discharges. Townsend?s theory. Glow discharge. Processes on the surface of electrodes. Technological applications. Plasma		
microwave discharge. A magnetic fields of Earth	Arc. Corona. Spark discharge. Lightning. Ball lightning. Z-pinch and its properties. Electromagnetic collapse. X-ray sources, co	introlled fusion. Ge	eneration of
XP13DTF	Thin film diagnostics	Z,ZK	4
	n. Definition of a thin film. Deposition methods; chemical vapor deposition, physical vapor deposition. Thin film characterizatio		-
	tion. X-ray diffraction and photoelectron spectroscopy. Thickness, mechanical, optical and electrical properties.		
XP32DZS	Digital Signal Procesing in Telecommunications	ZK	4
XP32DKS	Sizing of communications networks	ZK	4
XP33DID	Distributed Artificial Intelligence	ZK	4
	3/24 the course runs for the last time. In future years, it will not be opened anymore. Distributed problem solving. Multiagent pla	<b>U</b>	
	nunication strategies, message passing. Various AI approaches, case studies. Types of agent behavior. Negotiation. Organizat	-	-
· · ·	vstems. Client-server systems. Peer-to-peer systems. Implementation aspects of distributed knowledge-based systems. Learn quitance models, social knowledge, reflectivity in MAS. Coalition formation, team work. Formal models of agent architecture.	ning in mulliagent	systems.
XP36DSV	Distributed Systems	ZK	4
	nisms - message exchange, procedural communication (RPC, ORB), distributed shared memory. Process algebras - CSP, CO	1	-
	istributed execution, global state, causality, logical time. Algorithms of: exclusive access, leader election, deadlock detection/p		
resiliency, qourum algo	rithms, replication. Mobility, search in distributed systems - DHT.		
XP36DSY	Distributed Systems	ZK	4
	nisms - message exchange, procedural communication (RPC, ORB), distributed shared memory. Process algebras - CSP, Co		
	istributed execution, global state, causality, logical time. Algorithms of: exclusive access, leader election, deadlock detection/p rithms, replication. Mobility, search in distributed systems - DHT.	prevention, termina	ation. Faults,
XP37DRS	Satellite communication and navigation systems	Z,ZK	4
	- overview. Systems for fixed and mobile service. Satellite networks: Intelsat, Eutelsat, Inmarsat, Intersputnik, Astra. Orbits (		
	communication channel. Energetic budget of satellite link. Satellite link design. Frequency bands. Modulations and multiplexes:		
spectrum communication	on. Systems VSAT, DAMA, DVB-S, S-UMTS. Multimedia satellite services. Satellite navigation systems: GPS, GLONASS and (	GALILEO. Satellite	e communication
and navigation systems	s integration - CNS systems.		
XP14DSD	Dynamics of Electric Machines	ZK	4
	c machine general theory. Mathematical transformation systems, per unit system. Mathematical model of DC machine, of syn		
	ectro-dynamic transient phenomena in electric machines. Short-circuit. Switching of the motor on the network. Electromagne cillation. Circle diagram methods for transient effect solves. Non-symmetrical short-circuits.	lic lorque and its o	components.
XP14DES	Dynamics of Electric Machines	ZK	4
	an important role in a number of areas, such as e-mobility, renewable energy sources utilization, robotics and automation. Th	1	
to provide the students	with deep understanding of the principles, operation, and analysis of rotating electric machinery. Mathematical models based	d on the theory of	space phasors
	ed for various types of electric machines (induction machines, electrically excited synchronous machines, permanent magnet s	-	
	ical machine theory on such a level is necessary, for instance, for design of modern control methods of electric drives or cons		
XP16EES	Economics of energy systems	ZK	4 two main groups
	s to acquaint students with the emerging issues and problems associated with decentralization and liberalization of energy main as economic issues within interconnected markets and how to address economic issues within a decentralized market. In the		
	lations with the determination of economic variables - especially prices. Key issues are supply zones, transit payments, loss-si		
	customers, setting tariffs for electricity, dividing effects from decentralized production and more. Within the subject, the stude		
and procedures that are	e currently delivered within the interconnected electricity system. The aim is to analyze and identify the strengths and weakne	esses of these pro	cesses.

· · · · · · · · · · · · · · · · · · ·		
XP01EAL Effect algebras	ZK	4
Bsic course on effect algebras. Effect algebras, MV-effect algebras, various types of elements, compatibility, partitions, states.	71/	4
XP01EKM Mathematics Models for Economics	ZK	4
This course is an introduction to the theory of time series and random processes used in economics for describing values (financial assets, product developing in time will be shown. Further, the terms of stochastic differential and stochastic integral are introduced.	prices, financial ic	oss) randomiy
XP16ERU         Accounting	ZK	4
Principles of accounting. International accounting standards (IFRS). Methodology of accounting. Cost, revenues, profit and cash flow. Balance sheet		-
of company's financial position.	,	
XP16EKO Economics	ZK	4
Basic economic terms. Principles of microeconomics, consumer behaviour and producer behaviour. Profit maximization. Perfectly competitive marke	t. Market failure, r	nonopoly.
Principles of macroeconomics, aggregate demand and aggregate supply. Labour market. Money market and capital market. Macroeconomic policy of	-	as a factor
protecting and correcting the market. Comment: The subject is a necessary precondition for understanding other economic and managerial discipline		
XP16MES Economics and Management of Energy Systems	ZK	4
Strategic questions of electric power sector, gas systems and central heating systems functions. Marginal revenue in electric power system. Margina Power elements optimization, subsystem and system optimization in generation and transportation of different kinds of energy. Reliability in energy of		
in power industry. Energy price regulation and its consequences	lenvery. Internatio	
XP16EME Economics and Management of Energetics	ZK	4
Organizational structure of electric power sector, heating and gas sector. Principles of integrated source planning. Revenues, costs, prices and tariffs		nmental energy
policy. Development of international cooperation in power industry and its economic and ecology aspects.		-
XP16MEU Economics and Management of Energetics	ZK	4
Organizational structure of electric power sector, heating and gas sector. Principles of integrated source planning. Revenues, costs, prices and tariffs	s of energy. Gover	mmental energy
policy. Development of international cooperation in power industry and its economic and ecology aspects.		
XP16EPM Economics of power markets	ZK	4
The subject provides basic theoretical knowledge about the organization and functioning of electricity markets. The starting point is the theory of sho	-	-
and the generation of the electricity supply curve. This is followed by the theory of integration of electricity markets and the creation of economic welfa in power generation tend to decarbonise and integrate electricity markets. This, together with the massive rise in electricity from intermittent sources		,
constitution of electricity markets and new business models including demand response and the development of the prosumers concept (where end		
electricity generators). Part of the subject is also discussion of other links of the electricity market - emission allowances, connection to the heat market		-
XP16ERE Economics of power generation from RES	ZK	4
The subject focuses on complex problems of economy of production of electricity and heat from renewable energy sources. The course develops the	e acquired knowle	dge in the field
of financial management due to the specifics of electricity / heat generation from RES and the expected development of energy markets. Consequer	ntly, it deals with th	ne theoretical
concepts of the electricity market, taking into account current trends in the decentralization of energy systems, decarbonisation of energy and the expe	• •	,
from RES into the electricity market. These trends require the development of different types of energy accumulation and the implementation of smar	t technologies in t	he management
of network operation. The course also includes modeling of the development of energy systems with high RES share.	71/	4
XP37ELA Elastoacoustics The course deals with interactions of elastic structures with gaseous medium, namely vibrations of plates, radiation impedances, modal equations, in	ZK	
acoustic space, finite element method, calculation of eigenfrequencies.		surrounding
XP15ES Electrical Lighting	Z,ZK	4
Visual sensory processes. Light micro climate design. Daylight, artificial and mixed lighting. Visual performance. Visual comfort. Colorimetry. Light so	,	-
Lighting systems. Exterior and interior lighting. Lumen method. Integrated and remote controlled lighting systems.		
XP15ET Electroheat	Z,ZK	4
The definition of fundamental equations of heat and mass transfer in electromagnetic field in continuum. Thermal effects of electromagnetic field. The	e definition of the	problems of
induction, dielectric and arc heating. Similarity and analogy of equations and their use. Numerical methods in electroheat.		
XP02EVA Physics for Electroenergetics	ZK	4
Lessons contain selected parts of physics for students of electric power engineering: Physical principles of gas discharges - glow, arc, spark and corona	-	
The students become acquainted with characteristics for magnetized, astrophysical and fusion energy generation. A part of the course is two excursion Academy of Sciences.	ins in laboratories	CTU and Czech
XP34ETS Electrical Transport in Semiconductors	ZK	4
Electron and hole transport in semiconductor crystals. Effective mass, mobility Boltzmann's transport equation. Scatter mechanisms, frequency. Scatter		
velocity saturation. Relaxation time approximation Carrier transport in a strong electric field, velocity saturation. Carrier transport in magnetic field. C		-
structures. Quantum transport, density matrix, Green's and Wigner's functions. Resonance tunnelling, transport of electrons in superlattices. Single	-	
blockade. Ballistic transport. Quantum Hall's effect. Simulation of transport effects.		
XP17ELD Electrodynamics	ZK	4
XP14EMC Electromagnetic Compatibility	ZK	4
Interference sources. Interference coupling. Shielding. Earthing. Nonlinear consumers. Harmonics in electric convertors in steady and transient cond	itions. Supressior	of negative
converor influences on the network. Compensation and filtration.		
XP14ECD Electromagnetic Compatibility	ZK	4
Interference sources. Different manner and coupling factors of interference spreading. Grounding influences. Screening. Non-linear electric appliance	-	
Current and voltage forms of different electric appliances. Harmonic current and voltage components of different electric appliances. Steady state an harmonics components. Interference suppression of converters on the network. Compensation and filtration substations.		it and voltage
XP38EMC         Electromagnetic Compatibility of Data Acquisition Systems	ZK	4
EMC - basic terms. Measurement of electromagnetic emission and immission. EMC standards. Modelling of disturbing signals. Electromagnetic distu		-
Design of DAQ systems with regard to EMC. EMC of data transmitting lines.		, ,
XP15EH Energy Economy	Z,ZK	4
Energy economy, part of national economy. Terminology of energy economy. The energy systems. Forecast of energy consumption. Energy balance in		Energy balance
in buildings. Energy economy and its impact to environment. Energy economy on the organization level. The control of energy economy. Basic proble	ms of energy poli	cy.
XP15EZP Control in Power Engineering	Z,ZK	4
Overview of environmental problems. The role of power engineering. Global climate change. The greenhouse effect. Carbon dioxide emissions. Impact	-	
of hydro power plants. Renewable energy sources. Methods and technology for decreasing of impact to environment. Electric power transmission and	u ine environmen	. The control of
power energy system		

XP33ECD	Evolutionary Computing	ZK	4
Introduction to evolution	ary computing in contrast to classical computing techniques, Genetic algorithms (GA) for optimisation. The Simple Genetic A	Algorithm (SGA) a	ind its behaviour.
GA Convergence, negat	ive phenomena. GA and constrained tasks, special representations. Genetic Programming (GP), relationship to GA. GP typica	al tasks, GP and m	nachine learning.
GA and GP applications	. Special methods for improving GA performance.		
XP15EXE	Expert Systems in Electrical Power Engineering	Z,ZK	4
		1 1	-
	aluation. Expert systems in electrical power engineering and diagnostics of insulating systems. Application of rule-based exp	-	neural networks
	eering and diagnostics of insulating systems. Creation of expert systems for electrical power engineering and electro diagno	1	
XP16FVT	Philosophical Problems of Science and Technology	ZK	2
The course is engaged	n the evolution of principal ideas on which the science and technology are founded. Philosophical aspects of physics and m	athematics are de	eper examined
	the so called "Postmodernism" and to the alternative ways of understanding and their social coherences are discussed.		
		71/	4
XP16FIM	Financial Management	ZK	-
Principles of finance, pr	esent value and alternative cost of capital, net present value, present value of bonds and stocks, investment decision making	g and net present	value, return and
alternative cost of capita	Il, risk and return, lease or buy decision, inflation and return, real options, financial options, option valuation, hedging, short	term finance, cash	h flow finance.
XP31FSK	Phonetic signals and their coding	ZK	4
	he processing of speech signals. Within the subject students should manage from basic to advanced and modern algorithm		-
-	Further reasonable part is focused on speech recognition, where students will get to know modern and advanced technique in		
speech recognition or s	beaker recognition. Special attention is devoted to usage of classification techniques based on GMM, DTW, HMM, ANN/DN	N, WFST, JFA, i-ve	ectrors, etc.
XP31FON	Speech Phonetics and Advanced Voice Technologies	ZK	4
XP15FAK	Photometry and Colorimetry	Z,ZK	4
		1	
	methods. Standards of luminance and luminous flux. Receivers of radiation and modification of their characteristics. Photor		
light source parameters	Luminaire parameters. Measuring of indoor lighting systems. Measuring of outdoor luminance and illuminance. Colour visio	on theory. Chroma	ticity. Colour.
Colorimeter space. Colo	ur rendering-index. Chromaticity system. Diagram of chromatic. Colorimeter. Spectroscop		
XP37FOS	Photonic Imaging Systems	ZK	4
	ation. Energetic image description. Principles of image acquisition, transferring and storing. Image entropy function, 2 dimen	1	1
	ption. Novel compression techniques. Image reproduction, matrix description. Light diffraction. 2D transfer functions - PSF, N		
detection systems. 2D to	ansfer systems and their signal distortion, image aberration and their correction, toleration analysis of optical system. Recei	ivers and transmit	ters for special
application. Photonic pr	pressors, computers and memories.		
XP13FCD	Photovoltaics systems	Z.ZK	4
		1 '	
	ne most important problems of principle, technology of production and final use of photovoltaic systems for power generation		
	Photovoltaic effect, photovoltaic cells. Optimization of cell structure in terms of optical and electrical properties of individual	-	
photovoltaic cells. Deter	nination of the maximum theoretically achievable energy conversion efficiency of a given structure. Photovoltaic modules. Tecl	hnological process	ses of production
of basic types of photovo	Itaic cells and modules. Characterization and diagnostic methods, analysis of failure types, influence on durability. Photovoltaic	c systems (autonor	mous, connected
to the grid). Component	s of photovoltaic systems. Simulation of yield for a given type of climate and season. Trends in applications of photovoltaic sy	vstems and econo	mic aspects.
XP04F1ZK	French language 1	ZK	0
XP04F1	French language 1	NIC	
Basic knowledge of gra	nmar and vocabulary, with the emphasis on technical style ; ability to understand technical texts on an intermediate level ( te	ested on reading c	ca 60 pages of
texts) Oral presentation	s - ability to talk on subjects studied by the postgraduate student. Writing cover letters CV answering advertisements etc.		
	s - ability to talk on subjects studied by the postgraduate student. Writing cover letters , CV, answering advertisements etc.	71/	0
XP04F2ZK	French language 2	ZK	0
	French language 2	ZK	0
XP04F2ZK XP04F2	French language 2 French language 2	NIC	
XP04F2ZK XP04F2 Very good proficiency b	French language 2 French language 2 oth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult	NIC t text, reading com	prehension of
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C	French language 2 French language 2 oth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po	NIC t text, reading com	prehension of
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl	French language 2 French language 2 oth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po cations, cover letters etc.	NIC t text, reading com ostgraduates). Ma	prehension of
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C	French language 2 French language 2 oth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po	NIC t text, reading com	prehension of
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1	French language 2 French language 2 oth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po cations, cover letters etc.	NIC t text, reading com ostgraduates). Ma	pprehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel	French language 2 French language 2 bth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc. Functional Analysis 1 besgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory.	NIC t text, reading com ostgraduates). Ma	prehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO	French language 2 French language 2 bth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc. Functional Analysis 1 besgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory. Fuzzy Logic	NIC t text, reading com ostgraduates). Ma	pprehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO	French language 2 French language 2 bth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc. Functional Analysis 1 besgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory.	NIC t text, reading corr ostgraduates). Ma ZK ZK	prehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO	French language 2 French language 2 bth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc. Functional Analysis 1 besgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory. Fuzzy Logic	NIC t text, reading com ostgraduates). Ma	prehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO Basics of fuzzy sets and XP33FLO	French language 2         French language 2         bth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc.         Functional Analysis 1         pesgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory.         Fuzzy Logic         fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Logic	NIC t text, reading corr ostgraduates). Ma ZK ZK	prehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO Basics of fuzzy sets and XP33FLO Basics of fuzzy sets and	French language 2         French language 2         bth in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc.         Functional Analysis 1         pesgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory.         Fuzzy Logic         Ifuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Logic         I uzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.	NIC t text, reading corr ostgraduates). Ma ZK ZK ZK	prehension of stering language 4 4 4
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO Basics of fuzzy sets and XP33FLO Basics of fuzzy sets and XP35FMD	French language 2         French language 2         both in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc.         Functional Analysis 1         pesgue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory.         Fuzzy Logic         I fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Logic         I fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Modelling and Control	NIC t text, reading com ostgraduates). Ma ZK ZK ZK ZK	hprehension of stering language
XP04F2ZK XP04F2 Very good proficiency b texts (cca 120 pages). C skills related to job appl XP01FA1 Measure theory and Lel XEP33FLO Basics of fuzzy sets and XP33FLO Basics of fuzzy sets and XP35FMD The goal of the subject i	French language 2         French language 2         bith in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult ral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by po- cations, cover letters etc.         Functional Analysis 1         peegue integral. An introduction to Hilbert spaces. Theory of linear operators in Hilbert spaces. Spectral theory.         Fuzzy Logic         I fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Logic         I fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Logic         I fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.         Fuzzy Modelling and Control         sto introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic	NIC t text, reading com ostgraduates). Ma ZK ZK ZK ZK and neural networ	hprehension of stering language 4 4 4 4 rks. This includes
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XP34ASD	Physics of Advanced Semiconductor Devices and Materials	ZK	4
	devices and integrated circuits are based on unique energy band, carrier transport, and optical properties of semiconductor m		
	ties for operation of semiconductor devices. Emphasis is on quantum mechanical foundations of the properties of solids, ene s, semi-classical transport theory (Boltzmann transport equation), carrier scattering, electro-magneto transport effects, high fi		
	e and non-radiative recombination. These princliples will be studied on the experimental basis as well. Students will prepare	-	-
	y will characterise them during their individual projects		g
XP13FPD	Semiconductor Physics	Z,ZK	4
The aim of the course is	s to deepen the knowledge of the properties of semiconductor materials and structures that are important for a deeper under	standing of the se	emiconductor
components technology			
XP02FPT	Physics for Therapy	Z,ZK	3
	d to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significal lerapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spole		
many practical knowled		ten about. Otuden	tis will also gain
XP37FHA	Physiological, Psychological and Musical Acoustics	ZK	4
	organ, hearing theory, hearing field, loudness, masking, pitch of sound, temporal tresholds, distortion in the hearing organ, a	1	and impairment
of hearing system. Bina	ural hearing, objective and subjective properties of musical signals, statistical and dynamical analysis. Perception of simple t	ones and complex	x sounds,
	ancy. Psychoacoustics of transmission of the musical signal. Methods of psychoacoustic measurements, their validity, repeat	tability. Planning a	and realization
	As of statistical analysis of results, interpretation.	71/	1
XP37FHA1 Properties of musical si	Physiological, Pychologycal and Musical Acoustics 1 gnal in temporal and frequency domains, methods of sound synthesis, timbre and interpretation of sound spectra, objective a	ZK	4 bre theory of
	on to acoustics of speech and singing, physical-acoustic principles of musical instruments, tuning, dynamics, timbre of the to		
	n to methodology of measurement of musical instruments.	· · ·	
XP37FHA2	Physiological, Psychological and Musical Acoustics 2	ZK	4
	gnal in temporal and frequency domains, methods of sound synthesis, timbre and interpretation of sound spectra, objective a		
	on to acoustics of speech and singing, physicalacoustic principles of musical instruments, tuning, dynamics, timbre of the to	ne, radiation prop	erties of musical
XP37GAB	n to methodology of measurement of musical instruments.	ZK	4
	Genesis and Analysis of Biosignals lension between the biological signals of both electric and non-electric nature. Properties of the biosign lensis and description of the most important biological signals of both electric and non-electric nature.		
, ,	studied. Finally, simple and advanced methods of biosignals pre-processing, analysis and evaluation are presented for each t		no concequentia.
XP33GAD	Geometrical Algebras	ZK	4
Algebraic structures us	ed in geometry: Groups and linear spaces, ordered groups and fields, othogonal groups, Clifford algebras, etc. Discussion of	potentital application	tions in image
processing.			
XEP33GMM	Graphical Markov Models	ZK	4
-	in WS 2023/24 for the last time. It will not be opened anymore. Markov models on graphs represent a model class widely app uter networks, data security, robotics and pattern recognition. The first part of the course covers inference and learning for Ma		-
	g structure learning can be solved by efficient algorithms. The second part addresses graphical models on general graphs. Hi		
			, practically all
inference and learning	asks are NP-complete. The focus is therefore on efficient approximative algorithms.		
inference and learning XP16HKA	asks are NP-complete. The focus is therefore on efficient approximative algorithms. Historical structures and technologies in architecture	NIC	2
-		NIC ZK	2
XP16HKA	Historical structures and technologies in architecture	-	
XP16HKA XP16HDS	Historical structures and technologies in architecture History of Transport Systems and Communications	ZK	2
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys	ZK NIC ZK ZK	2 2 4 4
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m	ZK NIC ZK ZK	2 2 4 4
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and sources. Noise in worki	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys <i>v</i> ibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m ng environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control.	ZK NIC ZK ZK apping, principles	2 2 4 s and types of
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and sources. Noise in worki XP36HS	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys <i>v</i> ibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m ng environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control. Hypermedia Systems and Internet Computing	ZK NIC ZK ZK happing, principles ZK	2 2 4 s and types of 4
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and sources. Noise in worki XP36HS Hypermedia systems, b	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m ng environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control. Hypermedia Systems and Internet Computing asic models. Intelligent searching, adaptive navigation, personalization of access to web applications. Web intelligence, semi	ZK NIC ZK ZK happing, principles ZK	2 2 4 s and types of 4
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and sources. Noise in worki XP36HS Hypermedia systems, b topics and the ways out	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m ng environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control. Hypermedia Systems and Internet Computing nasic models. Intelligent searching, adaptive navigation, personalization of access to web applications. Web intelligence, semi- . Internet computing. Modern technologies for web applications design.	ZK NIC ZK ZK napping, principles ZK antic web. Web er	2 4 4 s and types of 4 ngineering, main
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and sources. Noise in worki XP36HS Hypermedia systems, b topics and the ways out XP37IAR	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m ng environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control. Hypermedia Systems and Internet Computing asic models. Intelligent searching, adaptive navigation, personalization of access to web applications. Web intelligence, semi	ZK NIC ZK ZK apping, principles ZK antic web. Web er Z,ZK	2 4 4 s and types of 4 ngineering, main
XP16HKA XP16HDS XP16HEL XP16HIS XP02HS Sound field, noise and sources. Noise in worki XP36HS Hypermedia systems, b topics and the ways out XP37IAR PhD students' educatio	Historical structures and technologies in architecture History of Transport Systems and Communications History of Electrical Engineering Historiography of the Development of Science, Technology and the Methodology Noise Surveys vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise m ng environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control. Hypermedia Systems and Internet Computing asic models. Intelligent searching, adaptive navigation, personalization of access to web applications. Web intelligence, semi- . Internet computing. Modern technologies for web applications design. Implementation algoritms in radioelecronics	ZK NIC ZK ZK apping, principles ZK antic web. Web er Z,ZK aal processors, pro	2 4 4 s and types of 4 ngineering, main 4 ccessors with
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XP33CHM	Chapters in higher mathematics	ZK	4
	several deeper results in a few mathematical disciplines. The idea is to help a student to read, with a certain comfort, the molecular of the gourne are fundemental results (criminal a) of any other mathematical Mara association with a certain comfort.		
	nts of the course are fundamental results (principles) of nowadays mathematics. More specifically, the course concerns the soplied in mathematical logics and probability theory), the Banach fixed-point theorem for complete metric spaces (as applied	-	
	ompact spaces (as applied in measure theory), the Riesz representation theorem for linear forms in a Hilbert space (as applied		-
-	s in Rn (as applied in linear algebra the Perron theorem), the elements of category theory for a practical man, etc. The asset	-	
in a students research.		-,	
XP01KAS	Complexity and Combinatorical Algorithms	ZK	4
	xity of algorithms. P and NP problems and their solutions: exact solutions, heuristics, approximation schemes, probabilistic alg		ces of problems.
XP36KP	Communication Protocols	ZK	4
	I principles, SDL language, protocol architecture: ISO OSI, error control, data-link layer protocols: X.25, higher layer protocols	1 1	
state machines, implem	entation tools (FSM language ESTELLE, regular grammars), use of Petri nets, specification language LOTOS, protocol trans	sformation, design	, synthesis,
validation and verification	n of protocols.		
XP35CCM1	Cooperative control of multi-agent systems	ZK	4
Cooperative distributed	control is a relatively novel and rapidly developing area of control theory and engineering. Instead of centralized, large syste	ms are considered	d composed of
autonomous subsystem	s, with local computation and communication capabilities. The broad aim is solving classical problems e.g. stabilization, track	king, estimation ar	nd optimization,
	and team cooperation robust to changes in communication topology and disturbance. Relevant topics of classical control the	-	
-	tics needed for the course is also provided. The potential use of multi-agent cooperation in challenging applications involving	-	
	Theory: Review of qualitative properties of dynamical systems, Motivation for distributed multi-agent systems, Elements of al Consensus and synchronization of linear/nonlinear, continuous/discrete-time systems, Cooperative stability, optimality and rol	• • ·	
	y, Interactions with environment.	business, Distribu	ted optimization.
XP34CNO	Integrated Optics	ZK	4
	bgical principles of IO Basic materials for IO. Light propagation in waveguide structures. Methods of waveguide structure desig	1 1	•
	ctures. Modal spectroscopy. Fundamental physical effects and interactions for IO. Preparation of dielectric waveguides and s	-	
	al modulators. Applicable measurement methods. Devices based on nonlinear effects. Semiconductor integrated opto-electro		
XP16ECM1	Quantitative research methods in economy 1	ZK	4
	equel to Statistics/Linear regression. The objective of the course is to expose the student to variety of common and practical	1	•
	a stronger appreciation of strengths and weaknesses of econometric methodology and to overview historical developments in		-
	the general linear model and knowledge how to deal with basic model and data deficiencies, simultaneous systems, and sir		
course will start develop	ing theoretical topics covered in the essential courses on Econometrics. The course will follow with different empirical research	n projects drawn fro	om the literature.
Each project will be intro	oduced by the relevant economic theory-model. Using own and empirical data sets, the students will apply standard econom	etrics methods to	answer basic
	ercise sessions will provide introduction into advance use of statistical packages (best is TSP or Stata or their derivatives like	e E-views) and a f	eedback on
	blem sets. The course will require intensive work with data and statistical packages.		
XP16ECM2	Quantitative research methods in economy 2	ZK	4
	sequel to the basic Econometrics (Basic statistical methods and Linear regression model). It assumes familiarity with the ge		-
	nodel and data deficiencies, simultaneous systems, and simple time-series processes. Advanced Econometrics is the next co ression) designed to introduce tools necessary to understand and implement empirical studies in (micro)economics. The main	-	
in Statistics and on Regi			
(i) to oxtond regression		-	
	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are	not appropriate a	ind to study
alternative methods. The	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal	not appropriate a of gaining a stron	nd to study ger appreciation
alternative methods. The	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are	not appropriate a of gaining a stron	nd to study ger appreciation
alternative methods. The of strengths and weakne	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal asses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to	not appropriate a of gaining a stron	nd to study ger appreciation
alternative methods. The of strengths and weakne will be covered as well. XP16KVM	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal	not appropriate a of gaining a stron opics from advanc	nd to study ger appreciation ed econometrics 4
alternative methods. The of strengths and weakne will be covered as well. XP16KVM	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal asses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster and	not appropriate a of gaining a stron opics from advanc	nd to study ger appreciation ed econometrics 4
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alternative methods. The of strengths and weakne will be covered as well. XP16KVM Application of software s research and managem XP01KVP	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal asses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster and	not appropriate a of gaining a stron opics from advanc ZK nalysis and its usi ZK	nd to study ger appreciation ed econometrics 4 ng in marketing 4
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alternative methods. The of strengths and weakne will be covered as well. XP16KVM Application of software s research and managem XP01KVP Quantum computing rep problems. This safety m	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal assess of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. Quantum Computing resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop	r not appropriate a of gaining a stron opics from advanc ZK nalysis and its usi ZK omplexity of classic	nd to study ger appreciation ed econometrics 4 ng in marketing 4 cal mathematical
alternative methods. The of strengths and weakne will be covered as well. XP16KVM Application of software s research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of E	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal asses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. Quantum Computing resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. Medical Applications of Electromagnetic Field M Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio	not appropriate a of gaining a stron opics from advanc ZK nalysis and its usin ZK mplexity of classic ord during the cou ZK n of 3D SAR and	nd to study ger appreciation ed econometrics 4 ng in marketing 4 cal mathematical rse. We will 4 temperature
alternative methods. The of strengths and weakne will be covered as well. XP16KVM Application of software s research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of Ed distribution. Details of m	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal asses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. Quantum Computing resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. Medical Applications of Electromagnetic Field M Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and region interval of the section of the section of the point of view of applicators for local, intracavitary and region interval of the section of the section of the section of the point of view of applicators for local, intracavitary and region is provide the models applications for local intracavitary and region of the point of view of applicators for local intracavitary and region is provide the models applicators for local intracavitary and region is provide the point of view of applicators for local intracavitary and region is provide the point of view of applicators for local intracavitary and region is provide the point of view of applicators for local intracavitary and region is provide the point of view of applicators for local interval inte	not appropriate a of gaining a stron opics from advanc ZK nalysis and its usin ZK mplexity of classic ord during the cou ZK n of 3D SAR and	nd to study ger appreciation ed econometrics 4 ng in marketing 4 cal mathematical rse. We will 4 temperature
alternative methods. The of strengths and weakne will be covered as well. XP16KVM Application of software s research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of Eff distribution. Details of m thermometry (NMR, ultr	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are explicitly of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal asses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. Quantum Computing resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. Medical Applications of Electromagnetic Field M Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regio asound and radiometry) and special compatible applicators are described.	not appropriate a of gaining a stron opics from advanc ZK nalysis and its usin ZK omplexity of classic ord during the cou ZK on of 3D SAR and onal treatment. No	nd to study ger appreciation ed econometrics 4 ng in marketing 4 cal mathematical rse. We will 4 temperature n-invasive
alternative methods. The of strengths and weakne will be covered as well. XP16KVM Application of software s research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of El distribution. Details of m thermometry (NMR, ultr XP37LN	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are explicitly of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal assess of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to Quantitative Research Methods in Management SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. Quantum Computing resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. Medical Applications of Electromagnetic Field M Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regio asound and radiometry) and special compatible applicators are described. Aircraft Navigation	rot appropriate a of gaining a stron opics from advance ZK malysis and its usin ZK mplexity of classic ord during the cou ZK m of 3D SAR and onal treatment. No	nd to study ger appreciation ed econometrics 4 ng in marketing 4 cal mathematical rse. We will 4 temperature on-invasive 4
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alternative methods. The of strengths and weaknes will be covered as well. XP16KVM Application of software S research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of El distribution. Details of m thermometry (NMR, ultr XP37LN XP35LMI Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed XP35LM1 Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed je zde: http://www.fel.cv/ XP35LSD This course builds upon of these results for the of design. State-space and Toolbox.	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal isses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to <b>Quantitative Research Methods in Management</b> SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. <b>Quantum Computing</b> resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop algorithms, fast database search, etc.  Medical Applications of Electromagnetic Field Wield medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regive asound and radiometry) and special compatible applicators are described.  Aircraft Navigation Linear Matrix Inequalities ng or optimization over linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide of in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-calgorithms to solve LMI problems; Solvers and software; LMIs for polynomial mehods in control. Control applications: robustne-order robust controllers with H-infinity specifications. For more information, see http://www.laas.fr/-henrion/courses/Imi Linear Matrix inequalities ng or optimization over linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide ol in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution	rot appropriate a of gaining a stron opics from advance ZK analysis and its usin ZK omplexity of classic ored during the cou ZK on of 3D SAR and onal treatment. No ZK finite matrices. LN onvex polynomial ess analysis of line ledek studentské a ZK stems are studied. d estimation, and I ol System Toolbox	Ind to study ger appreciation ed econometrics 4 Ing in marketing 4 cal mathematical rse. We will 4 temperature In-invasive 4 Il methods are optimization ar and nonlinear ankety p edm tu 4 The significance LQG control , and Polynomial
alternative methods. The of strengths and weakness will be covered as well. XP16KVM Application of software S research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of El distribution. Details of m thermometry (NMR, ultr XP37LN XP35LMI Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed XP35LM1 Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed je zde: http://www.fel.cv/ XP35LSD This course builds upon of these results for the of design. State-space and Toolbox. XP36LSM	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal isses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to <b>Quantitative Research Methods in Management</b> SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster at ent. <b>Quantum Computing</b> resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The "building stones" of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. <b>Medical Applications of Electromagnetic Field</b> M Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regio asound and radiometry) and special compatible applicators are described. <b>Aircraft Navigation</b> Linear Matrix Inequalities ng or optimization over linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide ol in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-ca algorithms to solve LMI problems; Solvers and software; LMIs for polynomial mehods in control. Control applications: robuste order robust controllers with H-infinity specifications. For more information, see http://www.laas.fr/-henrion/courses/lmi Linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide ol in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-ca algorithms to solve LMI problems; Solvers	rot appropriate a of gaining a stron opics from advance ZK analysis and its usin ZK omplexity of classic ored during the cou ZK an of 3D SAR and onal treatment. No ZK finite matrices. LN onvex polynomial ess analysis of line Eledek studentské a ZK stems are studied. d estimation, and I ol System Toolbox ZK	Ind to study ger appreciation ed econometrics 4 Ing in marketing 4 cal mathematical rse. We will 4 temperature on-invasive 4 11 methods are optimization car and nonlinear and nonlinear ankety p edm tu 4 The significance LQG control , and Polynomial 4
alternative methods. The of strengths and weakness will be covered as well. XP16KVM Application of software S research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of El distribution. Details of m thermometry (NMR, ultr XP37LN XP35LMI Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed XP35LM1 Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed je zde: http://www.fel.cv/ XP35LSD This course builds upon of these results for the of design. State-space and Toolbox. XP36LSM General introduction to s	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal isses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to <b>Quantitative Research Methods in Management</b> SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster are ent. <b>Quantum Computing</b> resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The ``building stones'' of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. <b>Medical Applications of Electromagnetic Field</b> Mield metical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regio asound and radiometry) and special compatible applicators are described. <b>Aircraft Navigation</b> Linear Matrix Inequalities Ing or optimization over linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide of in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-co algorithms to solve LMI problems; Solvers and software; LMIs for polynomial mehods in control. Control applications: robustne-order robust control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-co algorithms to solve LMI problems; Solvers and software; LMIs for polynomial mehods in control. Control applications: robustne-order robust control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-co algorithms	rot appropriate a of gaining a stron opics from advance ZK analysis and its usin ZK omplexity of classic ored during the cou ZK in of 3D SAR and onal treatment. No ZK finite matrices. LN onvex polynomial ess analysis of line Eadek studentské a ZK stems are studied. d estimation, and I ol System Toolbox ZK em VHDL and its u	Ind to study ger appreciation ed econometrics 4 Ing in marketing 4 Itamperature In-invasive 4 In methods are optimization In ar and nonlinear ankety p edm tu 4 In the significance LQG control , and Polynomial 4 Ise for simulation
alternative methods. The of strengths and weakness will be covered as well. XP16KVM Application of software S research and managem XP01KVP Quantum computing rep problems. This safety m design fast factorization XP17LAE Future possibilities of El distribution. Details of m thermometry (NMR, ultr XP37LN XP35LMI Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed XP35LM1 Semidefinite programmi an important modern to problems; Interior-point systems; design of fixed je zde: http://www.fel.cv/ XP35LSD This course builds upon of these results for the of design. State-space and Toolbox. XP36LSM General introduction to s of digital circuits: data ty	models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are a objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal isses of the econometric methodology. Examples from applied work will be used to illustrate the discussed methods. Selected to <b>Quantitative Research Methods in Management</b> SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster at ent. <b>Quantum Computing</b> resents a new programming paradigm. The safety of nowadays encypering techniques is based on enormous computation co ay be broken by quantum computers. The "building stones" of a quantum computer and quantum computers will be develop algorithms, fast database search, etc. <b>Medical Applications of Electromagnetic Field</b> M Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculatio icrowave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regio asound and radiometry) and special compatible applicators are described. <b>Aircraft Navigation</b> Linear Matrix Inequalities ng or optimization over linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide ol in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-ca algorithms to solve LMI problems; Solvers and software; LMIs for polynomial mehods in control. Control applications: robuste order robust controllers with H-infinity specifications. For more information, see http://www.laas.fr/-henrion/courses/lmi Linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semide ol in systems control and signal processing. Theory: Convex sets represented via LMIs; LMI relaxations for solution of non-ca algorithms to solve LMI problems; Solvers	rot appropriate a of gaining a stron opics from advance ZK analysis and its usin ZK omplexity of classic ored during the cou ZK in of 3D SAR and onal treatment. No ZK finite matrices. LN onvex polynomial ess analysis of line Eadek studentské a ZK stems are studied. d estimation, and I ol System Toolbox ZK em VHDL and its u	Ind to study ger appreciation ed econometrics 4 Ing in marketing 4 Itamperature In-invasive 4 In methods are optimization In ar and nonlinear ankety p edm tu 4 In the significance LQG control , and Polynomial 4 Ise for simulation

XP33LPD Logic and Logic Programming		ZK	4
-	al system and its essential properties - validity, completeness. Syntax and semantic		
,	ts model, Herbrand's model. Herbrand's theorem, Gödel's completeness theorem		
	olog language. Metodology of logic programming. Introduction of extralogical feature	-	ates. New trends
XP38MPX Magnetism in Engineering Pra	ming (ILP). Some practical examples of complex logic programs and practical appli stice	ZK	4
	c sensors and engineering magnetism including FEM design and magnetic measure	I I	-
this advanced course can be modified according to the students			
XP02MHD Magnetohydrodynamics		ZK	4
Qualitative description of the behaviour of hot plasma in magnet	c fields		•
XP16MAN Management		ZK	4
	anagement, responsibility of managers, manager's ethics, successful manager thin	I I	r.
XP16MAV Production Management		ZK	4
The role of production process in promoting the marketing conce	pt of the firm and the competitive advantage. The system of operational planning w	ith respect to prod	uction typology.
Standardized basis of production management, standardization.	Controlling, production management methods.		
XP33MZT Management of Knowledge an	d Information Technologies	ZK	4
	mation systems. Configuration of information systems. User interfaces, especially co	-	-
	description of the workflows. Simplification of the processes by the support of IT (Pr	-	-
	nterpreneurship as well as in the project management. Business Intelligence. Value n globalization of businesses. Virtual enterprises and organizations.	chains: links amo	ng suppliers,
XP16MAU Accounting for management		ZK	4
	ational structure of the enterprise and to the production process. Budgets, use for m	I I	·
analyses. Productivity and measurement of productivity in the pr		anagomont. Calot	
XP16MAR Marketing		ZK	4
5	research and marketing information system. Concepts of marketing strategy. The use		cle and portfolio.
Product and service policy, pricing and contractation policy, com	nunication, distribution. Marketing mix.		·
XP16MAS Marketing Strategies		ZK	4
Broadening of basic knowledge of marketing. The analysis of ma	rketing strategies in different market situations. The firm`s behavior under competiti	on and competitiv	e advantage.
Case studies in the field of product policy, price and condition po	licy, communication policy and distribution policy.		
XP33MAD Mathematical Analysis of Dem	oster-Shafer Theory	ZK	2
	uantification and processing in knowledge-based systems. The belief function, which i		
	aken as a generalization of probability measure. The model of DST will be presented		-
	t of the outcoming knowledge demanded by the classical DST is at our disposal. Be	-	
application oriented toward decision making under uncertainty.	ntended goal of the course is to offer a solid basis for the practical and critical applic		anous neius or
XP01MST Mathematical Statistics		ZK	4
	ple statistics. Point estimates and interval estimates.Confidence intervals. Estimation	I I	-
	esis testing for equality of parameters. Nonparametric tests. Regression analysis.	,	
XP01MTS Mathematical Methods in Sign	al Theory	ZK	4
	er series and Fourier integral. Band-limited signals. Theorems of Paley-Wiener and	Shannon-Kotelnik	ov. Modulation.
Analytic signals.			
XP01MKR Mathematics for cryptography		ZK	4
Introduction to the theory of groups, finite fields, and polynomials	over finite fields and their applications in cryptography.		
XP33MKD Mathematics for Cybernetics -	Selected Topics	ZK	4
_	gebras, representations. Topological spaces. Metric spaces, completeness, fixed-po		
	of linear equations, spectral theory. Matrix calculus, matrix inequalities. Least squares	and singular value	e decomposition.
Tensor product. Elementary theory of Hilbert spaces. Introductio		71/	
5	Photonic Devices and Structures	ZK	3
	onductors, optical glass, crystals, and polymers. The students get acquainted also v sent technologies for deposition of the micro and nano layers deposition. Students	•	
	ctronic devices and structures. It will be also shown the design of the photonic structures		
the measurement of the optical and optoelectronic properties.			
XP01MTP Matrix Calculus		ZK	4
	canonical form of a real matrix. Characteristic and minimal polynomial. Caley-Hamilt	I I	-
exponential matrix. Symetric, orthogonal and positive matrices. Di	agonalization of symetric, positive and circulant matrices. Singular value decompositi	on. Moore-Penros	e pseudoinverse
matrix. Generalized solution of systems of linear equations.			
XP15MPE Mechatronics in Electrical Pow	er Engineering	Z,ZK	4
	ators, steam and water turbines and nuclear reactor. Dynamics and control of STATCO	· · · · · · · · · · · · · · · · · · ·	
XP38MMN   Measurement of Nonelectric Q		ZK	4
	ssure, flow, movement, position and other physical quantities. Chemical sensors an	d analyzers, biose	
	an aircuite. Concer Applications is is during the second of the second	studies and a 111	
Sensor design and technology. Signal processing in sensor syste	ng circuits. Sensor Applications in industry, transport and consumer electronics. Ser	curity and military	applications.
XP15M\/N High \/oltage Measurement			
XP15MVN High Voltage Measurement	ms, intelligent sensors.	Z,ZK	4
Types of testing voltages and high voltage generators. Measurer	ems, intelligent sensors.	Z,ZK se voltages by volt	4 age dividers,
Types of testing voltages and high voltage generators. Measurer types of dividers. Dividers for measurement of fast transients, ca	ms, intelligent sensors.	Z,ZK se voltages by volt leasurement of AC	4 age dividers, high voltages,
Types of testing voltages and high voltage generators. Measurer types of dividers. Dividers for measurement of fast transients, ca	ems, intelligent sensors. Thent cables, attenuators. Disturbances of HV measurement. Measurement of impuls ibration of dividers. Measurement of DC high voltages, HV resistors and dividers. M neasurement of voltage peak values. Measurement of high current, shunt reactors,	Z,ZK se voltages by volt leasurement of AC	4 age dividers, high voltages,
Types of testing voltages and high voltage generators. Measurer types of dividers. Dividers for measurement of fast transients, ca instruments for measurement of RMS voltages. Instruments for r	ems, intelligent sensors. Thent cables, attenuators. Disturbances of HV measurement. Measurement of impuls ibration of dividers. Measurement of DC high voltages, HV resistors and dividers. M neasurement of voltage peak values. Measurement of high current, shunt reactors,	Z,ZK se voltages by volt leasurement of AC	4 age dividers, high voltages,
Types of testing voltages and high voltage generators. Measurertypes of dividers. Dividers for measurement of fast transients, cainstruments for measurement of RMS voltages. Instruments for rcurrent on potential by utilization of optical-fibre waveguides. VoltagesXP37MVPScientific Work Methodology	ems, intelligent sensors. Thent cables, attenuators. Disturbances of HV measurement. Measurement of impuls ibration of dividers. Measurement of DC high voltages, HV resistors and dividers. M neasurement of voltage peak values. Measurement of high current, shunt reactors,	Z,ZK e voltages by volt leasurement of AC Rogowski coil. Me ZK	4 age dividers, c high voltages, asurement of 4
Types of testing voltages and high voltage generators. Measurer types of dividers. Dividers for measurement of fast transients, cal instruments for measurement of RMS voltages. Instruments for r current on potential by utilization of optical-fibre waveguides. Voltages/Versional Scientific Work Methodology         XP37MVP       Scientific Work Methodology         Targeting and motivation of scientific work, exploitation of literatu projects, formal requirements ( PhD Thesis, article, conference),	ems, intelligent sensors. hent cables, attenuators. Disturbances of HV measurement. Measurement of impuls ibration of dividers. Measurement of DC high voltages, HV resistors and dividers. M heasurement of voltage peak values. Measurement of high current, shunt reactors, age tests of transformers. HV measurement of dielectrics.	Z,ZK e voltages by volt leasurement of AC Rogowski coil. Me ZK preparation, exam	4 age dividers, c high voltages, asurement of 4 ples of scientific
Types of testing voltages and high voltage generators. Measurer types of dividers. Dividers for measurement of fast transients, cal instruments for measurement of RMS voltages. Instruments for r current on potential by utilization of optical-fibre waveguides. Voltages/VP         XP37MVP       Scientific Work Methodology         Targeting and motivation of scientific work, exploitation of literature	ems, intelligent sensors. hent cables, attenuators. Disturbances of HV measurement. Measurement of impuls ibration of dividers. Measurement of DC high voltages, HV resistors and dividers. M heasurement of voltage peak values. Measurement of high current, shunt reactors, age tests of transformers. HV measurement of dielectrics. re and other information resources, accessible databases, fundamentals of project patents and patent search. Internet exploitation, discussion groups, WWW present	Z,ZK e voltages by volt leasurement of AC Rogowski coil. Me ZK preparation, exam	4 age dividers, c high voltages, asurement of 4 ples of scientific

computation of transmission linkes parameters. Computation of microwave circules scattering parameters, analysis of plasma methods.       Computation of transmission linkes parameters. Computation of microwave circules scattering parameters, analysis of plasma methods.         CP38MDC       Methods of Signals Digitalization and Reconstruction       ZK       4         Horison enteroids       Methods of Signals Digitalization and Reconstruction       ZK       4         Vision enteroids       Methods of Precision Measurement of active and passive electrical quantities and Measurement Data Processing       ZK       4         Vision enteroids       Methods of Precision Measurement of active and passive electrical quantities. Scatterical analysis transwarent data.       ZK       3         P33MED       Methods of certical quantities and weak weak weak weak weak weak weak weak	XP17MAPP Computation of transmis	Analysis Methods for Passive Elements of Microwave and Millimeter-wave Technique	ZK	4
Identification         Methods of Signals Digitalization and Reconstruction         ZK         4           (P38MDR         Methods of Signals Digitalization and Reconstruction         ZK         4           (P38MDR)         Methods of Precision Measurement of allow supression of disturbing signals.         (P38MPDR)         K         4           (P38MPDR)         Methods for Precision Measurement of active standards. Inductive ratio devices for precision electrical quantities and Measurement and uncertainties. Metrological parameters. Solution relative standards inductive ratio devices for precision electrical quantities. Statistical analysis freesurement data.         ZK         3           (P38MPL)         Metrological electrical quantities and spectral quantities and application of modern tools to It. The lectures acquaint students with the up-to-date entered of precises measurement of active and uncertainties. Metrological electrical quantities and application of modern tools to It. The lectures acquaint students with the up-to-date entered of precises accuracity. East computing, interface issues. Paralel information processing Aufliprocessos state systems. The schedules application of accuracy.         ZK         4           (P14MID)         Microprocessor Control of Electric Drives         ZK         4           (P14MID)         Microprocessor Control of Electric Drives         ZK         4           (P14MIP)         Microprocessor Control of Electric Drives         ZK         4           (P14MIR)         Microprocessor Control of Electric Drives <td></td> <td><i>,</i></td> <td>I I</td> <td>alysis of passive</td>		<i>,</i>	I I	alysis of passive
PR3BMDR         Methods of Signal Digitalization and Reconstruction         ZK         4           he up-to-date and unconventional methods of analog preprocessing of typical sensors signals, selection of optimal digitization methods and optimization of hardware solution including processing of measurement tasks to achieve high accuracy and effective suppression of discurbing signals.         4           P33BMPM         Methods for Precision Measurement of Electrical Quantities. Tand Measurements and possibilities of improving their increlogical parameters.         4           Instantum standards of a obtime high accuracy and effective suppression of discurbing signals.         4           Resource in Solving problems connected with the metrology of electrical quantities. Evaluation of modern tools to it. The lectures acquaint students with the up-to-date vehicus of precision measurement of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date vehicus of precision concept, fast computing, interface issues. Parallel information processing, Multiprocessor systems. Real-time system. SW. HV design techniques and the course is to introduce students of the interupt driven system, full feature terrents. Tasks, intertask communication, queues, semaphores. Croltol algorithms design of the course is to introduce students on the latest issues of mikroprocessor control of Electric Drives         ZK         4           P14MIN         Microprocessor Control of Electric Drives         ZK         4           earminer, field alignal processor (DSP) approacessor system, field oppressing addition of electric drives.         ZK         4           P	circuits with the stress o	n methods: spectral domain, integration equation, finite differences, finite elements, mode matching, transversal resonance.	Survey of basic th	neorems of
he up-to-date and unconventional methods of analog preprocessing of twoical sensors signals, selection of optimal digitation methods and optimization of hardware solution including processing of measurement results and/ness/interests in disturbing signals.  (P38MPM Methods for Precision Measurement of Electrical Quantities and Measurement Data Processing) ZK 4  Autorus standards of electrical quantiles. Collective standards. Inductive relia devices for precision electrical measurement and possibilities of improving their metrological parameters.  FW38MET Metrology ZK 3  FW38MET Metrology Control of Electrical quantities. Evaluation of measurement roles to it. The lectures acquaint students with the up-to-date entrols of precises measurement of accuracy.  FW14MID Mitoroprocessor Control of Electric Drives  FW14MID Mitoroprocessor Control of Electric Drives  FW14MIP Mitoroprocessor Control of Electric Drives  FW14MIR Mitoropro	electromagnetic fields, r	noment method, disturbance method.		
Iprocessing of measurement results to achieve high accuracy and effective suppression of disturbing signals.              (P38MPM) Methods for Precision Measurement of Electrical Quantities and Measurement and possibilities of improving their metrological parameters. (PastMPC quantities. Soliective standards. Inductor ratio devices for precision identical measurement and possibilities of improving their metrological parameters. (PastMPC quantities. Soliective standards. Inductor ratio devices for precision identical measurement and possibilities of improving their metrological parameters. (PastMPC quantities. Collective standards. Inductor ratio devices for precision of modern tools to it. The lectures acquaint students with the up-to-date the course is forcased on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date the course is forcases or concept, fast computing, interface issues. Parallel information processing. Multiprocessor systems. Real-time system. Standards and the course is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course data with topics of control of Electric Drives               ZK             4            (P14MIN]         Microprocessor Control of Electric Drives               ZK             3               A               A             (P14MIN] </td <td>XP38MDR</td> <td>Methods of Signals Digitalization and Reconstruction</td> <td>ZK</td> <td>4</td>	XP38MDR	Methods of Signals Digitalization and Reconstruction	ZK	4
(P38MPM)         Methods for Precision Measurement of Electrical Quantities and Measurement Data Processing         ZK         4           Maintum standards of electrical quantities. Collective standards. Inductive relice devices for precision neesurement and possibilities of improving their methological parameters.         Methods for Precision Measurement of active and possible electrical quantities. Evaluation of measurement and possibilities of improving their methological reliability. Statistical analysis           (P38MET)         Metrology         ZK         3           the occurse is focused on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date embods of precises processor. Concurse I, fast computing, interface issues.         4           Annotic Computers, their architecture. ADC, DAC special circumpting, interface issues.         Parallel information processing. Multiprocessor systems. Real-line systems. SN: WM design examples.           (P14MID)         Microprocessor Control of Electric Drives         ZK         4           (P14MIP)         Microprocessor Control of Electric Drives         ZK         4           (P14MIP)         Microprocessor Control of Electric Drives         ZK         4           (P14MIP)         Microprocessor Control of Electric Drives         ZK         4           (P14MIR)         Microprocessor Control of Electric Drives         ZK         4           (P14MIR) <td< td=""><td>The up-to-date and unco</td><td>nventional methods of analog preprocessing of typical sensors signals, selection of optimal digitization methods and optimiza</td><td>tion of hardware s</td><td>olution including</td></td<>	The up-to-date and unco	nventional methods of analog preprocessing of typical sensors signals, selection of optimal digitization methods and optimiza	tion of hardware s	olution including
upantum standards of electrical quantities. Collective standards. Inductive raito devices for precision measurement and possibilities of measurement data.         ZK         3           (P38MET)         Metrology         ZK         4           he course is focused on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date vehicles of precise measurement of electrical quantities with an accent to correct evaluation of accuracy.         ZK         4           CP14MID         Microprocessor Control of Electric Drives         ZK         4           control computers, their architecture. ADC, DAC special circuits, DMA, measurement of pulse parameters. Event memories, FIFOs, CAMs, multiport RAMs, gate arrays. Serial communication, pueues, semaphores. Control of Electric Drives         ZK         4           control computer, site architecture. ADC, DAC special circuits, DMA, measurement of pulse parameters. Event memories, FIFOs, CAMs, multiport RAMs, gate arrays. Serial communication, pueues, semaphores. Control of Electric Drives         ZK         4           Notifications accessor concept, tast computing, interface issues. Parallel information processor systems, parameters. The course deals with topics of control on puer digital signal processor (DSP) accitecture, computational resources, fixed point, fraction, metrode, buess, protocols. synchronization, multiprocessor systems, parallel processing.         4           he aim of the course is to introduce students to the latest issues of microprocessor control of pelectric Drives         ZK         4	of processing of measur	ement results to achieve high accuracy and effective suppression of disturbing signals.		
Instant         Instant <t< td=""><td>XP38MPM</td><td>Methods for Precision Measurement of Electrical Quantities and Measurement Data Processing</td><td>ZK</td><td>4</td></t<>	XP38MPM	Methods for Precision Measurement of Electrical Quantities and Measurement Data Processing	ZK	4
Immegnenent data.       ZK       3         (P38MET)       Metrology       ZK       3         recourse is focused on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date selends of precise measurement of electrical quantities with an accent to correct evaluation of accuracy.       ZK       4         Optimization DSP processor concept, fast computing, interface issues, Parallel information processing, Multiprocessor systems, Real-time system, SW, HW design examples.       ZK       4         (P14MID)       Microprocessor Control of Electric Drives       ZK       4         no discuss, SW, HW design examples.       ZK       4         (P14MIP)       Microprocessor Control of Electric Drives       ZK       4         no discuss, SW, HW design examples.       ZK       4       4         (P14MIP)       Microprocessor Control of Electric Drives       ZK       4         nopular, digital signal processor (CSP) achicitacy, computational resources, fixed point, fraction, finding point arithmetic, interrupt system, DMA controller, special blocks, ADC, vent memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, control computer resources application in scalar and vector control of electric drives.       ZK       3         (P14MIR)       Microprocessor Control of Electric Drives       ZK       4       3         (P14MIR)<				
(P38MET         Metrology         ZK         3           the course is locused on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date electrical quantities with an accent to correct evaluation of accuracy.         ZK         4           control computers, their architecture. ADC, DAC special circuits, DMA, measurement of pulse parameters. Event memories, FIFOS, CAMs, multiport RAMs, gate arrays. Serial communication. DSP processor concept, fast computing, interface issues. Parallel information processing. Multiprocessor systems. Real-time system, SV, HW design techniques.           cilcel consp., phase/state driven systems. Interrupt driven system, full featured kernels. Tasks, intertask communication, queues, semaphores. Control algorithms design and issues. SW, HW design computer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controller, special blocks, ADC, vent memory. FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocol computer resources application in scalar and vector control computer digital signal processor (DSP), achitecture, computation control computer programming methods, control computer resources application in scalar and vector control or electric drives.         ZK         3           (P14MIR         Microprocessor Control of Electric Drives         ZK         3           control diverse         ZK         3           control diverse         ZK         4         3           control diverese         ZK <td></td> <td>cision measurement of active and passive electrical quantities. Evaluation of measurement errors and uncertainties. Metrological descentions and the second s</td> <td>ogical reliability. Sta</td> <td>atistical analysis</td>		cision measurement of active and passive electrical quantities. Evaluation of measurement errors and uncertainties. Metrological descentions and the second s	ogical reliability. Sta	atistical analysis
he course is focused on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquaint students with the up-to-date textods of precises measurement of electrical quantities with an accent to correct evaluation of accuracy.           [P14MID]         Microprocessor Control of Electric Drives         ZK         4           communication. DSP processor concept, fast computing, interface sizes. Parallel information processing, Multiprocessor system. XRe H/due system. XR, H/due design techniques.         Velocity of the size of the s				_
heteods of precise measurement of electrical quantities with an accent to correct evaluation of accuracy.       ZK       4         (P14MID       Microprocessor Control of Electric Drives       ZK       4         control computers, their architecture. ADC, DAC special circuits, DMA, measurement of pulse parameters. Event memories, FIFOs, CAMs, multiport RAMs, gate arrays. Serial ormunication, DSP processor concept, fast computing, interface issues. Parallel information processing. Multiport RAMs, gate arrays. Serial ormunication, gueues, semaphores. Control algorithms design in dissues. SW, HW design examples.       YK       4         (P14MIP)       Microprocessor Control of Electric Drives       ZK       4         he aim of the cource is to introduce students to the latest issues ignal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processing, URI processing, Multiport RAM, impulse signal generation, serial communication, embods, buses, protocols, synchronization, multiprocessor systems, parallel processing, CMI processin			I I	÷
(P14MID         Microprocessor Control of Electric Drives         ZK         4           Control computers, their architecture, ADC, DAC special circuits, DMA, measurement of pulse parameters. Event memories, FIFOs, CAMs, multiport RAMs, gate arrays. Serial communication, occepting, fast computing, interface issues. Parallel information processing, Multiprocessor systems. Real-line systems. With W design techniques.           Voltage and the concept, fast computing, interface issues. Parallel information processing, Multiprocessor systems. Real-line systems. With W design examples.         Voltage and the concept, fast computing, interface issues.           VP14MIP         Microprocessor Control of Electric Drives         ZK         4           he aim of the course is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course deals with topics of control omputer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controller, special blocks, ADC, vent memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, nultiprocessor QDSP, digital s			quaint students wit	th the up-to-date
control computers, their architecture, ADC, DAC special circuits, DMA, measurement of pulse parameters. EPGs, CAMs, multiport RAMs, gate arrays. Serial ommunication. DSP processor concept, fast computing, interface issues. Parallel information processing, Multiprocessor systems, Real-time system, SC antrol algorithms design techniques. Semphores. Control algorithms design techniques. Semphores. Control of Electric Drives       ZK       4         the aim of the course is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course deals with topics of control omputer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system. DMA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processing.         CP14MIP       Microprocessor Control of Electric Drives       ZK       3         control computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system. DMA controller, special blocks, ADC, event memory, FIFO, CAM, Multipocks, ADC, event memory, FIFO, CAM, Multipoter AM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, utiliprocessor systems, parallel processing, RT systems, solution methods, systems: NIT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources applications.         (P34MS)       Microsystems       Microsystems       A       4       4				
ommunication. DSP processor concept, fast computing, interface issues. Parallel information processing, Multiprocessor systems, Real-time system, SW, HW design techniques. I oldel loops, phase/state driven systems, Inferrupt driven system, full featured kernels. Tasks, intertask communication, queues, semaphores. Control algorithms design d issues. SW, HW design examples. KP14MIP Microprocessor Control of Electric Drives A month the course is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course deals with topics of control omputer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controller, special blocks, ADC, vent memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processing. Ty systems, prequestive RTOS, tasks, queues, semaphors, critical section, control computer programming methods, control computer resources application in scalar and vector control federtic drives. (P14MIR Microprocessor Control of Electric Drives Sortod computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DAA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, inpulse signal generation, serial communication, methods, buses, protocols, synchronization, nultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control modure regramming methods, control of microsystems, and Micro-sensors, Micro-sensors, Micro-sensor, Micro-sensor, Micro-selectrical-mechanical structures). (P34MSY Microsystems and Microsystems and Microacetuators (P34MSA Microsystems and Microacetuators (P34MSA Microsystems an				-
folled loops, phase/state driven systems, F/B systems. Interrupt driven system, full featured kernels. Tasks, intertask communication, queues, semaphores. Control algorithms design and issues. SW, HW design examples.         P(14MIP)       Microprocessor Control of Electric Drives       ZK       4         he aim of the course is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course deals with topics of control omputer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controller, special blocks, ADC, vent memory, FIFO, CAM, Multiport RAM, inpulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor gystems, parallel processing, IT systems, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, inpulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessing, IT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control of omputer, digital ginal processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control ormputer programming methods, control computer resources application in scalar and vector control of electric drives.       ZK       3         (P34MRY)       Microsystems       Microsystems, parallel processing, RT systems, Sultion methods, systems: INT, BG-FG, FSA, CC, preenptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources application in scalar and vector control of electric drives.       ZK       4         (P34MSY)				
Indissues, SW, HW design examples.       ZK       4         (P14MIP)       Microprocessor Control of Electric Drives       ZK       4         he aim of the course is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course deals with topics of control computer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DRA controller, special blocks, ADC, vent memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system. DNA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, floating point arithmetic, interrupt system. DNA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, floating point arithmetic, interrupt system. DRA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, floating point arithmetic, interrupt system. DRA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, floating point arithmetic, interrupt system. Dreg systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer pregramming methods, control computer resources a			-	-
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computer, digital signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controller, special blocks, ADC, vent memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processing, Tsystems, preemptive RTOS, tasks, queues, semaphors, critical section, control computer programming methods, control computer resources application in scalar and vector control fetertir drives.         (P14MIR       Microprocessor Control of Electric Drives       ZK       3         control computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controlles, peecial blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, MEMS (micro-electrical-mechanical structures). MCES micro-electrical structures). MCES micro-electrical structures). MEMOS (micro-electrical-mechanical structures). Microsystems and chira systems, and Microacutators       ZK       3         (P34MSA)       Microsystems and Abicroacutators       ZK       3         (P34MISA)       Micros	I		I I	•
vent memory, FIFÖ, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processing, TT systems, preemptive RTOS, tasks, queues, semaphors, critical section, control computer programming methods, control computer resources application in scalar and vector control felectric drives. ZK 3 control computer, digital signal processor Control of Electric Drives ZK 3 control computer, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, jultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources application in scalar and vector control of electric drives. (P134MSY Microsystems 2 K 4 undamental concepts and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MOES inco-optical-electrical structures). MEMOS (micro-electrical-mechanical-optical structures). Microsystem design. Microsystem modelling. Manufacturing technologies. Materials. (P34MSA Microsystems and Microactuators 2 ZK 3 Pa4MISA Microsystems and Microactuators 2 ZK 3 Pa4MISA Microsystems and a papilications. (P34MISA Microsystems and big setternal. The course shows new possibilities of realization and application of integrated micro-components working with various physical rinciples and quantities using mainly MEMS technology, increasing reliability with all its attributes. The course inforduces modern elements - microactuators with various physical rinciples and quantities using mainly MEMS technology, increasing reliability with all its attributes. The course inforduces modern elements - microactuators with various physical rinciples and its circuit elements including hybrid and monolithic integrated cicru				
IT systems, preemptive RTOS, tasks, queues, semaphors, critical section, control computer programming methods, control computer resources application in scalar and vector control felectric drives.         (P14MIR       Microprocessor Control of Electric Drives       ZK       3         control computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DNA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, EG-FS, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources application in scalar and vector control of electric drives.         (P34MSY)       Microsystems       ZK       4         undamental concepts and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical-optical structures). Microsystem modelling. Manufacturing technologies. Materials. Ndustrial applications. Medical applications.       ZK       3         (P34MSA)       Microsystems and Microactuators       ZK       3         he course deals with system integration applied in the design of digital and analog systems with application of negrated micro-components working with various principles of neir activities including basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoelectronic system surveus working with various princi			· ·	
f electric drives.          P14MIR       Microprocessor Control of Electric Drives       ZK       3         bontrol computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, nultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources application in scalar and vector control of electric drives.       ZK       4         VP34MSY       Microsystems       ZK       4         undamental concepts and classification of microsystems. Micro-sensors. Microsystem design. Microsystem modelling. Manufacturing technologies. Materials. ndustrial applications.       ZK       4         VP34MSA       Microsystems and Microactuators       ZK       3         he course deals with system integration applied in the design of digital and analog systems with application of system engineering, in it is solved interconnection of various types of nodern electronic systems on a chip as well as external. The course shows new possibilities of realization and application of nanocectronic structures are mentioned ere. The subject extends students' expertise with the latest multidisciplinary chip eleme				
KP14MIR         Microprocessor Control of Electric Drives         ZK         3           control computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt ystem, DMA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, nultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer regoramming methods, control computer resources application in scalar and vector control of electric drives.         ZK         4           (P34MSY)         Microsystems         Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MOES micro-optical-electrical structures). MEMOS (micro-electrical-mechanical-optical structures). MEMOS (micro-electrical-mechanical-optical structures). Microsystem modelling. Manufacturing technologies. Materials. Natural applications.         XK         3           (P34MSA)         Microsystems and Microactuators         ZK         4           (P34MSA)         Microsystems and Microactuators         ZK         3           (P34MSA)         Microsystems and Microactuators         ZK         3           (P34MSA)         Microsystems and Microactuators         ZK         3           (P34MSA)         Microsystems and Abicroactuators         ZK         3 <td< td=""><td>of electric drives.</td><td></td><td></td><td></td></td<>	of electric drives.			
control computer, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt         ystem, DMA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, inpulse signal generation, serial communication, methods, buses, protocols, synchronization, nultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources application in scalar and vector control of electric drives.         KP34MSY       Microsystems       ZK       4         undamental concepts and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MCSS (micro-electrical-mechanical-optical structures). MEMOS (micro-electrical-mechanical-optical structures). MEMOS (micro-electrical-mechanical-optical structures). MEMOS (micro-electrical-mechanical-optical structures). MEMOS (micro-electrical-mechanical-optical structures). Microsystem applications.       ZK       4         VP34MSA       Microsystems and Microactuators       ZK       3       A       A       A         he course deals with system integration applied in the design of digital and analog systems with application of system engineering, in it is solved interconnection of various types of nodern electronic systems on a chip as well as external. The course shows new possibilities of realization and application of integrated micro-components working with various principles of neir activities including basic applications in industry, medicine, regulation, automotive co		Microprocessor Control of Electric Drives	ZK	3
ystem, DMA controller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, nultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control omputer programming methods, control computer resources application in scalar and vector control of electric drives.  (P34MSY Microsystems and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MOES micro-optical-electrical structures). MEMOS (micro-electrical-mechanical-optical structures). Microsystem design. Microsystem modelling. Manufacturing technologies. Materials.  (P34MSA Microsystems and Microactuators Z(P34MSA) Micro-sensors. Micro-actuators. Signal processing within the system modelling. Manufacturing technologies. Materials.  (P34MSA Microsystems and Microactuators Z(P34MSA) Micro-sensors. Micro-sensors			I I	-
nultiprocessor systems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, semaphors, critical section, control ormputer programming methods, control computer resources application in scalar and vector control of electric drives.         (P34MSY)       Microsystems       ZK       4         undamental concepts and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MOES micro-optical-electrical structures). MEMOS (micro-electrical-mechanical structures). Microsystem modelling. Manufacturing technologies. Materials. dustrial applications.         (P34MSA)       Microsystems and Microactuators       ZK       3         he course deals with system integration applied in the design of digital and analog systems with application of system engineering, in i tis solved interconnection of various types of nodern electronic systems on a chip as well as external. The course shows new possibilities of realization and application of integrated micro-components working with various physical rinciples and quantities using mainly MEMS technology, increasing reliability with all its attributes. The course introduces modern elements - microactuators with various principles of realization gasic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoelectronic structures are mentioned ere. The subject extends students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, loT, biomedicine, aerospace, automotive dustry etc.         (P17MT)       Microwave Technique       ZK       4         Microwave circui				
computer programming methods, control computer resources application in scalar and vector control of electric drives.       ZK       4         VP34MSY       Microsystems       Microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MOES micro-optical-electrical applications.       Methods       M	•			-
undamental concepts and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-mechanical structures). MOES         micro-optical-electrical structures). MEMOS (micro-electrical-mechanical-optical structures). Microsystem design. Microsystem modelling. Manufacturing technologies. Materials.         ndustrial applications. Medical applications.       ZK       3         he course deals with system integration applied in the design of digital and analog systems with application of system engineering, in i tis solved interconnection of various types of todern electronic systems on a chip as well as external. The course shows new possibilities of realization and application of integrated micro-components working with various physical rinciples and quantities using mainly MEMS technology, increasing reliability with all its attributes. The course introduces modern elements - microactuators with various principles of neir activities including basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoelectronic structures are mentioned ere. The subject extends students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biomedicine, acrospace, automotive dustry etc.         CP17MT       Microwave Technique       ZK       4         ficrowave transmission lines and its circuit elements including hybrid and monolithic integrated circuits technology. Resonators and other type of passive microwave measurement.       CA       4         QP32MOS       Mobile Networks       ZK       4         he course familiarizes students with evolution and				,
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KP13MSD       Modelling and Simulation of Technological Systems       Z,ZK       4         trogram tools of computer modelling and simulation. Programs processing port diagrams or block diagrams. Text edited systems and examples. Graphic edited systems and examples       SiMULINK. Modelling of electric and electronic systems. Models of power semiconductor devices, modelling of power semiconductor systems. Examples of simulations. Modelling of electric and electromechanical systems, hydraulic systems and thermal systems. Examples of simulations.         KP33ICT       Modern ICT for Industry and Smart Grids       ZK       4         KP02MPF       Z,ZK       2         KP14RPD       Advanced Controlled Drives       ZK       3         C motor with variable frequency feeding. Current source converter. Voltage source converter, PWM, Electromagnetic torque by feeding from frequency converters. Vector oriented ontrol system, Direct and indirect torque control system, Self-controlled synchronous motor drive. Methods for rotor position determination. Switch Reluctance Motor, SD motor.         KP14MPO       Advanced Controlled Drives       ZK       4         KP37MSC       CNS Modern Systems       ZK       4         KP34PD       Advanced Power Semiconductor Devices and ICS       ZK       4         KP34APD       Advanced Power Semiconductor Devices and ICS       ZK       4         KP34APD       Advanced Power Semiconductor Devices and applications. Bipolar structures. BiMOS structures. High voltage ICs, operation, princ	here. The subject extendindustry etc. XP17MT Microwave transmission attenuators, couplers, is CAD of microwave circu XP32MOS The course familiarizes a used in mobile networks XP33MOL A model of knowledge in knowledge. Correspond XP13MSD Program tools of compu - SIMULINK. Modelling of mechanical and electror XP33ICT XP02MPF XP14RPD AC motor with variable f control system, Direct an XP14MRP XP37MSC XP34APD Physical and technologi transistors. MOS and IG applications XP14MZR	basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoeled is students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biom Microwave Technique lines and its circuit elements including hybrid and monolithic integrated circuits technology. Resonators and other type of pa- polators and circulators, modulators etc.) and active microwave circuits (e.g. oscillators, mixers and amplifiers), microwave filt its. Mobile Networks tudents with evolution and standardization of mobile networks and mainly provides a detailed description of network architectu. The course as well depicts trends and the future development of mobile networks. Modal Logics for Distributed Systems a distributed environment and "muddy children puzzle". Introduction of modal operators and their semantics based on possib distributed environment and properties of possibility relation in the model. Knowledge in MAS. Common knowledge and agree Modelling and Simulation of Technological Systems ter modelling and simulation. Programs processing port diagrams or block diagrams. Text edited systems and examples. Grap of electric and electronic systems. Models of power semiconductor devices, modelling of power semiconductor systems. Exa nechanical systems, hydraulic systems and thermal systems. Examples of simulations. Modern ICT for Industry and Smart Grids Advanced Controlled Drives requency feeding. Current source converter. Voltage source converter, PWM, Electromagnetic torque by feeding from frequency advanced Controlled Drives CNS Modern Systems Advanced Power Semiconductor Devices and ICS at structures. Development trends. Parameters and applications. Bipolar structures. MOS structures. BiMOS structures. PN 8T transistors. Thyristors (including GTO and MCT). Secondary breakdown, mechanism, safe area. Smart-power devices. Higt New Control Methods for Electric Drives	ZK         assive microwave m	are mentioned ce, automotive 4 elements (e.g. easurement. 4 basic principles 4 Properties of 4 as and examples ons. Modelling of 4 2 3 ector oriented SD motor. 4 3 4 4 diodes. Bipolar ation, principles, 4
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KP13MSD       Modelling and Simulation of Technological Systems       Z,ZK       4         trogram tools of computer modelling and simulation. Programs processing port diagrams or block diagrams. Text edited systems and examples. Graphic edited systems and examples SIMULINK. Modelling of electric and electronic systems. Models of power semiconductor devices, modelling of power semiconductor systems. Examples of simulations. Modelling of nechanical systems, hydraulic systems and thermal systems. Examples of simulations.       XK       4         KP33ICT       Modern ICT for Industry and Smart Grids       ZK       4         (P02MPF       Z,ZK       2       ZK       3         (P14RPD)       Advanced Controlled Drives       ZK       3         .C motor with variable frequency feeding. Current source converter. Voltage source converter, PWM, Electromagnetic torque by feeding from frequency converters. Vector oriented ontrol system, Direct and indirect torque control system, Self-controlled synchronous motor drive. Methods for rotor position determination. Switch Reluctance Motor, SD motor.         KP14MPO       Advanced Controlled Drives       ZK       4         (P14MPO)       Advanced Controlled Drives       ZK       4         (P34APD)	here. The subject extend industry etc. XP17MT Microwave transmission attenuators, couplers, is CAD of microwave circu XP32MOS The course familiarizes s used in mobile networks XP33MOL A model of knowledge ir knowledge. Correspond XP13MSD Program tools of compu - SIMULINK. Modelling mechanical and electror XP33ICT XP02MPF XP14RPD AC motor with variable f control system, Direct at XP14MPO XP14MRP XP37MSC XP34APD Physical and technologi transistors. MOS and IG applications XP14MZR The aim of the course is electromechanical energy	basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoeled is students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biom Microwave Technique lines and its circuit elements including hybrid and monolithic integrated circuits technology. Resonators and other type of pa- lators and circulators, modulators etc.) and active microwave circuits (e.g. oscillators, mixers and amplifiers), microwave filt its. Mobile Networks tudents with evolution and standardization of mobile networks and mainly provides a detailed description of network architectu. The course as well depicts trends and the future development of mobile networks. Modal Logics for Distributed Systems to distributed environment and "muddy children puzzle". Introduction of modal operators and their semantics based on possile ance between axioms and properties of possibility relation in the model. Knowledge in MAS. Common knowledge and agree Modelling and Simulation. Programs processing port diagrams or block diagrams. Text edited systems and examples. Grap of electric and electronic systems. Models of power semiconductor devices, modelling of power semiconductor systems. Exa nechanical systems, hydraulic systems and thermal systems. Examples of simulations. Modern ICT for Industry and Smart Grids Advanced Controlled Drives Advanced Controlled Drives Advanced Controlled Drives Advanced Controlled Drives Advanced Power Semiconductor Devices and ICs al structures. Development trends. Parameters and applications. Bipolar structures. MOS structures. BIMOS structures. PN 8T transistors. Thyristors (including GTO and MCT). Secondary breakdown, mechanism, safe area. Smart-power devices. Higt New Control Methods for Electric Drives to introduce students to the latest issues of control and regulation of electric drives, taking into account the focus of their doctor y conversion parameters in electric drive system	ZK         assive microwave me         ZK         assive microwave me         ZK         ures and discusses         ZK         ble-worlds model. If         ment.         Z,ZK         phic edited system         mmples of simulation         ZK         Dral work. Its purport	Are mentioned tee, automotive 4 elements (e.g. easurement. 4 basic principles 4 Properties of 4 Properties of 4 and examples ons. Modelling of 4 2 3 ector oriented 3 ector oriented 3 ector oriented 4 3 ector oriented 5 D motor. 4 3 ector oriented 4 3 ector oriented 4 a 4 4 a 4 a 4 a 4 a a 4 a a a a a a a a a a a a a
KP13MSD       Modelling and Simulation of Technological Systems       Z,ZK       4         trogram tools of computer modelling and simulation. Programs processing port diagrams or block diagrams. Text edited systems and examples. Graphic edited systems and examples SIMULINK. Modelling of electric and electronic systems. Models of power semiconductor devices, modelling of power semiconductor systems. Examples of simulations. Modelling of nechanical and electromechanical systems, hydraulic systems and thermal systems. Examples of simulations.       XX       4         KP33ICT       Modern ICT for Industry and Smart Grids       ZK       4         KP02MPF       Z,ZK       2         KP14RPD       Advanced Controlled Drives       ZK       3         C motor with variable frequency feeding. Current source converter. Voltage source converter, PWM, Electromagnetic torque by feeding from frequency onverters. Vector oriented ontrol system, Direct and indirect torque control system, Self-controlled synchronous motor drive. Methods for rotor position determination. Switch Reluctance Motor, SD motor.         KP14MPO       Advanced Controlled Drives       ZK       4         KP14MPO       Advanced Controlled Drives       ZK       4         KP31MSC       CNS Modern Systems       ZK       4         KP34MPD       Advanced Power Semiconductor Devices and ICs       ZK       4         KP34MPD       Advanced Power Semiconductor Devices and applications. Bipolar structures. MOS structures. BiMOS structures. PN diodes. Sch	here. The subject extendindustry etc. XP17MT Microwave transmission attenuators, couplers, is CAD of microwave circu XP32MOS The course familiarizes sused in mobile networks XP33MOL A model of knowledge ir knowledge. Corresponde XP13MSD Program tools of compu - SIMULINK. Modelling mechanical and electror XP33ICT XP02MPF XP14RPD AC motor with variable f control system, Direct ar XP14MPO XP14MRP XP37MSC XP34APD Physical and technologic transistors. MOS and IG applications XP14MZR The aim of the course is electromechanical energy	basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoeled is students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biom Microwave Technique lines and its circuit elements including hybrid and monolithic integrated circuits technology. Resonators and other type of pa- lators and circulators, modulators etc.) and active microwave circuits (e.g. oscillators, mixers and amplifiers), microwave filt its. Mobile Networks tudents with evolution and standardization of mobile networks and mainly provides a detailed description of network architectu. The course as well depicts trends and the future development of mobile networks. Modal Logics for Distributed Systems to distributed environment and "muddy children puzzle". Introduction of modal operators and their semantics based on possile ance between axioms and properties of possibility relation in the model. Knowledge in MAS. Common knowledge and agree Modelling and Simulation. Programs processing port diagrams or block diagrams. Text edited systems and examples. Grap of electric and electronic systems. Models of power semiconductor devices, modelling of power semiconductor systems. Exa nechanical systems, hydraulic systems and thermal systems. Examples of simulations. Modern ICT for Industry and Smart Grids Advanced Controlled Drives Advanced Controlled Drives Advanced Controlled Drives Advanced Controlled Drives Advanced Power Semiconductor Devices and ICs al structures. Development trends. Parameters and applications. Bipolar structures. MOS structures. BIMOS structures. PN 8T transistors. Thyristors (including GTO and MCT). Secondary breakdown, mechanism, safe area. Smart-power devices. Higt New Control Methods for Electric Drives to introduce students to the latest issues of control and regulation of electric drives, taking into account the focus of their doctor y conversion parameters in electric drive system	ZK         assive microwave me         ZK         assive microwave me         ZK         ures and discusses         ZK         ble-worlds model. If         ment.         Z,ZK         phic edited system         mmples of simulation         ZK         Dral work. Its purport	Are mentioned tee, automotive 4 elements (e.g. easurement. 4 basic principles 4 Properties of 4 Properties of 4 and examples ons. Modelling of 4 2 3 ector oriented 3 ector oriented 3 ector oriented 4 3 ector oriented 5 D motor. 4 3 ector oriented 4 3 ector oriented 4 a 4 4 a 4 a 4 a 4 a 4 a 4 a a a a a a a a a a a a a

Development trends in e	Advanced Control Methods of Electric Drives lectric drive control. Application of microprocessor technology, program realization of algorithms for modern drives, modulato e control, converter with harmonic current control for synchronous machine, functions and control of compatible rectifier, pre			
electric drives.	e control, converter with narmonic current control for synchronous machine, functions and control of compatible rectilier, pre	view of modern c	ontrollers for	
1	Multimedia Signals Transmission	ZK	4	
	tion system scheme. Extended knowledges in radio transmitters and radio receivers. Radio transmitters and receivers syste radiotelephone systems. Terrestrial and satellite digital broadcasting. Analog and digital radiorelay systems. Metallic commu	-		
	ponic communication systems. Modulation and multiplexing in optoelectronic systems. Cable television networks, interactive t	-		
	elopment trends. Electromagnetic compatibility.	-		
·	Navigation systems	ZK	4	
	n the field of navigation systems and their practical applications. It covers GNSS technology including definition of coordinat stated with satellite navigation, and positioning methods. On the other hand, only one lecture is devoted to the design of GNS			
	ills described in other master's course Architecture of Radio Receivers and Transmitters. The GNSS area is further extended			
including the navigation	equations and mechanization of the calculation, inertial sensors and aiding systems/sensors, e.g. pressure based altimeters	, magnetometer, l	Lidars, ultrasonic	
	The focus is paid on detailed data fusion practical tasks for estimating position, velocity and attitude in outdoor/indoor envir	1		
	Design and circuit structures of electronic systems	ZK	4	
	nportant applications of analogue technique. The subject is divided into the three basic parts. The first part is devoted to amp gnal processing. Special application amplifiers, nonlinear and parametric analog functional blocks and fast analog circuits op	-		
	part is devoted to linear analog systems, their characteristics, description and synthesis capabilities. There are discussed: th	-		
	filter synthesis and their optimization with regard to real properties and value variances of the circuit elements, implementation		-	
	switched capacitor (SC) and switched-current (SI) circuits. The last part deals with computer-aided circuit design. The princip	-	-	
	s of functional blocks and circuit elements are discussed together with simulation result processing and their utilization for c Digital filter synthesis	ZK	4	
	ignals. Impulse response, step response, convolution. Elements of z-transform and Fourier transform. Difference equation, tr	1	-	
	methods for finite impulse response (FIR) digital filters - windowing and frequency sampling methods, optimal design algorit			
	Ind filters. Design methods for infinite impulse response (IIR) digital filters. Bilinear transformation. Analytic design methods in	digital z-domain.	All-pass sections	
	nal processing. Group delay equalization, phase shift and notch filters. Wave digital filters.	71/	4	
	Programmable IC Design to acquaint students with advanced methods of design, synthesis and verification of programmable systems and systems verification of programmable	vith high integration	4	
	asic building elements, architecture and design procedures used to implement complex integrated systems, methods of design			
synthesis. They will learn	n verification strategy, design and analysis of tests. This project-oriented course would with the use of state-of-the-art EDA to	ols to implement a	a comprehensive	
· · ·	d system whose application would be linked to the topic of the dissertation.			
	CAD for RF and Microwave Circuits	Z,ZK	4	
	onductor devices and transmission lines implemented in the PSpice class and similar programs. Hierarchy of the models of ot nodel accuracy with artificial neural networks (ANN). Advanced algorithms for analysis and optimization of RF and microwave c			
	Nonlinear systems	ZK	4	
	s to help student develop a deeper and broader perspective on theory and applications of nonlinear systems. At the hearth	1	-	
	proach, which can be used for controllability and observability analysis of nonlinear systems, characterization of various typ			
-	reat attention is paid to analysis of the structure of nonlinear systems from the perspective of control design. It follows from ransformations of the nonlinear model into a simpler form that is usable for control design. Differential-geometric conditions for	-		
	e. Concepts of nonlinear controllability and observability are introduced in this course and their relation to stabilization and re			
it is not as clear as for linear systems. Some additional topics such nonsmooth stabilization and discontinuous stabilization will be covered. Examples of use of the presented theories				
	walking, nonholonomic systems and optimization of biosystems will be given.			
	Nonlinear Systems	ZK	4	
	a continuation of the master level course "Nonlinear systems" being opened during winter semester. It is devoted to the deta of design point of view. It is based on state space descripion of nonlinear systems. Model transformations will be studied to s			
	gives mathematical conditions for the existence of these transformations. Nonlinear analougues of controllability and observal			
	to detectability and stabilizability investigated. Finally, elements of nonlinear output regulation as well as of nonlinear robust	and adaptive de	sign will be	
-	I be, in particular, based on MATLAB and SIMULINK use.		1	
	German language 1 emphasis on professional language. Listening to authentic technical texts from areas of electrical engineering, eliciting basic	NIC	the text Reading	
	onal texts regarding the needs of postgraduate students. Training of various reading skills. Writing technical texts on specific		•	
	advanced students based on 5 video tapes about these topics: postgraduate studies, professions, internships abroad, profe		-	
	er. Revising and extending typical grammar for technical style, syntax of technical texts.			
	German language 1	ZK	0	
-	emphasis on professional language. Listening to authentic technical texts from areas of electrical engineering, eliciting basic onal texts regarding the needs of postgraduate students. Training of various reading skills. Writing technical texts on specific		-	
	advanced students based on 5 video tapes about these topics: postgraduate studies, professions, internships abroad, profe		-	
profession of an enginee	er. Revising and extending typical grammar for technical style, syntax of technical texts.			
	German language 2	ZK	0	
	German language 2	NIC		
The course is focused of presentations etc.)ations	n extending and elaborating grammar and conversation, namely on professional language skills (reading + writing technical setc.)	texts, preparing	papers, reviews,	
	Neural Networks and Neurocomputers	ZK	4	
	paradigm classification and artificial neural networks learning methods. Student is supposed to propose and test the application	1	-	
-	rning his dissertation theme during the semester. Procedure and results would be concluded in the preliminary publication for			
a scientific forum.				

XEP33NEP	Neuroprosthetics	Z,ZK	4
	incerned with the use of artificial devices to replace or improve the function of the human nervous system. The neuroprosthetic		-
	vith approximately 150,000 in use worldwide. In this course we will look at the different technologies involved, particularly in te		
	tical use. We will also see how such implants interact with the human nervous system, forming a bidirectional gateway both t timulate the human brain.As well as witnessing the exciting development of the field we will consider neuroprosthetics in term	0	
	s but also for visual and motor repair. We will however also look at the possibilities of Neuroprosthetics for general human enl	-	
	experimentation fits into teh field. Whilst the course will focus on technical issues, it will be presented in a general way such the		-
-	cal background is not a requirement). Indeed as this technology has immediate impact, societal, ethical and moral issues rais		
course is complementa	ry to the lecture course given on Bionics: this set of lectures being specifically concerned with neural aspects - linking the hum	an brain and ner	ous system with
technology.			
XP13NM	New Matherials and their Application	Z,ZK	4
	on the topic of the doctoral thesis, e.g. carbon materials and composites, conducting polymers and composites, biomimetic m	ateriály, selfasser	nbly, glassy
materials, and new mat		71/	4
XP14MEN	New Trends in Converter Technology	ZK	4
-	to introduce students to the principles and functions of latest topologies of power semiconductor electric energy converters, t nt of the subject is the optimization of the power conversion parameters in power semiconductor converter systems. The subject	-	-
	bles, topologies, functions and possibilities of application of power semiconductor converters realized on the basis of modern		
-	erful control microcomputers. The topics are focused on pulse width modulation methods for voltage and current control, mod		
	e control of the current curve and the voltage curve, as well as the overall quality of electric energy transmission. The probler	-	
matrix converters, mult	-level converters, resonant converters as well as problems related to their practical use are also solved.		
XP14MTD	New Trends in Converter Technology	ZK	4
Up to date power semi-	conductor devices. Pulse Width Modulation methods for current and voltage control. Single-phase PWM converter. Converters wi	th unity power fac	tor. Single-phase
	rrent shape control. Three-phase converter with active current shape control. Converter with active voltage shape control. Conve	erters for multisyst	em locomotives.
Resonant converters.			
XP14APR	New Trends in Electric Device Apply	ZK	3
XP14NAP	New Trends in Electric Device Apply	ZK	4
XP14APD	New Trends in Electric Device Applications	ZK	4
	nent and design of electric apparatus. Electric apparatus and electric devices co-operation. Electric apparatus switching chara		
	ing overvoltage and possibility of its limitation. Up to date systems for overvoltage limitation. Problems of high voltage motor s	witching. Electric	apparatus
	up to date methods. Internal smart installations. New generation of building installations.	71/	4
XP14NTP	New Trends in Electric Device Theory	ZK	4
XP14TPR	New Trends in Electric Device Theory	ZK	3
XP14TPD	New Trends in Electric Device Theory	ZK	4
-	dels and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric a	-	
limitation. Electric conta	on physical process in arcing chamber. Switcher braking capacity and possibility of their inducement. Fuses theory. Electric cir	cuit braking with	short current
XEP33NUM	Numerical Analysis	Z,ZK	4
	to basic numerical methods of interpolation and approximation of functions, numerical differentiations and integration, solution		-
	equations and systems of linear equations. Emphasis is put on estimation of errors, practical skills with the methods and demo		
Maple and computer gr			
XP33NUM	Numerical Analysis	Z,ZK	4
The course introduces	to basic numerical methods of interpolation and approximation of functions, numerical differentiation and integration, solution	of transcendent a	nd (ordinary and
partial) differential equa	tions and systems of linear equations. Emphasis is put on estimation of errors, practical skills with the methods and demonst	ration of their pro	perties using
Maple and computer gr			
XP01NLA	Numerical Linear Algebra	ZK	4
	bra. Norms of vectors and matrices. Numerical linear algebra. Special systems. Eigenvalues and eigenvectors. Iterative meth	ods. Matrix invers	ion. Singular
	eneralized solutions of linear systems.	71/	4
XP32NMR	Numerical Methodes of Electromagnetic Tasks Solution	ZK	4
	analysis of electromagnetic field distribution through both air and other environment. It offers a view deep inside to popular nume nent Method and Finite Element Method. Handling the software is obvious nowadays; nevertheless, the mayor attention is paid t		
	apparatus and understanding the physical principles of the solved tasks in symbiosis to particular used software.	o understanding t	nemanematica
XP17NME	Numerical Methods in Electromagnetic Field	ZK	4
	z and wave equations. Analytical, semianalytical, seminumerical and numerical methods. Matrix equations and algorithms: Methods and algorithms: Method		
	od of Moments, Multiple MultiPoles, Boundary Element Method, Finite Difference Method, Finite Element Method, Finite Integr	-	-
Solution of matrix equa	tions: direct methods, Gauss-JordanOs elimination, pivotation, LU-decomposition, banded and sparse matrix, conjugate-grad	lient method.	
XP34EHA	Renewable Energy Microsources for Electronics - Energy Harvesting	ZK	4
The course deals with	system integration applied in the design of digital and analog systems with application of system engineering, in i tis solved in	terconnection of	arious types of
modern electronic syste	ems on a chip as well as external. The course shows new possibilities of realization and application of integrated micro-compon	ents working with	various physical
	s using mainly MEMS technology, increasing reliability with all its attributes. The course introduces modern elements - microa		
-	basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoelec		
=	ds students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biom	edicine, aerospad	ce, automotive
industry etc. XP37IPP	Image Processing and Photonics	ZK	4
	innage Processing and Protonics cipline used in space technology. Students will become acquainted with advanced imaging photonics used in space sciences, ir		
	nd the influence of the environment. In addition, there are included parts describing the parameters of optical instruments (PS		
	ation modeling and removal methods for IR - VIS electromagnetic radiation. The subject also includes a description of the ser		
	ne reconstruction of the acquired image, and discusses its use in space applications. In addition, there are parts including Earth	-	
and the use of modern	instruments in this area, including optical Fourier transform, electromagnetic wave polarization research, and hyperspectral in	naging and data p	rocessing in this
area, including image c	ata telemetry.		

XP32ODV	Intellectual property protection	ZK	4
This subject introduces	the basic issues of intellectual property (IP) protection. Students learn why it is necessary to protect research results, how the	ey can protect the	eir own technical
solutions and designs, h	ow to obtain a trademark and also how to succeed with IP protection at the international level. The course also deals with lic	ense granting pro	cedures for
	thods as part of a standard way of commercializing original IP. Emphasis is put on quality methodology for database searchir		or successful
	ent projects. Motto: Those who do not protect the results of their research work can never dream of being on par with the bes		
XP35OFD	Estimation and Filtering	ZK	4
<b>0</b> , 1	nt design, structure selection and parameter estimation. Bayesian approach to uncertainty description. Posterior probability de		· .
	Robust numerical implementation of least squares estimation for Gaussian distribution. Parameter estimation and state filter	ing - Bayesian ap	proach. Kalman
	perties of Kalman filter. Kalman filter for colored/correlated noise.		
XP35ESF1	Estimation and filtering	ZK	4
	nt design, structure selection and parameter estimation. Bayesian approach to uncertainty description. Posterior probability de		
	Robust numerical implementation of least squares estimation for Gaussian distribution. Parameter estimation and state filter	ing - Bayesian ap	proacn. Kaiman
	perties of Kalman filter. Kalman filter for colored/correlated noise.	71/	4
XP33OSD	Real Time Operating Systems	ZK	4
	perating systems, system and user modes, memory protection, operating systems (OS) classification and types, special requ		
	cesses and application programs, kernel and its services, system calls. Concurrent processes and threads, inter-process commu es. Process scheduling, scheduling in single- and multiprocessor systems. Processor management, process creation and termina	-	-
	strengthere in the strengthere and multiple strengthere is the strengt	-	-
	ion, critical section, deadlocks. Synchronization tools: semaphores, monitors, looks, deadlock detection and prevention. OS kern		
TCP/IP.		er components for	internetworking,
XP370DS	Optical Design and Simulation	ZK	4
XP170V	Optical Fibers	ZK	4
	bers, attenuation and dispersion, step-index fibers, gradient fibers, single and f1ibers, optical cables, splices and connectors	I I	•
	enomena in optical, fibers, fibers for sensors.	, optical libers life	asurements,
XP32OSY	Optical Systems	ZK	4
	stems are being more extensively used in a practice, particularly in a telecommunication networks. Tremendous transmission		-
	the state being more extensively used in a practice, particularly in a telecommunication networks. The networks transmission by factors making it attractive. The objective of this subject is to provide students with a more rigorous theoretical background		
function.			mission systems
XP35ORC1	Optimal and robust control	ZK	4
	Irse about modern control design methods that formulate the design as a mathematical optimization. Besides teaching pract	I	-
	er understanding of fundamental concepts as well as build awareness of the latest results. Thanks to its background in mathe	-	
	In the seen beyond the borders of automatic control domain. The course can be viewed as an extension of the equal-named	-	
	numerous topics are new and those few topics that already appeared in the master version will be discussed at a significant		
	ive practical tool but also to go through the proofs, discuss various interpretations, and survey the results from the latest literat		
	to acquire advanced competences (knowledge and skills) in the area of computational design of control systems (or rather		
-	ssume availability of a mathematical model of the system to be controlled (hence model-based control design). We will consider	-	
-	linear and nonlinear, single and multiple inputs and outputs. Since all the design methods introduced in this course formulate t		
	will come from the areas of optimization, both finite-dimensional (linear, quadratic, nonlinear and semidefinite programming)	-	
of variations, operator th	eory, differential games).		
XP36PSV	Parallel Systems and Algorithms	ZK	4
	nd scalability of parallel algorithms. Parallel computer architectures, models, PRAM, APRAM. Direct and indirect interconnec	tion networks, em	beddings,
simulations. Communica	ation algorithms - routing, switching techniques, deadlock problem, permutation routing, collective communication operations	. Fundamental pa	rallel algorithms
- reduction, prefix compu	ttation, Euler tour technique. Parallel sorting. Parallel linear algebra algorithms. Parallel combinatorial search. Parallel complexit	y theory Graduate	s of engineering
studies in specialization	Computer Science and Informatics FEE CTU cannot register.		
XP01PDR	Partial Differential Equations	ZK	4
Problems in partial differ	rential equations of mathematical physics. Initial and boundary value problems. The method of characteristic functions, integr	al form and nume	rical methods.
XP34PED	Advanced Electronic Devices	ZK	4
Energy band engineering	g. Quantum well, wire, point. 2D electron gas based devices (HEMT, MOD FET). Devices based on resonance double-barrier t	ر unnelling. 3D stru	ctures. Quantum
device applications (mer	mories, generators, multipliers). Heterogeneous structures. Microwave devices, HBT, Gunn diodes. Microwave device applica	tions. Heterogene	eous devices
with internal optical coup	oling. Cryotronic devices. Recording media. IC development trends.		
XP13PED	Plastics in Electrical Engineering	Z,ZK	4
Exploitation plastics in el	ectrical manufacturing. Exercise plastics in the production of the cables, structural members etc. The specialty requirements on		ls (conductance,
the mechanic rigidity, of	shape constancy). Composite materials from out plastics. Technology treatment of plastics. Degradation of plastics impact of	í environment(clin	natic and the
mechanic stability and c	hemical resistance). The plastic waste. Recycling of plastics. Impact of production and the used up plastics on the environme	ent.	
XP02PT	Plasma Technologies	ZK	4
XP33VTP	Computer Vision Theory and Practice	ZK	4
	tudents will study selected sophisticated state-of-the-art computer-vision methods that have an efficient implementation pub	I	-
	Is that have been successfully used in a number of applications, including large scale search in high-dimensional spaces, de	-	
-	methods selected for the course evolve based on the current progress in the field; the selection is also alternated by the stu	-	
	d the method, to understand the implementation, and to be able to use the implementation as a tool to solve other problems		5
XP01POA	Advanced theory of operator algebras	ZK	4
	s of the theory of operator algebras are treated. In particular, structure of ideals, convex structure of the state space, tensor p	I I I I I I I I I I I I I I I I I I I	
modular theory.		-, p.,	,
XP39CG	Advanced Computational Geometry	ZK	4
	to deepen the knowledge of computational geometry. The course is designed primarily for students who have a dissertation	I I I I I I I I I I I I I I I I I I I	
	effective work with them. The starting point of the study will be chapters from the compulsory literature, specific topics will be	-	
	ents will have the latest articles on the subject and will creatively process the theme. This is mainly about mastering the meth		
	of the dissertation. Precisely this aspect (the methodology of scientific work in the given field) is one of the added values oftl		- 1
	vites directly to the above-defined concept.		.,,
XEP36AGT	Advanced Computational Game Theory	ZK	4
	I J		

XP37CAD Advanced methods for circuit analysis and optimization using computer-aided design	Z,ZK	3
The first part of the subject deals with contemporary models of both classical semiconductor elements (in submicron domain) and special microwa		-
Moreover, models of power MOS (LDMOS) transistors are also defined and characterizing the elements by X-parameters is included as well. The r		-
completed by characterization nano-scale elements, including noise models, and by a description of memristors, memcapacitors and meminductor	-	-
contains algorithms for solving nonlinear stiff systems of differential-algebraic equations in implicit form combined with nonstandard sensitivity analysis in the frequency domain is also included as well as nonstandard sensitivity analysis of noise figure. Attention is also given to steady-state	-	
difficult form usable for autonomous circuits. The analytic methods are naturally complemented by single- and multi-objective optimizations. Up to f	•	
demonstrated on very complicated, but technically useful tasks from the microwave area including power RF amplifiers.		
XP16AFM Advanced Financial Management Methods	ZK	4
The aim of the course is a deeper understanding of the more complex financial management issues. It builds on knowledge of standard financial management	1	-
are alternative capital market models, other investment valuation methods (generalized NPV method, general IRR method). The student will learn	-	
derivatives, evaluating exotic derivatives. In addition, students will assess using the Monte Carlo method the value of derivatives and financial instrur		-
formulas are not available. Other modern finance issues will be addressed through case studies. An integral part is the question of numerical metho		
use. Students create their own models and simulations based on the chosen topic. The output will be a comparative analysis of the proposed meth	ods and standard r	nethods. The
wide use of computational tools and models (Matlab, Mathematica, others) is assumed.		
XP39UID Advanced methods of UI design	ZK	4
The goal of the course is to introduce advanced methods for user interface and interaction design in non-standard environments, such as virtual and	nd augmented reali	ty. Students will
gain theoretical background related to human interaction in such environments. During the course students will get familiar with a set of techniques	for design and test	ing of interactive
systems in non-standard environments, especially in virtual and augmented reality with collaborative aspects.		
XP39VIZ Advanced Visualization Methods	ZK	4
Human factors in visualization (Perception and cognition, Visual saliency, Visual thinking) Design of User Interfaces for Visualization applications (Ev		• •
Advanced volume visualization (Illustrative volume rendering) Big data visualization, Visual analytics, Animation for visualization, Data compression	n and reduction Lar	ge scale data
visualization Visualization techniques in nonstandard environment		
XP39PMV Advanced Methods of Visualization	ZK	4
Scientific visualization based on physical models. Scientific visualization and volume rendering. Volume graphics. Information visualization. Interact		alization
environment. Scientific visualization in WWW environment. Particle models and visualization of technological processes. Computational fluid dynar	1	4
XP36POA Advanced Parallel Algorithms	ZK	4
Design and analysis of time-, and cost-efficient PRAM algorithms and parallel algorithms for distributed memory machines. The collection of algorithms distributed list ranking. Color Marga Cart acting mach part approximation and trac avaluation and trac avaluation and trac avaluation.		anced parallel
scan algorithms, distributed list ranking, Cole's MergeSort, optimal mesh sort, connected components, tree contraction and tree evaluation, pattern		4
XP37NOS Advanced Computational Tools for Imaging and Radio Systems The course focuses on advanced image and signal processing with a focus on imaging and radio systems. The emphasis is on the implementation of	ZK	4
work in the laboratory. Students will verify the principles of algorithms in solving non-trivial problems, such as processing of image data from wide-fi	-	
processing of large data volume from non-linear image system, 2D photometric system calibration, and real-time GNSS signal processing.	siu systemis useu ii	rastronomy, last
	Z,ZK	4
5 5	1 .	•
The course covers selected areas of advanced multimedia signal processing with emphasis on processing techniques adapted for sensing, processing and video signals concerning the requirements of human observers and the characteristics of human visual system (HVS). Main focus of the		
coding, including overview of conventional methods in respect to the information theory, rate-distortion analysis and advanced methods for efficien		
in respect to Quality of Experience (QoE) in emerging immersive multimedia. Emphasis is placed on the rigorous theoretical description of the met		-
their experimental verification in the laboratory using special equipment or simulation tools.		e peccianty et
XP17PEM Advanced Electromagnetism	ZK	3
The course presents advanced topics of classical electromagnetic field theory, especially: electric and magnetic vector potential; reciprocity, duality		-
function; multipole expansion; scattering and characteristic modes; homogenization and Bloch's theorem; synthesis and topological optimization Th		-
can be used in many branches of applied electromagnetism, especially in antenna theory and microwave circuit design.	0.0	
XP34SDS Semiconductor Structures	ZK	3
The aim of this course is to provide postgraduate students with a deeper and more detailed insight into principles of and properties of advanced elec	1	
Completion of this course enables doctoral students to deepen the basic knowledge, which they obtained in the bachelor and master stages of stu	-	
structures and elements. They will be able to solve scientific tasks in electronics and optoelectronics focused on design, analysis and applications adv	anced electronic ar	nd optoelectronic
structures. The student will gain deep knowledge of physics principles of PiN and MOS structures, as these dominate the current integrated and po	wer semiconductor	technology. The
lecture will be further focused on the use of new principles associated with miniaturization and the use of advanced materials. Higher-order phenor	nena whose knowle	edge is essential
for understanding the current semiconductor devices will be described. It is expected that the course will focus on specific issues according to the i	nterests and scient	ific focus of the
participants.		
XP34SRS Semiconductor Radiation Sources	ZK	4
Stimulated emission in semiconductors. Homogeneous and heterogeneous junction, double heterostructure lasers and LEDs. Non-coherent LED's	, super-luminescer	ce diodes.
Electromagnetic fields in semiconductor lasers. Types of lasers and their properties. Waveguide lasers, DFB and BFR structures. SQW and MQW I		
injection lasers. Spectral line width and line stability. Radiating characteristic, coupling of the radiation source to a waveguide. Bi-stable and memory ele		s. Semiconductor
injection, waveguide amplifiers and wave convertors. Lasers and non-coherent diodes for optical communications. Measurement methods, applicat		
XP33PPD Practical Data Mining Problems	ZK	4
The course is focused on solving of practical data mining problems. Lectures deal with data transformation, pre-processing and verification, selection		
and data mining process evaluation and results interpretation. The attention is paid to solving of an individual data mining problem based on real-li	e data under super	rvision of the
XP33PAD Probabilistic Algorithms	ZK	2
A survey of basic notions of statistic and probability. An analysis of the notion of non-deterministic algorithm. Effectivity criteria for non-deterministic	-	
of probabilistic algorithms. The probability of failure. Loss function. The expected risk. Probabilistic analysis of deterministic algorithms. Criteria for ap	plication of probab	ilistic algorithms.
Probabilistic algorithms and their practical importance.	71/	4
XP33PMD Probabilistic Models of Uncertainty in Al		4
Basic (discrete) probability. Foundations of graph theory. Triangulated graphs and their characteristics. Information as a measure of dependence. Conclusional distributions, Qualitative knowledge represented by dependence.	-	
Lemma, Block Independence Lemma). Knowledge representation by multidimensional distributions. Qualitative knowledge represented by depend models and Bayesain networks. Decomposable models for computation in Graphical Markov models. Examples of application.	since structures. Gr	apriicai iviarkov
	ZK	4
XP34ADM   Principles and Applications of Device Models Fundamentals of the computer-aided technological design. Device simulators Silvaco Atlas and Synopsys Quantum ATK: principles, applications. Ba		
Numerical methods. Recombination models. Avalanche ionisation models. Mobility models. Practical exercises (individual projects) according to the	-	-

XP37PKP	Biomedical Engineering in Clinical Practice	ZK	4	
	tical problems that a biomedical engineer has to overcome in the clinical practice. Position of BME in research and in the clinical			
and clinical experiments - design, conducting and evaluation, statistical analysis used in medicine. Thermodynamics of gas mixtures. Humidification of ventilation gases. Evaporisers				
of anaesthetical substances. Systems with compressible fluids. Measurement of physical parameters in rigid and compliant systems. Basic parts of pneumatic systems in medicine (jet				
	of airflow and pressure, gas blenders, etc.). Modelling and analysis of biological systems using electrical analogy, practical ap		-	
	I, biochemical sensors. Haematology analysers. Interference, corrections of measured values, standardisation in medicine. Ele lectrodes and circuits for biopotential measurement and electrical stimulation. Indirect measuring methods of biological and p		r internal organs	
XP36PAS	Algebraic Specifications Prototyping	ZK	4	
	syntax and semantics of a specification language (OBJ3), structured specifications, generic specifications, implementation o			
	og, translation into Lisp, term rewriting systems, abstract rewriting machine, prototyping of a specification, prototyping in OBJ3,			
(C++).				
XP33PAM	Industrial application of multi-agent systems	ZK	4	
XP13PSD	Flexible Production Systems	Z,ZK	4	
	automation. Flexible automation. Basic components of FMS. Machining centres, flexible manufacturing cells and islands. Opti-			
	components. Interfaces. Systems of automatical self checking of quality. CNC machines appropriate for FMS. Manipulators ar control. CNC for the control of FMS. Flexible assembling systems. Automated plants of future, conception and tasks. Efficience			
XP15PEE	Transmission of Electricity	Z,ZK	4	
-	ransmission of Lecthory in the second s		-	
	multaneous faults. Special transients in the integrated power systems. Distance and comparison protection relays, principles	-		
	networks, prediction and limitation of disturbances due to non-linear loads. Static stability of the power system and its criteria.			
system and its criteria.	Methods for increasing of the stability in power systems. Multimachine transient stability. Reliability of the power transmission	systems.		
XP38PSL	Aircraft Instrumentation	ZK	4	
The subject acquaints s	tudents with the current technology used in aircraft with respect to instruments, systems and sensors working in the low-freq	uency field and w	ith methods for	
basic processing of sys	tem data. The course includes a detailed description of aircraft instrumentation and its resistance to external influences, a de	scription of aircraf	t power sources	
	jineering, analysis of instruments and systems for measurement of engine and aerometric quantities, and a description of emerg		-	
	kground related to nowadays technology and methodology utilized on aircraft. The course provides a detailed overview of qu			
-	and their integration into signal/data processing and aircraft system design principles. The last part of the course discusses t	he current publish	ing activities in	
the field of aircraft instru		71/	0	
XP38PUC		ZK	2	
XP37RAD	Radioelectronics	ZK	4	
XP36RSY	Reconfigurable Systems	ZK	4	
-	nfigurability as a part of normal function. Technology of reconfiguration., partially reconfigurable devices. Reconfiguration contractive structure of the second structure of	-		
	software support. Design and verification of reconfigurable systems, algorithms, EDA tools. Reconfiguration in System on Ch with reconfigurable devices, case study, literature research.	ip (Soc). Codesig	n issues in Soc.	
XP35RRD	Robust Control	ZK	4	
	lected topics in robust control.		4	
XP33RSK	Robust Statistics for Cybernetics	ZK	4	
	basic tools of control and decision making theory. Classical statistical methods (e.g. MLE) are usually very sensitive to deviat	I	-	
Thus many methods wh	nich are robust have been developed. It means that these methods are not so sensitive to small deviations from an underlying	, model. So we bri	efly explain the	
parametric concept of e	stimation and then we introduce the robust approach, some basic robust estimators of location (e.g. trimmed mean, Hampel	estimator) and me	easures of	
robustness (influence fu	inction, breakdown point).			
XP33ROD	Pattern Recognition	ZK	4	
	z/wiki/courses/xp33rod/start			
XP04R1	Russian language 1	NIC		
	or intermediate students who have an equivalent command of the language as someone who has completed book Raduga.	Course objective:	Acquiring the	
	to get by in everyday situations and a basic understanding of straightforward technical texts.		-	
XP04R1ZK	Russian language 1	ZK	0	
XP04R2ZK	Russian language 2	ZK	0	
XP04R2	Russian Language 2	NIC		
-	cluding messages, summaries, business correspondence and dissertation theses; understanding lectures and other listening sk	ills; note-taking; or	al presentations;	
	ation. Russian realia and the way of Russian life.Besides the course books, the supplementary texts and AV aids are used.	71/	4	
XP35FSC1	Flexible structures control	ZK	4	
design of space modes	urse is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors an will be follow	d actuators. The n	DDUST CONTROL	
XP35FSC	Flexible Structure Control	ZK	4	
	urse is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors an	1		
design of space modes				
XP16JAK	Quality Management	ZK	4	
	e organization. Statistical methods in quality management. Models of quality systems. Economic issues in quality assurance.	1		
-	Certification of products and production systems. Recommendations for quality management in the organization.			
XP33RMD	Control of Mobile Robots	ZK	4	
	bile Robots. Known Control Architectures. Top-Down and Bottom-Up Approaches. Overview and Comparison. Distributed Autor	nomous Motion Co	ntrol. Modelling.	
Realisation. Neighbourh				
	nood Mapping. Needed Sensors. Ground of Ethology. Imprinting. Taxe. Stimuli, Receptors. Multiple Motivated Behaviour. Read	-		
	Robots Structure. Task- or Behaviour-Oriented Robots. Ways and Realisation of Robots Co-operation, Motivation, Observation	on, Perception, Co	ommunication	
and Imitation. Multi-Age		on, Perception, Conning. Evolutionary	ommunication	

XP35CCM	Cooperative Control of Multi-agent systems	ZK	4		
Cooperative distributed	control is a relatively novel and rapidly developing area of control theory and engineering. Instead of centralized, large system	ms are considered	l composed of		
autonomous subsysten	ns, with local computation and communication capabilities. The broad aim is solving classical problems e.g. stabilization, track	king, estimation ar	nd optimization,		
via local communication and team cooperation robust to changes in communication topology and disturbance. Relevant topics of classical control theory are revisited and a brief review					
-	atics needed for the course is also provided. The potential use of multi-agent cooperation in challenging applications involving	-			
observed is discussed. Theory: Review of qualitative properties of dynamical systems, Motivation for distributed multi-agent systems, Elements of algebraic graph theory, Distributed					
	Consensus and synchronization of linear/nonlinear, continuous/discrete-time systems, Cooperative stability, optimality and rol	oustness, Distribut	ed optimization:		
. , ,	ry, Interactions with environment.				
XP33RSP	Management of Software Projects	ZK	4		
XP32RTS	Telecommunications Systems Management	ZK	4		
-	ystems Management is a discipline which deals problems of interactions of technical and business aspects of management of	i telecommunicatio	on networks and		
services provided.					
XP15RE	Control of Power Systems	Z,ZK	4		
	power system control, feasibility and algorithms of optimization methods, handling of constrain conditions. Hierarchy and deco		-		
-	imation. Load forecasting and load curve civering. Unit commitment. Optimization of operation with respect to net topology co		-		
	e. Control of frequency and active powers balance. Optimal power flow. Dynamical models of power stations and systems. Sol	lution of extraordin	ary states		
Dispatch, system and s		71/	4		
XEP17SWR	Scientific Writing	ZK	4		
applicable to all technic	to help researchers organize and effectively communicate, in English, their scientific results. While the instructor is an Electrical disciplines	ical Engineer, the	approaches are		
		7	4		
XPE04SCWR	Scientific Writing		•		
	-Hee Won]: With the assistance of a Fulbright Distinguished Chair at CTU and a Professor in Electrical Engineering for Templ- Pennsyvania, USA), researchers will be instructed on how to organize and effectively communicate their scientific results. Wh				
	hes will be applicable to all technical disciplines. 2) SEMINARS [Michael Ynsua]: Under the guidance of a native-speaking Eng				
	academic writing with the goal of sharpening critical writing skills (reasoning, formulating, and developing arguments and exp		-		
	ics, usage, and style (grammar, etc).	Janatons). Opecia			
XP15SPS	Coupled Problems in Heavy Current and Power Engineering	Z,ZK	4		
	broblem, classification of the coupled problems typical for heavy cur-rent and power applications. Mathematical description of		-		
	partial differential equations. Characteristics of electromagnetic-thermal problems (with respecting eventual thermoelasticity), elec				
	echanical problems and also problems based on a com-bination of the electromagnetic field and electric circuits. Formulation o	•			
-	of their solution. Information about available SW, its existing capabilities and perspectives.				
XEP33VKR	Selected Topics in Pattern Recognition and Computer Vision	ZK	4		
	fundamental results from computer vision and pattern recognition. The course treats selected key results, as well as latest are		•		
	Jence the development in the subject field. Education is performed in the form of a reading group. The course is mainly target				
-	nts with strong interest, possibly experience too, on a research topic that is relevant to the course.	ing ind canadaa			
XP01SPJ	Syntax and semantics of a formal language	ZK	4		
	of a formal language. A simple imperative language, assignment command. Denotational and operational semantics, coheren	I I	•		
-	functionals, recursive definitions. Lambda - notation. A simple functionI language, denotational semantics. New functions defin				
	Other approaches to semantics, continuation semantics. Axiomatic (Hoare's) semantics. Expressive power of a programming				
XP39SCG	Seminar in Comnuter Graohics	ZK	4		
	ter Graphics will make students familiar with selected research topics from computer graphics srrch ag efficienf renderino me	I —·· I	•		
	gimrrlafinn of nhygical nhennmena or geometrical modeling and animation. The course rvill also include graphics methods us				
	puter vision, and human computer interaction. The goal of the course is to expound the selected topics to students and in the se				
skills by analyzing exist	ting high quality research rvork. A significant added value is the acquaintance of students with methods of scientific work in co	onnection with the	aim of using the		
gathered knowledge to	solve specific problems of their PhD theses.				
XP39SPG	Computer Graphics Seminar	Z,ZK	4		
	seminar will cover selected research topics in computer graphics such as efficient rendering techniques, modeling of surface ma				
	nenomena, geometrical modeling and animation. In the seminar we will also discuss computer graphics techniques used in re				
image processing, com	puter vision and human computer interaction based on the particular topics of PhD theses of the participating students. The	goal of the course	is to introduce		
the selected topics to the	ne students and by analyzing selected highly influential research publications to further develop the research capabilities of th	ie students.			
XP36SEP	Seminars on Architectures of Parallel Computers	ZK	4		
Overview of architectur	es of high-performance computers and trends in technologies. Memory coherence and sequential consistency models. Share	d-memory archite	ectures: buses		
and switches, bus-base	ed cache coherence protocols and synchronization mechanisms. Virtual shared memory architectures: distributed cache-cohe	erence protocols.	Synchronization		
mechanisms - barriers.	Clusters: fast communication networks and protocols.				
XP38SSB	Sensors and Buses	ZK	4		
The student will be intro	duced into the advanced topics of engineering sensors and sensor networks. Topics include: Sensor applications, physical prin	ciples, sensor type	es and important		
parameters, the concep	t of smart sensors, measurement systems, analog circuits for sensor signal processing, sensor error correction, calibration and	diagnostics, noise	and disturbance		
immunity.					
XP38SSA		ZK	3		
The course is focused	on advanced sensors and data communication principles within heterogeneous automotive networks. It especially deals with	modern wideband	automotive		
sensors communication	n over the internal vehicle communication infrastructure.				
XP13SID	Software in Industrial Engineering	Z,ZK	4		
Introduction to using of	IBM compatible personal computers, their architecture. Using of application programs for mathematics, graphics, text process	ing, database and	CAD, examples		
of software systems. In	troduction to user interface based on Microsoft Windows.				
XP13SSD	Special Methods of Devices Quality Evaluation	Z,ZK	4		
	rincipal values determining the quality of the passive and active devices. Measuring methods, their evaluation, identification of	· · ·	The description		
	o ports parameters of the device. Matching of the device to the measuring circuit. The noise of the electronic circuits, optimal	-	-		
	ear" circuits, intermodulation distortion, measuring of the non-linearity and intermodulations.		-		
XP37SRP	Radio Receivers Special Technology	ZK	4		
	ed radio receivers technology. Basic structure classical and modern software defined radio receivers. Technical parameters ra	I I			
	television receivers. Professional radiocommunication receivers and transceivers. Diversity techniques. Spread spectrum radio	-			
and broadband amplifie	ers. Oscillators and frequency synthesizers. Mixers and demodulators. Radio receivers system design.				
XP13SAV	Statistic analysis and technological data evaluation	Z,ZK	4		

XP02SF	Statistical Physics	Z,ZK	4
XP37SZS	to the fundamentals of statistical physics. It is the third part of four-part lecture cycle. Statistical Signal Processing	Z,ZK	4
	ind detection theory. General properties and fundamental limits. ML, LS, Bayes (MAP,MSE), NP, MM estimators and detectors		-
RLS). Iterative detection	n and parameter estimation.		
XP16SDE	Building heritage of the industrial era	NIC	2
XP16STV	Product Strategy	ZK	4
	licy, pricing and contractation policy, communication, distribution. Marketing mix. Inovations. Concepts of marketing strategy. F egic marketing simulation Markstrat.	Reverse marketing	g. Product
XP36STR	Stringology	ZK	4
	nd sequences. General, ordered alphabet. Generalized and weighted strings. Finite and infinite alphabet. Searching in text, di		
	ing. Forward and backward matching. Searching in compressed text. Searching in more-dimensional text. Searching for longest ca	ommon factors an	d subsequences.
	es in text. Construction of covering of text. Representation of text, prefix, suffix and factor automata, suffix trees and arrays.		
XEP33SML	Structured Model Learning	ZK and (stashastic	4
Networks.	e learning course covers learning and parameter estimation for structured models like Markov Random Fields, Belief Network	ร สาม (รเอตาสรแต	) Deep Neulai
XP34STV	VLSI Structures and Technologies	ZK	4
	f the IC's. Bipolar and unipolar structures. BiCMOS structures. 3D structures. Sub-micron structures. Memory structures. Testi	-	SI technological
	emiconductor technology. IC design, design of technology. Design rules. Reliability, yield. Outlooks and limitations of IC devel	-	
XP15ZSS	Light sources and Equipment	Z,ZK	4
XP33SCD	Man-Machine Systems	ZK sel svætern. Distrik	4
	e systems development. Human operator tasks. Manual control, supervisory control cognitive control. Typical structure of a contr rator and machine. Control levels after Rasmussen. Skill based, role based and knowledge based operator behavior models.	-	
	lental models. Human-machine interaction. Intelligent interface. Factors influencing operator behavior. Stress. Mental load. Hur	-	-
	machine systems simulators. User-centered system design.		
XP33SDD	Discrete Event Systems	ZK	4
	event systems. Modeling of discrete event systems, GRAFCET and it is applications with practical examples. Petri nets over		
	s. Reduction methods, formal languages and algebraic description of PNs. Timed PNs and modeling in P- and T-timed PNs. Pr	actical examples	and applications
in CIM systems.			
XP38SYS	Measurement and Data Acquisition Systems	ZK	4
-	the principles and technical means of data acquisition in the laboratory and industrial environment. Attention is paid to both h ms for data acquisition and process control. Laboratory exercises are designed in part in the form of classical tasks, partly in t		-
	ning of automated measurement systems and control of measurement processes.		
XP13SRD	Real Time Systems for Process Control	Z,ZK	4
	real time control paradigm. Architecture of real time systems. State transition diagram of real time systems. Semaphore and de		-
in control of technologie	cal systems.		
XP13SJD	Quality Control Systems	Z,ZK	4
	and reliability. Basic quality management systems. ISO 9000, TQM, Kaizen. Basic characteristics of ISO 9000. Quality manua		
	Mathematical model based on factor experiments. Optimization of mathematical model. Six Sigma quality management system		
-	system. Reliability as a subset of quality. Mathematical distributions used in the field of reliability. Usage and maintenance coe on. Accelerated reliability testing. Processing and analysis of experimental data.	пісіепі. Баскир -	types and
XP04S1ZK	Spanish language 1	ZK	0
XP04S1	Spanish language 1	NIC	0
	edge of Spanish language, including the language for specific purposes. Specific technical style characteristics focused on sp		-
comprehension, oral pr	esentations, understanding the text-all based on intermediate level language.	-	-
XP04S2ZK	Spanish language 2	ZK	0
XP04S2	Spanish language 2	NIC	0
Basic language skills(li	stening, understanding a Spanish text of cca 120 pages, writing, speaking). The skills are practiced on writing letters, presenta	ations both writter	and oral,news
	eparation is necessary. Materials are chosen with regards to the study field of a postgraduate. High-level and fluent speech is		
XP37TMP	Medical Instrumentation	ZK	4
-	principles and properties of medical systems for analysis of body fluids, blood gas analysis, medical minors of basic life funct rinciples of anaesthetic equipment and equipment for artificial lung ventilation, haematological analysers and other medical a		oxymetry EEG,
XP13TND	Technology of Low Temperatures and Superconductivity	Z,ZK	4
	bles of cooling. Equipments for achievement of low temperatures, liquifiing of gases. Ultralow temperatures. Properties of isoto		
	solids at low temperatures. Principles of superconductivity theory, transport currents, stability of superconductivity state, weak	-	-
phenomena. Properties	and technology of metallic and high temperature superconductors. Thermal insulation of low temperature equipments. Low temp	perature thermom	etry. Accessories
and work in low temper	ature laboratory. The use of low temperature technology in practice.		
XP17TVC	Technique of Highly Sensitive Receivers	ZK	4
	ve microwave receivers, mm - wave and submm - wave receivers. Electromagnetic spectrum and noise properties of the Earl		
	ave communication. Semiconductors for microwave and millimetre wave bands, SIS detectors, mixers, infrared receivers. High f parameters. Multispectral radiometry and remote sensing, electromagnetic radiation - interference, EMC theory and measure		erere rechnology,
XP13TMD	Technological Aspects of Microcomputer Design	Z,ZK	4
	ers, modular design and hardware solution. The data storage technology. The data storage media. The device protection agai		-
	n of equipments. The human machine interface - input and output devices. The ergonomic design of microcomputers and spe		
	s, criteria. The quality control of design and services, the quality of software. The legal aspects of microcomputer use. The cor	ntemporary trends	s in industrial
microcomputers.			
XP13TPD	Technological Processes in Electronic Manufacturing	Z,ZK	4
	logy of packaging. Contemporary methods of packaging of components SOP, DIP, SIP, ZIP, QFP and others, properties, advan iewpoint of environmental resistivity. Classification of multichip modules. Multichip modules of different types: MCM-L, MCM-C	-	
	nology of contacting og dies. Electrical design of MCMs. Thermal design of MCMs. Physical design of MCMs. Parameters for		
	Programmable modules. Applications of MCMs.		<b>-</b> - <b>-</b>

XP34TOS Technology of Optical Devices	ZK	4
Preparation of optoelectronic materials and structures. Diagnostic and testing methods. Design and preparation of double heterostructures. Preparation of double heterostructures.	1	ctor waveguides.
Preparation of LED's, lasers, photo-resistors. Preparation of QW structures. Design of dielectric waveguide structures. Preparation of dielectric waveguide structures.		•
preparation of optical radiation distributing structures. Design and preparation of optical radiation control structures. Measurement methods. Testing m	ethods. Examples of	of semiconductor
structures. Examples of dielectric structures.		
XP37TEA Theoretical Eletroacoustics	Z,ZK	4
Vibrating systems in fluids and solids. Systems of lumped and distributed parameters in solids. Equivalent circuits of membranes and plates. Recipr	1	ith magnetic and
electric field. Non-reciprocal transducers ( opto and thermoacoustical transducers, piezoresistive transducer). Electromechanical and electroacoust	ical transducers wi	th lumped and
distributed elements. Radiation, radiation impedance. Acoustic transmitters, directivity. Acoustic receivers. Acoustical systems with lumped and distribu	ted elements. Acou	istic waveguides,
air-gaps. Coupled systems.		
XP37TEM Theoretical Electroacoustics and Measurement	Z,ZK	3
The course is aimed at selected parts of electroacoustics and related fields with the emphasis on the theoretical aspect. The main interest lies in el	ectroacoustic trans	ducers and their
parts. Their description will include non-linear mode. The part on measurement will include mainly calibration methods and their usage in cases clo	se to topics of thes	ses of doctoral
students.		
XP02TF1 Theoretical Physics 1	Z,ZK	4
The lecture Theoretical Physics 1 is a basis for the following lectures of theoretical physics for the doctoral study. The main aim is theoretical Mecha	nics - to master th	e description of
motion in curvilinear coordinates.		
XP02TF2 Theoretical Physics 2	Z,ZK	4
The lecture is devoted to the fundamentals of quantum physics in Dirac formalism. It is the second part of four-part lecture cycle.		
XP17TOM Theoretical Optoelectronics in Medicine	ZK	5
The course gives to doctoral students from different disciplines the opportunity of both highly theoretical studies and numerical simulations of intera	ctions of electrom	agnetic waves in
the visible part of the spectrum (and adjacent UV and IR bands) with biological tissues. And to learn about modern optoelectronic sensor concepts	and their application	ons in the field of
medical therapy and diagnostics. Interdisciplinary topics will be discussed and focused on the benefits and current applications of optoelectronics i	n medicine. Importa	ant definitions
(such as radiation intensity, etc.) will be formulated and important methods will be described, in particular: radiometry, photometry, eye as a radiation	on detection field. L	JV, VIS, NIR
spectroscopy, interferometry, scattering measurements, integration of spherical theory, etc. Emphasis will be placed on modern theoretical approact	hes (i.e. mathemat	ical and physical
models), e.g. calculation of the light intensity distribution in biological tissue, theory of radiation transmission (e.g. theory and model Kubelka-Munk		
with the possibilities of numerical simulations of the given problems by aid of modern SW products (like e.g. COMSOL Multiphysics, SEMCAD / Sim		-
based on numerical methods FDTD, FEM, MoM, Monte-Carlo etc. Operating principle of the optoelectronic reflective and transmissive sensors. Mea	-	
detection of peripheral blood volume dynamics, clinical examples and typical examination tests. Principles and applications of functional optical images and typical examination tests.		ptical biopsy, IR
Diaphanoscopy, IR thermography, Laser Doppler perfusion imaging (LDPI), Photoplethysmo-graphy imaging (PPGI), optical coherence tomography		_
XP37RUP Radio determination of position, theory and practice, experience	Z,ZK	5
The main aim of the subject is to acquaint a doctoral student with receiver position determination methods in systems using different measurements and	-	-
(least-squares methods) and with their accuracy. The student will study error magnitude derivation and will get information concerning the choice of	-	-
rates and precision. It will be revealed that massively used satellite navigation methods suffer from many deficiencies under real environment conditi		•
of these weaknesses can be reduced by the assistance from other sensors based on radio as well as non-radio principles. Moreover, there are very		
based on Signals of opportunity processing; they are included in the course, too. The student will verify the achieved results by individual laboratory		
equipment like a signal generator with simulator of satellite signals and generators of communication signals (DVB-T, LTE). The acquisition of the e	quipment was supp	ported by the
development project OP VVV.		
XP37TAS Acoustic signal processing and theory	Z,ZK	4
Acoustic signal classification, sources, description of properties. Statistical analysis of acoustic signals. Spectral analysis of signals, Fourier transfo		
analysis, Short-time Fourier Transform, Wavelet transform, Wigner-Ville distribution. Cepstral analysis and its application in acoustics. Discrete signal accustication of accus		
perception. Oversampling, noise shaping. Granulation noise, dithering, signal requantization. Acoustic signal acquisition and data pre-processing. Impuls		
systems. System analysis using swept and time delayed acoustic signals. Pseudorandom signals and their application in acoustic system analysis. D		
XP01TGR Graph Theory	ZK	4
Basic course in graph theory. Trees, their characterization, minimal spanning tree. Strongly connected components, rooted trees. Shortest paths, F		
their applications, Hamiltonian graphs and their applications. Chvatal's theorem. Flow in networsk, admissible flows and admissible circulations. Ma		
bipartite graphs. Vertex cover and independent sets. Cliques. Colorings. Plannar graphs. Graphs and vector spaces. The content of the course is m	ballied according to	o the needs of
	71/	4
XP01TJA Languages, Automata and Grammars	ZK	4
Finite automata. Nerod theorem and its applications. Nondeterministic automata. Regular expressions nad Kleene theorem. Grammars and their cla	ssification. Cotnex	t-free grammars.
Chomsky hierarchy. CYK algorithm for context-free grammars. Turing machines, decision problem. Algorithmically nonsolvable problems.	7 71/	4
XP15TOS Theory of Light field	Z,ZK	4
Theory of light field. Mathematical description of emission of unsymmetrical luminaires. Photometry of distante and close point. New characteristics		
Flux method calculation of integral characteristics. Light field of surface type and cube type luminaire. Light flux distribution from point source. Distr	bution of light flux	of linear source.
Distribution of light flux of surface source. Interreflection theory. Design of indoor illumination using PC.	714	
XP32TPZ   Teletraffic Theory	ZK	4
The aim of the course is to present an overlook of dimensioning of telecommunications networks on the basis of results of the queuing theory (QT).	-	
and modeling networks both from the point of view of grade of service GoS and quality of service QoS as well. Results of the QT are applied on diff	-	
telecommunication networks deploying and operating at time being. Theoretical knowledge about models of service systems can be utilized for dimer	isioning of different	service systems
in real life - not only in the telecommunication.	71/	4
XP31TSS   Signal and system theory	ZK	4
Signals and transformations - Laplace and Z-transforms, Fourier transform, cepstra, wavelet transforms. Signal parameterization - AR, MA, ARMA		trum, Signal
classification - spectral distances, Markov models, neural nets, signal prediction.		
XP02TZP   Theory of Sound Field		-
	ZK	4
The aim of this course is deeper understanding the fundamentals of physical acoustics. The continuity equation, Euler and Navier-Stokes equations a face the acoustic the second state of a linear s	ZK	4 ation are derived
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its	ZK and the energy equ special solutions ar	4 ation are derived e discussed.
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its s General solutions of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these in	ZK and the energy equ special solutions ar	4 ation are derived e discussed.
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its s General solutions of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these in radiation and diffraction are studied. Problem of the acoustic field description is further developed using the methods of Fourier acoustics.	ZK and the energy equ pecial solutions ar ntegrals, some prot	4 ation are derived e discussed. olems of acoustic
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its s General solutions of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these is radiation and diffraction are studied. Problem of the acoustic field description is further developed using the methods of Fourier acoustics. XP17TAM Evaluation of Applicators for Microwave Thermotherapy	ZK and the energy equ pecial solutions ar ntegrals, some prot	4 ation are derived e discussed. olems of acoustic
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its s General solutions of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these is radiation and diffraction are studied. Problem of the acoustic field description is further developed using the methods of Fourier acoustics. XP17TAM Evaluation of Applicators for Microwave Thermotherapy Lectures are focussed on methodology of evaluation of microwave applicators, which means measurements of SAR distribution in water phantom a	ZK and the energy equ pecial solutions ar ntegrals, some prot ZK and measurements	4 ation are derived e discussed. olems of acoustic 4 s of temperature
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its se General solutions of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these is radiation and diffraction are studied. Problem of the acoustic field description is further developed using the methods of Fourier acoustics. XP17TAM Evaluation of Applicators for Microwave Thermotherapy Lectures are focussed on methodology of evaluation of microwave applicators, which means measurements of SAR distribution in water phantom a distribution in various types of agar phantoms. Further design and optimisation of measuring probes is discussed, methodology of probes calibration	ZK and the energy equ special solutions ar ntegrals, some prot ZK and measurements on and measured d	4 ation are derived e discussed. olems of acoustic 4 s of temperature
from the prime laws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its s General solutions of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these is radiation and diffraction are studied. Problem of the acoustic field description is further developed using the methods of Fourier acoustics. XP17TAM Evaluation of Applicators for Microwave Thermotherapy Lectures are focussed on methodology of evaluation of microwave applicators, which means measurements of SAR distribution in water phantom a	ZK and the energy equ special solutions ar ntegrals, some prot ZK and measurements on and measured d	4 ation are derived e discussed. olems of acoustic 4 s of temperature

XP02UZ	Ultrasound and Quantum Acoustics	ZK	4
The purpose of these le	ectures is to familiarize doctoral students with the issues of ultrasonic waves needed for the design of a wide range of ultrasor	hic devices and to	discuss in detail
the parts that the docto	ral student could use in his work. The subject of the offer is a range of classic and recently developed findings from research.		
XP33UID	Artificial Intelligence	ZK	4
-	sues. Knowledge representation: production systems, predicate logics, semantic nets, frames, and scenarios. Problem solving		-
	e search algorithms. Expert systems for diagnostics and planning tasks. Uncertainty processing. Hajek's algebraic theory. Creation	-	ases. Knowledge
	om examples. Distributed expert systems with the blackboard architecture, multi-agent systems. Backgrounds of pattern reco		
XP01UAG	Introduction to Algebraic Geometry	ZK	4
	solution sets of systems of polynomial equations in more than one variable and their relationship with the ideals in polynomial	-	
varieties and radicals.	er's bases and their properties, Buchberger's algorithm for searching a Groebner's basis, elimination theory, Hilbert's Nullstel	lensatz, correspo	ndence between
XP02UEF	Introduction to Electrophysiology	Z,ZK	4
	anatomical, physiological and physical aspects of selected electrophysiology problems.	Ζ,ΖΝ	4
XP02UFL	Introduction to Laser Physics	ZK	4
	the basics of laser physics. It explains the principle of laser operation, presents basic terms and describes in detail individual	1	
	izes the main properties of laser radiation and briefly indicates the possibilities of creating short pulses of radiation. The next		-
	nan activity. It also lists safety principles for working with lasers. In the practical part, it is supplemented by visits to top workpla		
dealing with the given is	ssue.		
XP37ISS	Introduction to space science and technology	ZK	4
Introduction to space s	ciences and technology on PhD level. Methods and resources of space research and their applications. Satellites, space prot	bes, space station	s, space
transportation systems	, their development, proposals and design. Optoelectronic systems for space, onboard systems and payload, space commun	ication and naviga	ation, space
materials and technolog	gy. Remote sensing and multispectral images, applications. Space physics, cosmic environment, cosmic radiation and particle	es. Ground based	segment, tests
of space systems, space	ce software, archiving and data reduction, organization international co-operation.		
XP01UKS	Introduction to Quantum Structures	ZK	4
Basic course of quantu	m structures. The notions of an orthomodular lattice, orthomodular poset, orthoalgebra, effect algebra, state, center are introd	uced. Basic prope	rties of quantum
structures are studied i	ncluded representations of quantum structures.		
XP01UNA	An introduction to nonassociative algebras	ZK	4
The basic course in the	e theory of nonassociative algebra. We introduce the otions of free nonassociative algebra, tensor algebra, bimodules and ire	presentations for a	algebras in a
variety. We pay a big at	tention on the ariety of alternative algebras and composition algebras. We define Lie, alcev and Jordan algebras, their univer	sal enveloping alg	ebras.
XP01USA	An introduction to superalgebras.	ZK	4
	theory of superalgebras. We introduce notions of a graded algebra, superalgebra, Grassmann envelope of a superalgebra. C	onsider varieties	of superalgebras
·	Igebras. We pay a big attention on the variety of alternative and Jordan superalgebras.		
XP15UEE	Electric Energy Use and Conservation	Z,ZK	4
XP13VTK	Vacuum technology and cryogenics	Z,ZK	4
Physics of gas. Volumin	nous processes. Surface processes. Processes circulative to wall. Vacuum pumps. Measurements in vacuum techniques. Prince	ciples of cooling a	nd constructions
	achievement of low temperatures. Properties and behavior of matters at low temperatures. Transport of heat and insulating sy		•
	try.Laboratory training and seminars are focused to obtain a basic practical proficiencies and the other knowledges in vacuur	n technology and	cryogenics.
XP16HKC	Science, Technics and Technology in the Historic Landscape of the Czech Lands	ZK	4
XP16VTK	Everyday Science and Technology	ZK	4
XP37VRA	Research Seminars in Radioelectronics and Acoustics	Z,ZK	4
The course is intended	for PhD students of the radioelectronics and acoustics specialization. It develops the presentation skills and serves as a platf	orm for discussion	n and defence of
students' research resu	ilts.		
XP16VPB	Science, Technology and Industrial Boom	ZK	4
XP39VR	Virtual reality	ZK	4
	he VRML language. Standard and non-standard extensions to the VRML language. Programming of external applications wit	h EAI interface. M	ulti-user virtual
reality. Distant cooperat	tion in virtual environment. Hardware and software support for virtual reality systems. QuickTime VR. Specification X3D.		
XP02VNP	Plasma Waves and Instabilities	Z,ZK	4
Basic wave phenomena	a will be introduced in the first part of the lecture (dispersion relation, phase and group velocities, Fourier analysis). Fundame		rsion relations
will be derived from the	linearized MHD equations (magnetoacoustic waves - Alfven, F and S wave; electromagnetic waves in plasma - O, X, R, L was	ave, CMA diagram	ı). The second
part of the lecture will b	e devoted to final size waves, nonlinear phenomena (Landau damping) and solitons in plasma.		
XP16DEL	History of technology and economic	ZK	2
XP37VKF	Selected Parts from Photonics	ZK	4
Anatomy and physiolog	y of vision. Integral photonic sensors. Panoramatic (image) photonic sensors. Integral photonic displays. Panoramatic photon	1	on optics. Image
converters. Special pho	tonic elements. Basic elements of optical systems. Fundamentals of illumination. Fiber-optics elements and systems. Optical n	nethods of informa	ation processing.
Optical (photonic) proc	essors.		
XP37FOT	Selected Parts from Photonics	Z,ZK	3
The subject is focused	on the overview of recent applied photonic topics esp. integral and panoramic photonics receivers, transmitters and other spec	cial elements and	subsystems incl.
relevant theoretical bac	kground. Selected examples of applied photonic elements and subsystems will be demonstrated in lab experiments and resu	ults of ESA space	projects. Lab
	e in the specialized departmental laser lab for limited number of participants. Selected experiments will also be presented durin	ig lectures. The du	rable equipment
	roject frame will be exploited.		
XP38VKP	Selected Parts of Instrumentation	ZK	4
	d to principle, properties and applications of selected special measuring instruments. It deals mainly with calibrators and other		-
	nt of extremely low voltage and current signals, lock-in amplifiers, power analyzers and electronic loads, devices used for EMC r		-
	optical reflectometers and radio testers (Bluetooth, NMT, GSM, UMTS). A special part is devoted to sampling measurement me		
XP01TEM	Selected chapters of the measure theory	ZK	4
	tely additive and sigma-additive measures, classic results (the Radon-Nikodym theorem and the Carathéodory theorem), the	extension of finat	ely additive
	rski technique, the Banach limit method, some questions of the lifting, etc.), the Hammer-Sobczyk theorem.		
XP33KSI	Sotware Engineering - Selected chapters	ZK	4
XP38VKZ	Selected Chapters of Signal Processing	ZK	4
	d to advanced signals processing methods used in contemporary electronic devices and measuring instruments. It concerns		-
	Fourier), stochastic methods, processing of the multimedia signal, suppressing of unwanted effect, methods used for quality	increasing of mult	imedia signal
transmission, etc.			

	Selected Chapters of Diagnostics	ZK	4
I his course introduces adv	vanced concepts of fault detection, isolation and diagnostics, signal analysis methods for machine condition monitoring, ar		instrumentation
of non-destructive testing,	the corresponding advanced signal processing, and self-acting evaluation in order to improve reliability, availability, mainter	enance, and life-tir	ne.
	Selected Parts of Data Mining	ZK	4
-	ing non-trivial, hidden and ultimately applicable knowledge in large data. This course focuses on two key data mining issues		
	ata, it is important to resolve both the technical issues such as distributed computing or hashing and general algorithmic c		
	y case studies on web and social network mining. The second part will discuss approaches that merge heterogeneous pric ne main application field here. It is assumed that students have completed the master course on Machine Learning and Da		
	Selected topics in probability and mathematical statistics	ZK	4
	ns of probability and procedures of mathematical statistics that go beyond commonly taught methods.		4
	vrtificial Intelligence	ZK	4
	ication with a computer, phases of processing, syntactic analysis, grammars including DCG. Understanding a sentence, s		of analysis and
efficient memory organizat	tion. Knowledge engineering and knowledge elicitation. Machine learning -review of methods and tools. PAC learning. Learn	ing in 1st order log	gic, ILP. Planning
and scheduling.			
	Selected Chapters from Antennas and Propagation	ZK	4
	d modern antenna technology. Selected problems of antennas and propagation for fixed and mobile communication, earth		
services. Antenna anechoi	services and communication. Topics of near a far field antenna measurement, compact antenna measurement. Measurem ic chambers design	ent of signal level	ior specific
	Selected Topics of Physics 1	ZK	4
	Selected Topics of Physics B	ZK	4
	Selected Topics of Physics B	Z,ZK	4
	Selected Topics of Optics	Z,ZK Z,ZK	4
	juation, plane wave, polarization, reflection and refraction, natural and artificial anisotropy, optical modulators, coherence, inter		
	holography, methods of visualization, normal and anomalous dispersion, optical image formation, optical devices, photometry		
stimulated emission, lasers			
XP33ROZ S	Selected Topics in Pattern Recognition	ZK	4
Prerequisites: basic course	e in pattern recognition (e.g. P33ROD, 33RPZ). Selected topics: Anderson's problem, Kozince algorithm, kernel perceptor	n, nonlinear Fishe	r discriminant.
-	Deterministic learning. Unsupervised learning: Robbins algorithm and emprirical Bayesian approach. Expectation-minimiza	tion algorithm. Re	cognition of
	cyclic graphs. Markov models. Combination of weak classifiers: boosting and bagging. AdaBoost.	71/	
	Selected Problems of Economy and Management of Energy cess in promoting the marketing concept of the firm and the competitive advantage. The system of operational planning wi	ZK	4
	duction management, standardization. Controlling, production management methods.	in respect to prod	uction typology.
	Fundamentals of Physical Acoustics	ZK	4
1 1	ty, Carthesian tensors. Theory of small deformations, dynamic equations of isotropic elastic medium. Microscopic model of		
-	s. Stationary flow of vascous fluid.		
XP16STM S	Selected Statistical Methods	ZK	4
	formation of random variables. Aproximation of theoretical distributions. Interval estimates. Hypothesis testing. Simple and m	ultiple regression.	Analysis of time
series.Index number.			
XP36VAV		ZK	4
XP39VPG C	Computational Geometry	ZK	4
XP39VPG C Principles of computational	al geometry (CG), data structures and paradigms, methods of geometric search, convex polygons and hulls, applications o	ZK f convex hull, pro	4 kimity problems,
XP39VPG C Principles of computationa Voronoi diagrams, triangula	al geometry (CG), data structures and paradigms, methods of geometric search, convex polygons and hulls, applications o ation, efficient intersection algorithms, intersection of semispaces and polygonal regions, geometry of rectangles, dual ma	ZK f convex hull, pro	4 kimity problems,
XP39VPG C Principles of computationa Voronoi diagrams, triangul dual space, algorithms of c	al geometry (CG), data structures and paradigms, methods of geometric search, convex polygons and hulls, applications o ation, efficient intersection algorithms, intersection of semispaces and polygonal regions, geometry of rectangles, dual ma computer graphics and CG. Students who completed course 36VGE cannot enroll.	ZK f convex hull, prox ppings and space	4 kimity problems, es, convex hull in
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XP33KHD	Introduction to Game Theory	ZK	4		
The course offers a brief	survey on classical and contemporary theory of games. It includes the elements of the utility theory, decision-making theory, so	lution concepts of	non-cooperative		
games (balance and minimax) and the basic concepts of coalition games, especially its solutions (core and value) and relation to the market models.					
XP33ZPM		ZK	4		
XP33ZVD	Introduction to Computer Vision	ZK	4		
The subject does not ex	ist anymore. Its last lecture run in the academic year 2021/2022.	I			
XP33POS	Fundamentals of Possibilistic Measures	ZK	4		
	resent a mathematical tool for uncertainty (randomness) quantification and processing applying the notions and apparatus of	I I	y sets. They are		
	ic measures in the sense that they are based on the maxitivity priciple in spite to the additivity principle applied in the standar				
	the operation of maximum (supremum) can be defined also in certain non-numerical structures, possibilistic measures takin				
sets and, in particular, in	n complete lattices, are worth being investigated. The lecture will not suppose any preliminary knowledge in fuzzy set theory,	lattice theory or th	he standard		
measure and probability	/ theory.				
XP33TPS	Foundations of the Possibilistic Measures	ZK	4		
Possibilistic/posibility m	e easures can be sen as an alternative mathematical model for uncertainty quantification and processing, topical and intensive	ly developed in o	ur times. They		
are based on the maxiti	vity principle replacing the additivity principle applied in the classical measure theory. Besides the real-valued possibilistic me	asures also non-	numerical		
possibilistic measures ta	aking their values in complete lattices will be introduced and analyzed.				
XP01ZOA	Fundamentals of the theory of operator algebras	ZK	4		
	ry of operator algebras aimed at the theory of C* algebras and von Neumann algebras in its concrete Hilbert space represed	ntation. The state	space, GNS		
construction and repres	entations are studied. Comparison theory of projections, states and representations is explained. Von Neumann algebras are	classified as finite	and infinite and		
structural types I, II, III.					
XP16ZVP	Fundamentals of Scientific Work	ZK	4		
XP01ZWT	Wavetet Transform.	ZK	4		
	bus wavelet transform. Time and frequency localization. Discrete wavelet transform. Riesz bases and frames. Multiresolution		ions to signal		
processing.					
XP37ZI	Information recording	Z,ZK	4		
-	bry. FM signal recording. Video information recording systems. High density recording, tape recorder thin heads. Impulse reco		-		
	DAT. Digital recording on CD-ROM, CD-video. WORM, CD-R recording. Erasable magneto-optical recording on MD. Digital vi	• ·	•		
compression.			3,		
XP34RSD	Radiation Saurces and Photodetectors for Integration	ZK	4		
	inted stimulated emission in semiconductors. Homogeneous and heterogeneous junction, double heterostructure laser. Wave		-		
	m wells. Electromagnetic fields in semiconductor lasers. Types of lasers and their properties. Tunable injection lasers. Spectra	-			
	, coupling the laser to a waveguide. Bi-stable and voltage devices, switches. Non-coherent LED's, super-luminescence diodes		-		
-	ons, injection and coherent external modulators. Injection laser amplifiers. Principles of nano-optoelectronic components. Mea				
	ced to new principles of integrated optoelectronic components and subsystems for informatics and sensor technique, design				
XP33ZDD	Processing of Biological Data	Z,ZK	-		
XP31ZBS	Biological Signal Processing	ZK	4		
	processing of biosignals and advanced methods of processing resulting from current research in solving common projects		•		
	utes of the ASCR, foreign universities). The subject concept allows us to respond flexibly to new directions and knowledge in	-			
XP37ZSN1	Signal processing in satellite navigation systems 1	Z,ZK	4		
	with pseudorandom signals and with carrier. Position determination based on measured distances. Time delay discriminator.		•		
	HDOP, VDOP. GPS system, precision. Glonass and its precision. GALLILEO. Comparison of these systems.	Schema of range	navigation		
XP37ZSN2	Signal processing in satellite navigation systems 2	Z,ZK	4		
	tion systems, structure of receiver and precision of position measurement. Shortcomings of satellite systems: limited access		-		
	al systems, Structure of receiver and precision of position measurement. Shortcomings of satellite systems, immed access al systems DGPS and DGLONASS, RTCM-104 standard. Systems SKY-FIX, FUGRO, RACAL, WAAS, EGNOS. GALILEO a				
XP33VID		ZK			
	3D Computer Vision ive geometry, perspective camera. Fundamental and essential matrices, their robust estimation, camera calibration. Correspo	I I I I I I I I I I I I I I I I I I I	4 structure from		
	c vision problem, cyclopean representation, disparity, disparity gradient limit, ordering constraint, four basic formulations of the	•			
	uction from stereovision, error propagation, examples. Physics of image reflection, image irradiance equation, basic reflectan	-	-		
	blem. Local shading analysis. Overview of other Shape-from-X methods. Up-to-date info at https://cw.felk.cvut.cz/doku.php/c		-		
	лост. доса опочну аналузю. Очегном огодног опаре пот у технова, орто-чале пно алтираломленской солики ририс				

## List of courses of this pass:

Code	Name of the course	Completion	Credits
XEP17SWR	Scientific Writing	ZK	4
This course is inten	ided to help researchers organize and effectively communicate, in English, their scientific results. While the instructor is an Electrical applicable to all technical disciplines.	Engineer, the app	roaches are
XEP33CML	Computational Intelligence Techniques for Machine Learning	Z,ZK	4
for learning, comp	become familiar with the theory and applications of computational intelligence methods in the context of systems capable of learning from utational intelligence. Supervised, unsupervised and reinforcement learning paradigms. Fuzzy systems, neural networks, neuro-fuzz ators for supervised learning. Fuzzy clustering methods for unsupervised learning. Reinforcement learning for single-agent and multi applications and case studies. The course will be connected with - a computer assignment with Matlab/Simulink and a literature assignment with Matlab/Simulink and assignment with Matlab/Simulink and assignment with Matlab/Si	y systems, and oth -agent systems. Ex	ner general
XEP33FLO	Fuzzy Logic Basics of fuzzy sets and fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.	ZK	4
XEP33GMM	Graphical Markov Models	ZK	4
	ught in WS 2023/24 for the last time. It will not be opened anymore. Markov models on graphs represent a model class widely applie imputer networks, data security, robotics and pattern recognition. The first part of the course covers inference and learning for Markov		•

All these tasks including structure learning can be solved by efficient algorithms. The second part addresses graphical models on general graphs. Here on the contrary, practically all inference and learning tasks are NP-complete. The focus is therefore on efficient approximative algorithms.

	interence and learning tasks are NP-complete. The focus is therefore on efficient approximative algorithms.		
XEP33NEP	Neuroprosthetics	Z,ZK	4
	s concerned with the use of artificial devices to replace or improve the function of the human nervous system. The neuroprosthetic de		
	lant with approximately 150,000 in use worldwide. In this course we will look at the different technologies involved, particularly in term		
	practical use. We will also see how such implants interact with the human nervous system, forming a bidirectional gateway both to m	-	
-	ctly stimulate the human brain.As well as witnessing the exciting development of the field we will consider neuroprosthetics in terms of aplants but also for visual and motor repair. We will however also look at the possibilities of Neuroprosthetics for general human enha	-	
	is self experimentation fits into the field. Whilst the course will focus on technical issues, it will be presented in a general way such that		•
	ematical background is not a requirement). Indeed as this technology has immediate impact, societal, ethical and moral issues raise		
	entary to the lecture course given on Bionics: this set of lectures being specifically concerned with neural aspects - linking the human		
	technology.		,
XEP33NUM	Numerical Analysis	Z,ZK	4
	uces to basic numerical methods of interpolation and approximation of functions, numerical differentiations and integration, solution of	of transcendent and	d (ordinary
and partial) differen	tial equations and systems of linear equations. Emphasis is put on estimation of errors, practical skills with the methods and demonst	tration of their prop	erties using
	Maple and computer graphics.		
XEP33SML	Structured Model Learning	ZK	4
This advanced ma	achine learning course covers learning and parameter estimation for structured models like Markov Random Fields, Belief Networks	and (stochastic) De	eep Neural
	Networks.		
XEP33VKR	Selected Topics in Pattern Recognition and Computer Vision	ZK	4
	with fundamental results from computer vision and pattern recognition. The course treats selected key results, as well as latest areas		
which substantial	ly influence the development in the subject field. Education is performed in the form of a reading group. The course is mainly targeting	g PhD candidates,	but is also
	available for Msc students with strong interest, possibly experience too, on a research topic that is relevant to the course.		
XEP35CMS	Computational Methods for Materials Science	Z,ZK	4
•	e course is to acquire advanced knowledge of Classical and Quantum Mechanics to design in-silico experiments within the Materials		
,	dents will know: - the fundaments of thermodynamics, newtonian and statistical mechanics, and how the relative formalism is implem		
	properties; - how the Schrödinger equation is setup and solved in order to calculate physical quantities; - how to combine the classica I results; and - a general protocol through which to design new materials at the atomic scale. By means of simulation laboratory experier		
moderexperimenta	learn how to setup and run simulations, and how to analyse and present the results by using post-processing softwares.		in eventually
XEP36AGT	Advanced Computational Game Theory	ZK	4
XP01EAL		ZK	4
AFUIEAL	Effect algebras Bsic course on effect algebras. Effect algebras, MV-effect algebras, various types of elements, compatibility, partitions, state		4
XP01EKM	Mathematics Models for Economics	ZK	4
	introduction to the theory of time series and random processes used in economics for describing values (financial assets, product pr	I	-
	developing in time will be shown. Further, the terms of stochastic differential and stochastic integral are introduced.		) randonny
XP01FA1	Functional Analysis 1	ZK	4
			4
AFUIFAI	•		4
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	Colocited characters of the measure theory	ZK	4
XP01TEM	Selected chapters of the measure theory of finetely additive and sigma-additive measures, classic results (the Radon-Nikodym theorem and the Carathéodory theorem), the e	I I	-
Basic properties	measures (the Horn-Tarski technique, the Banach limit method, some questions of the lifting, etc.), the Hammer-Sobczyk theo	,	/ auuilive
VD04TOD			4
XP01TGR	Graph Theory	ZK	4
-	aph theory. Trees, their characterization, minimal spanning tree. Strongly connected components, rooted trees. Shortest paths, Floyd		
, ii <i>i</i>	Hamiltonian graphs and their applications. Chvatal's theorem. Flow in networsk, admissible flows and admissible circulations. Matchi	0 0 0 1	
bipartite graphs. v	ertex cover and independent sets. Cliques. Colorings. Plannar graphs. Graphs and vector spaces. The content of the course is modif students.	led according to the	e needs of
		71/	4
XP01TJA	Languages, Automata and Grammars	ZK	4
Finite automata. Ne	rod theorem and its applications. Nondeterministic automata. Regular expressions nad Kleene theorem. Grammars and their classific		grammars.
VDALLAO	Chomsky hierarchy. CYK algorithm for context-free grammars. Turing machines, decision problem. Algorithmically nonsolvable pro		
XP01UAG	Introduction to Algebraic Geometry	ZK	4
	he solution sets of systems of polynomial equations in more than one variable and their relationship with the ideals in polynomial ring	-	
basis theorem, Gro	ebner's bases and their properties, Buchberger's algorithm for searching a Groebner's basis, elimination theory, Hilbert's Nullstellens	satz, corresponden	ce between
	varieties and radicals.		
XP01UKS	Introduction to Quantum Structures	ZK	4
Basic course of qua	ntum structures. The notions of an orthomodular lattice, orthomodular poset, orthoalgebra, effect algebra, state, center are introduce	d. Basic properties	of quantum
	structures are studied included representations of quantum structures.		
XP01UNA	An introduction to nonassociative algebras	ZK	4
	in the theory of nonassociative algebra. We introduce the otions of free nonassociative algebra, tensor algebra, bimodules and irepr	•	
, ,	v a big attention on the ariety of alternative algebras and composition algebras. We define Lie, alcev and Jordan algebras, their unive		ebras.
XP01USA	An introduction to superalgebras.	ZK	4
The basic course in	the theory of superalgebras. We introduce notions of a graded algebra, superalgebra, Grassmann envelope of a superalgebra. Cons	ider varieties of sup	peralgebras
	and identities in superalgebras. We pay a big attention on the variety of alternative and Jordan superalgebras.		
XP01VPS	Selected topics in probability and mathematical statistics	ZK	4
	Students will learn the terms of probability and procedures of mathematical statistics that go beyond commonly taught method	ods.	
XP01ZOA	Fundamentals of the theory of operator algebras	ZK	4
Basic course of the	e theory of operator algebras aimed at the theory of C* algebras and von Neumann algebras in its concrete Hilbert space represent	ation. The state spa	ace, GNS
construction and re	presentations are studied. Comparison theory of projections, states and representations is explained. Von Neumann algebras are cla	ssified as finite and	infinite and
	structural types I, II, III.		
XP01ZWT	Wavetet Transform.	ZK	4
Hilbert spaces. Co	ontinuous wavelet transform. Time and frequency localization. Discrete wavelet transform. Riesz bases and frames. Multiresolution ar	alysis. Application	s to signal
	processing.		
XP02AMA	Active Methods in Acoustics	ZK	4
Physical principles	, interference, Huygens principle, sound field in ducts, vawe-guides and enclosures. Active noise control in a duct. One or more seco	ndary sources. Act	ive control
in enclosures, acou	stic coupling, modes, local control. Feedback and feedforward strategy, analog adn digital realisations, algorithms based on LMS, stab	ility of algorithms, m	nultichannel
	algorithms. Practical realisations of active systems. Active control of vibrations, transducers for active control.		
XP02AME	Active Methods in Acoustics	ZK	
XP02BFY	Biophysics	Z,ZK	4
-	related to blood flow, measurement of haemodynamic parameters in vivo, properties of blood vessels. Special attention will be give		ry systems
	on in treatment of renal or lung insuficiency. The students will learn how to measure blood pressure under various degrees of load ar		
	ventilation parameters. Theoretical knowledge will be complemented by practical experience from excursions.	-	
XP02DP	Electric Discharges and their Applications	ZK	4
	lectric discharges. Townsend?s theory. Glow discharge. Processes on the surface of electrodes. Technological applications. Plasma (		
	arge. Arc. Corona. Spark discharge. Lightning. Ball lightning. Z-pinch and its properties. Electromagnetic collapse. X-ray sources, con		-
	magnetic fields of Earth.		
XP02EVA	Physics for Electroenergetics	ZK	4
	ected parts of physics for students of electric power engineering: Physical principles of gas discharges - glow, arc, spark and corona dis	I I	
	he acquainted with characteristics for magnetized, astrophysical and fusion energy generation. A part of the course is two excursions i		and Czech
	ne acquainted with characteristics for magnetized, astrophysical and fusion energy generation. A part of the course is two excursions i Academy of Sciences.		and Czech
	Academy of Sciences.	in laboratories CTU	
XP02FPL	Academy of Sciences. Solid State Physics		and Czech
XP02FPL	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large.	in laboratories CTU	4
XP02FPL XP02FPT	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy	in laboratories CTU	4
XP02FPL XP02FPT Lectures will be	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significant	in laboratories CTU ZK Z,ZK nt room will be dedi	4 3 cated to
XP02FPL XP02FPT Lectures will be	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significant siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken	in laboratories CTU ZK Z,ZK nt room will be dedi	4 3 cated to
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XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significant siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys	in laboratories CTU ZK Z,ZK nt room will be dedi about. Students wi ZK	4 3 cated to III also gain 4
XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significant siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise map	In laboratories CTU	4 3 cated to III also gain 4
XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS Sound field, noise	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significar siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise mar sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control	In laboratories CTU	4 3 cated to Ill also gain 4 d types of
XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significar siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise mar sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise control Magnetohydrodynamics	In laboratories CTU	4 3 cated to III also gain 4
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XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS Sound field, noise XP02MHD XP02MPF XP02PT	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significar siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise contro Magnetohydrodynamics Qualitative description of the behaviour of hot plasma in magnetic fields Plasma Technologies	in laboratories CTU ZK Z,ZK nt room will be dedi about. Students wi ZK pping, principles an ol. ZK Z,ZK ZK	4 3 cated to III also gain 4 d types of 4 2 4
XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS Sound field, noise XP02MHD XP02MPF	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significar siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise mar sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise contro Magnetohydrodynamics Qualitative description of the behaviour of hot plasma in magnetic fields Plasma Technologies Statistical Physics	in laboratories CTU ZK Z,ZK nt room will be dedi about. Students wi ZK pping, principles an ol. ZK Z,ZK	4 3 cated to III also gain 4 d types of 4 2
XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS Sound field, noise XP02MHD XP02MPF XP02PT XP02SF	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significar siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise contro Magnetohydrodynamics Qualitative description of the behaviour of hot plasma in magnetic fields Plasma Technologies Statistical Physics The lecture is devoted to the fundamentals of statistical physics. It is the third part of four-part lecture cycle.	in laboratories CTU ZK T Z,ZK about. Students wi ZK Dping, principles an ol. ZK Z,ZK Z,ZK Z,ZK	4 3 cated to III also gain 4 d types of 4 2 4
XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS Sound field, noise XP02MHD XP02MPF XP02PT	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significar siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise mar sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise contro Magnetohydrodynamics Qualitative description of the behaviour of hot plasma in magnetic fields Plasma Technologies Statistical Physics	in laboratories CTU ZK Z,ZK nt room will be dedi about. Students wi ZK pping, principles an ol. ZK Z,ZK ZK	4 3 cated to III also gain 4 d types of 4 2 4
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XP02FPL XP02FPT Lectures will be electrotherapy, phy XP02HS Sound field, noise XP02MHD XP02MPF XP02PT XP02FT XP02SF XP02TF1	Academy of Sciences. Solid State Physics The course provides fundamentals of solid state physics at large. Physics for Therapy focused to Over Using Syndrome problems. Besides that, there will be discussed pain treatment for patients with cancer. A significan siotherapy and phototherapy. Also healing processes, organ conservation methods and progressive surgery methods will be spoken many practical knowledge via labs. Noise Surveys and vibration measurement, noise legislation, hygiene control. Types of noise surveys, examples, types of noise sources. Noise marg sources. Noise in working environment. Noise in buildings. Transport noise, airport noise. Technical principles of noise contro Magnetohydrodynamics Qualitative description of the behaviour of hot plasma in magnetic fields Plasma Technologies The lecture is devoted to the fundamentals of statistical physics. It is the third part of four-part lecture cycle. Theoretical Physics 1 tical Physics 1 is a basis for the following lectures of theoretical physics for the doctoral study. The main aim is theoretical Mechanics	in laboratories CTU ZK Z,ZK nt room will be dedi about. Students wi ZK pping, principles an ol. ZK Z,ZK Z,ZK Z,ZK Z,ZK	4 3 cated to ill also gain 4 d types of 4 2 4 4 4 4

XP02TZP	Theory of Sound Field	ZK	4
The aim of this cou	rse is deeper understanding the fundamentals of physical acoustics. The continuity equation, Euler and Navier-Stokes equations and the	he energy equation	are derived
	ws of fluid dynamics. These equations are utilized for derivation of a linear wave equation under the acoustical approximation; its spe		
General solutions of	of the wave equation and Helmholtz equation are formulated using the integrals of Kirchhoff-Helmholtz and Rayleigh. Using these integr	-	s of acoustic
	radiation and diffraction are studied. Problem of the acoustic field description is further developed using the methods of Fourier ad	-	
XP02UEF	Introduction to Electrophysiology	Z,ZK	4
	Course is oriented on anatomical, physiological and physical aspects of selected electrophysiology problems.		1
XP02UFL	Introduction to Laser Physics	ZK	4
	duces the basics of laser physics. It explains the principle of laser operation, presents basic terms and describes in detail individual ty		
	acterizes the main properties of laser radiation and briefly indicates the possibilities of creating short pulses of radiation. The next part		
in various areas	of human activity. It also lists safety principles for working with lasers. In the practical part, it is supplemented by visits to top workplace	es (e.g. PALS, ELI;	I, HiLASE)
VBaaluT	dealing with the given issue.		
XP02UZ	Ultrasound and Quantum Acoustics	ZK	4
	ese lectures is to familiarize doctoral students with the issues of ultrasonic waves needed for the design of a wide range of ultrasonic of a parte that the doctoral student could use in his work. The subject of the effective a range of cleases and recently developed findings for		cuss in detai
	e parts that the doctoral student could use in his work. The subject of the offer is a range of classic and recently developed findings fi		4
XP02VNP	Plasma Waves and Instabilities omena will be introduced in the first part of the lecture (dispersion relation, phase and group velocities, Fourier analysis). Fundamenta		4
-	m the linearized MHD equations (magnetoacoustic waves - Alfven, F and S wave; electromagnetic waves in plasma - O, X, R, L wave		
will be derived ito	part of the lecture will be devoted to final size waves, nonlinear phenomena (Landau damping) and solitons in plasma.	, ONA diagram). I	The Second
XP02VPA1	Selected Topics of Physics 1	ZK	4
	Selected Topics of Physics P	ZK	
XP02VPA2			4
XP02VPB	Selected Topics of Physics B	Z,ZK	4
XP02VPO	Selected Topics of Optics	Z,ZK	4
	wave equation, plane wave, polarization, reflection and refraction, natural and artificial anisotropy, optical modulators, coherence, interfere		
diffraction, optical	grating, holography, methods of visualization, normal and anomalous dispersion, optical image formation, optical devices, photometry	/, colorimetry, atom	ns radiation
VD00ZED	stimulated emission, lasers.	71/	4
XP02ZFP	Fundamentals of the Plasma Physics	ZK	
This course will p	provide you with a basic knowledge of plasma physics and of its applications. Plasma definition. Main plasma characteristics. Collision model Magneto-hydrodynamics. Aplications.	is of charged parti	icies. Fiula
		NIC	1
XP04A1	English language 1 s general English from previous studies, further develops speaking skills, listening and recalling spoken English as well as note-taking	1	
The course revises	terminology (cause-effect relationship, definitions, classification, basic information on composing written documents).	SKIIIS. FTOVIDES DA	
XP04A1ZK		ZK	0
	English language 1 is only for those postgraduate students studying in older study program valid up to Sept.2003 and did not ask for studying language:	1	
	program.	s according to the	newer study
XP04A2	English language 2	NIC	
	jing written documents (papers, reports, articles, dissertations, official letters ); oral presentations, reading skills (getting both general	1	 mation): the
	ding speech in a foreign language ; selected parts of difficult grammar; selected items focused on practical skills (reading mathematic		
	writing CV). Oral presentations.		
XP04A2SZK	English Language	ZK	0
XP04A2ZK	English language 2	ZK	0
	ect is only for those postgraduate students who study in older program valid up to Sept.2003 and did not ask for studying the new lar	1	ļ
XP04AZK	English Language	ZK	0
	http://www.fel.cvut.cz/anketa/aktualni/courses/XP04AZK		
XP04C1ZK	Czech language 1	ZK	0
XP04C2ZK	Czech language 2	ZK	0
			0
XP04F1	French language 1		 60 no roc of
-	of grammar and vocabulary, with the emphasis on technical style ; ability to understand technical texts on an intermediate level ( teste exts). Oral presentations - ability to talk on subjects studied by the postgraduate student. Writing cover letters , CV, answering adverti	-	ou pages of
			0
XP04F1ZK	French language 1	ZK	0
XP04F2	French language 2		
	ency both in grammar and lexical issues with emphasis on what is typical for technical style. Ability to be oriented in a more difficult te		
texts (cca 120 page	es). Oral presentations, i.e. ability to talk about problems on a sufficiently good level, ( both language and content level studied by postg skills related to job applications, cover letters etc.	raduates). Masteri	ng language
		71/	0
XP04F2ZK	French language 2	ZK	0
XP04MIN	English Language 2	ZK	0
-	m of defense of professional study in English. The task of the doctoral student before the committee to defend his professional work dra equent discussion. PhD student is evaluated in presentation skills , mastery of the language in continuous speech and language skills	-	-
, is part of the subs	during the debate . Account is also the linguistic correctness of written text.		say issport
XP04N1	German language 1	NIC	
	the emphasis on professional language. Listening to authentic technical texts from areas of electrical engineering, eliciting basic info	-	 evt Reading
-	professional texts regarding the needs of postgraduate students. Training of various reading skills. Writing technical texts on specific		-
-	ions for advanced students based on 5 video tapes about these topics: postgraduate studies, professions, internships abroad, professional texts of specific		
	profession of an engineer. Revising and extending typical grammar for technical style, syntax of technical texts.		
XP04N1ZK	German language 1	ZK	0
	the emphasis on professional language. Listening to authentic technical texts from areas of electrical engineering, eliciting basic info	1	-
-	professional texts regarding the needs of postgraduate students. Training of various reading skills. Writing technical texts on specific		-
	ons for advanced students based on 5 video tapes about these topics: postgraduate studies, professions, internships abroad, profess		
	profession of an engineer. Revising and extending typical grammar for technical style, syntax of technical texts.		

XP04N2	German language 2	NIC	I .
The course is focu	sed on extending and elaborating grammar and conversation, namely on professional language skills (reading + writing technical texts presentations etc.)	s, preparing pape	ers, reviews
		71/	0
XP04N2ZK	German language 2	ZK	0
XP04R1	Russian language 1	NIC	 auirina tho
The course is sui	table for intermediate students who have an equivalent command of the language as someone who has completed book Raduga. Cou language skills required to get by in everyday situations and a basic understanding of straightforward technical texts.	inse objective: Ac	quinng the
XP04R1ZK	Russian language 1	ZK	0
XP04R2	Russian Language 2	NIC	0
	 xts including messages, summaries, business correspondence and dissertation theses; understanding lectures and other listening skills; n	-	 resentations
-	tructures and pronunciation. Russian realia and the way of Russian life.Besides the course books, the supplementary texts and AV aid		coontation
XP04R2ZK	Russian language 2	ZK	0
XP04S1	Spanish language 1	NIC	0
	nowledge of Spanish language, including the language for specific purposes.Specific technical style characteristics focused on specific		-
	comprehension, oral presentations, understanding the text-all based on intermediate level language.	3	
XP04S1ZK	Spanish language 1	ZK	0
XP04S2	Spanish language 2	NIC	0
	ills(listening,understanding a Spanish text of cca 120 pages, writing, speaking). The skills are practiced on writing letters, presentation		-
etc. Indi	vidual home preparation is necessary. Materials are chosen with regards to the study field of a postgraduate. High-level and fluent spe	ech is demanded	d.
XP04S2ZK	Spanish language 2	ZK	0
XP04 1	Czech language 1	NIC	0
XP04 2	Czech language 2	NIC	0
XP12IMM	Engineering Methods in Mechanics	Z,ZK	4
	I plution of problems in rigid bodies mechanics, hydromechanical, thermodynamic and electromechanical systems. Dynamics of combined	,	ing method
of vectorial and a	nalytical mechanics, assembling of mathematical model and resources for simulation. Identification of system parameters with respect	to passive resist	ances and
(	energy losses. Physical similarity and analogy, dimensional analysis, dimensionless parameters, PI-terms, fundamentals of experimentation of the second s	al research	
XP12VVM	Development and Research of Materials	Z,ZK	5
Research of con	nposite materials wth specific electrical properties. Diagnostics of materials in electrotechnology. Polymers. Phase transitions. Thin and	thick conductive	layers on
	polymers. Organic solar cells. Models of function of biomaterials.		1
XP13DEZ	Degradation processes of electridal equipment	Z,ZK	4
	rizes students with the basic processes of degradation, which is exposed to the electrical product in a production environment. The stud		-
to a specific proc	luct for a model operating environment. The student should try to verify the dominant degradation process of the product in the laborate	ory or perform its	computer
			oompator
	tion. Attention is also paid to environmental aspects associated with the choice of materials (technology) that are able to limit the degr	adation process.	
XP13DFD	Data and Functional Analysis of Production Systems	adation process. Z,ZK	4
XP13DFD Technological syste	Data and Functional Analysis of Production Systems	adation process. Z,ZK iterprise, distribut	4 ted systems
XP13DFD Technological syste Methodology of an	Data and Functional Analysis of Production Systems em of production enterprise and its structure. Relationship of technological system to other systems. Tools of control and information of er alysis of enterprise. Date base of technical preparation of production. Methodology of functional analysis of enterprise. Methods of data	adation process. Z,ZK aterprise, distribut a and material flo	4 ted systems ws analysis
XP13DFD Technological syste Methodology of an	Data and Functional Analysis of Production Systems em of production enterprise and its structure. Relationship of technological system to other systems. Tools of control and information of er alysis of enterprise. Date base of technical preparation of production. Methodology of functional analysis of enterprise. Methods of data sis of user interface of enterprise IS. Object oriented methodology of analysis of enterprise. Methods of time analysis of enterprise. Use	adation process. Z,ZK aterprise, distribut a and material flo	4 ted systems ws analysis
XP13DFD Technological syste Methodology of an Methods of analys	Data and Functional Analysis of Production Systems em of production enterprise and its structure. Relationship of technological system to other systems. Tools of control and information of er alysis of enterprise. Date base of technical preparation of production. Methodology of functional analysis of enterprise. Methods of data sis of user interface of enterprise IS. Object oriented methodology of analysis of enterprise. Methods of time analysis of enterprise. Use enterprise. Documentation and standards for data and functional analysis. Automation of analysis methods, CASE tools.	adation process. Z,ZK aterprise, distribut a and material flo e of Petri nets for	4 ted systems ws analysis analysis of
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XP13DFD Technological syste Methodology of an Methods of analys XP13DTF Surface charact XP13FCD The course discus principles of cor photovoltaic cells. I	Data and Functional Analysis of Production Systems           em of production enterprise and its structure. Relationship of technological system to other systems. Tools of control and information of eralysis of enterprise. Date base of technical preparation of production. Methodology of functional analysis of enterprise. Methods of data sis of user interface of enterprise IS. Object oriented methodology of analysis of enterprise. Methods of time analysis of enterprise. Documentation and standards for data and functional analysis. Automation of analysis methods, CASE tools.           Image: the interface of a thin film. Deposition methods; chemical vapor deposition, physical vapor deposition. Thin film characterization: diffraction. Ion implantation. X-ray diffraction and photoelectron spectroscopy. Thickness, mechanical, optical and electrical prope           Photovoltaics systems         Image: systems           sees the most important problems of principle, technology of production and final use of photovoltaic systems for power generation. Top wersion. Photovoltaic effect, photovoltaic cells. Optimization of cell structure in terms of optical and electrical properties of individual lar Determination of the maximum theoretically achievable energy conversion efficiency of a given structure. Photovoltaic modules. Technologi	adation process. Z,ZK Iterprise, distribut a and material flo e of Petri nets for Z,ZK optical methods rties. Z,ZK pics: Solar energ yers. V-A charact gical processes of	4 ted systems ws analysis analysis of 4 ; electron 4 y and basic eristics of of productio
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XP13SID	Software in Industrial Engineering	Z,ZK	4
Introduction to usin	g of IBM compatible personal computers, their architecture. Using of application programs for mathematics, graphics, text processing, of software systems. Introduction to user interface based on Microsoft Windows.	database and CAD	), examples
XP13SJD	Quality Control Systems	Z,ZK	4
	lity and reliability. Basic quality management systems. ISO 9000, TQM, Kaizen. Basic characteristics of ISO 9000. Quality manual. Qu		-
	ality. Mathematical model based on factor experiments. Optimization of mathematical model. Six Sigma quality management system		
tools of the Six	Sigma system. Reliability as a subset of quality. Mathematical distributions used in the field of reliability. Usage and maintenance coef	ficient. Backup - ty	pes and
	mathematical description. Accelerated reliability testing. Processing and analysis of experimental data.		
XP13SRD	Real Time Systems for Process Control	Z,ZK	4
Introduction to using	g of real time control paradigm. Architecture of real time systems. State transition diagram of real time systems. Semaphore and deadlo	ck. Using of real tir	ne systems
	in control of technological systems.		
XP13SSD	Special Methods of Devices Quality Evaluation	Z,ZK	4
	he principal values determining the quality of the passive and active devices. Measuring methods, their evaluation, identification of sys		-
	vice, two ports parameters of the device. Matching of the device to the measuring circuit. The noise of the electronic circuits, optimal i Non-linearity of the "linear" circuits, intermodulation distortion, measuring of the non-linearity and intermodulations.	loise and power m	atoning.
XP13TMD	Technological Aspects of Microcomputer Design	Z,ZK	4
	nputers, modular design and hardware solution. The data storage technology. The data storage media. The device protection against	· · ·	
	condition of equipments. The human machine interface - input and output devices. The ergonomic design of microcomputers and spe		
microcomputer sy	stems, criteria. The quality control of design and services, the quality of software. The legal aspects of microcomputer use. The conte	mporary trends in	industrial
	microcomputers.		
XP13TND	Technology of Low Temperatures and Superconductivity	Z,ZK	4
	vrinciples of cooling. Equipments for achievement of low temperatures, liquifiing of gases. Ultralow temperatures. Properties of isotope		-
	ies of solids at low temperatures. Principles of superconductivity theory, transport currents, stability of superconductivity state, weak s		
phenomena. Prope	ties and technology of metallic and high temperature superconductors. Thermal insulation of low temperature equipments. Low temperature to the section and work in low temperature laboratory. The use of low temperature to the low temperature to the section.	ture thermometry. P	Accessories
XP13TPD	and work in low temperature laboratory. The use of low temperature technology in practice.	Z,ZK	4
-	Technological Processes in Electronic Manufacturing hnology of packaging. Contemporary methods of packaging of components SOP, DIP, SIP, ZIP, QFP and others, properties, advantage		-
	he viewpoint of environmental resistivity. Classification of multichip modules. Multichip modules of different types: MCM-L, MCM-C, M	-	-
	. Technology of contacting og dies. Electrical design of MCMs. Thermal design of MCMs. Physical design of MCMs. Parameters for ev	,	
	of MCMs. Design tools. Programmable modules. Applications of MCMs.		-
XP13VNM	Research of new materials	Z,ZK	4
The course will cov	er the topics of materials such as Piezoelectrics, pyroelectrics and ferroelectrics without lead, Multiferroics, Special magnetic elements	, Carbon materials	and carbon
	inspired materials and hybrid organic inorganic materials, Polymers and composites containing polymer for electrical engineering, National States and St		
	billed content of amorphous / crystalline / nanocrystalline mass, Metals with extreme dependence of electrical resistance on temperat		
	rial behavior, Carbides and nitrides (MAX phase). Critical methods for study of these materials will be discussed - Characterization of		
speciroscopic lec	hniques, Characterization of materials by microscopy (SEM, TEM, polarized light, confocal), Characterization of materials by impedar simulation of temperature and el. fields.	ice analyzers, woo	lenny and
XP13VTK	Vacuum technology and cryogenics	Z.ZK	4
	iminous processes. Surface processes. Processes circulative to wall. Vacuum pumps. Measurements in vacuum techniques. Principle	, ,	-
	s for achievement of low temperatures. Properties and behavior of matters at low temperatures. Transport of heat and insulating systemeters	-	
temperature ther	mometry.Laboratory training and seminars are focused to obtain a basic practical proficiencies and the other knowledges in vacuum	technology and cry	ogenics.
XP13VVM	Development and Research of Materials	Z,ZK	4
Research of com	posite materials wth specific electrical properties. Diagnostics of materials in electrotechnology. Polymers. Phase transitions. Thin an	d thick conductive	layers on
	polymers. Organic solar cells. Models of function of biomaterials.	r	
XP14APD	New Trends in Electric Device Applications	ZK	4
	elopment and design of electric apparatus. Electric apparatus and electric devices co-operation. Electric apparatus switching character		
switched circuit.	Switching overvoltage and possibility of its limitation. Up to date systems for overvoltage limitation. Problems of high voltage motor su measuring and testing up to date methods. Internal smart installations. New generation of building installations.	vitching. Electric ap	oparatus
XP14APR	New Trends in Electric Device Apply	ZK	3
XP14DES	Dynamics of Electric Machines	ZK	4
	play an important role in a number of areas, such as e-mobility, renewable energy sources utilization, robotics and automation. The m	1	
	lents with deep understanding of the principles, operation, and analysis of rotating electric machinery. Mathematical models based or	-	
	loped for various types of electric machines (induction machines, electrically excited synchronous machines, permanent magnet sync		
understanding of	electrical machine theory on such a level is necessary, for instance, for design of modern control methods of electric drives or constr	uction of electric m	nachines.
XP14DSD	Dynamics of Electric Machines	ZK	4
Assumptions for el	ectric machine general theory. Mathematical transformation systems, per unit system. Mathematical model of DC machine, of synchro	onous and inductio	n machine,
of collector mach	ine. Electro-dynamic transient phenomena in electric machines. Short-circuit. Switching of the motor on the network. Electromagnetic	torque and its corr	nponents.
	Synchronous motor oscillation. Circle diagram methods for transient effect solves. Non-symmetrical short-circuits.	T	
XP14ECD	Electromagnetic Compatibility	ZK	4
	ces. Different manner and coupling factors of interference spreading. Grounding influences. Screening. Non-linear electric appliances ge forms of different electric appliances. Harmonic current and voltage components of different electric appliances. Steady state and the second state as		
	harmonics components. Interference suppression of converters on the network. Compensation and filtration substations.		iu voltage
XP14EMC	Electromagnetic Compatibility	ZK	4
	ces. Interference coupling. Shielding. Earthing. Nonlinear consumers. Harmonics in electric convertors in steady and transient conditi	1	
	converor influences on the network. Compensation and filtration.	·	0
XP14MEN	New Trends in Converter Technology	ZK	4
	dy is to introduce students to the principles and functions of latest topologies of power semiconductor electric energy converters, tak	ing into account the	e scope of
	ontent of the subject is the optimization of the power conversion parameters in power semiconductor converter systems. The subject is		
-	inciples, topologies, functions and possibilities of application of power semiconductor converters realized on the basis of modern pow		
	powerful control microcomputers. The topics are focused on pulse width modulation methods for voltage and current control, modes of a setue control of the current cur	-	
	; active control of the current curve and the voltage curve, as well as the overall quality of electric energy transmission. The problems matrix converters, multi-level converters, resonant converters as well as problems related to their practical use are also solve		11110515 UI

XP14MID			r
	Microprocessor Control of Electric Drives	ZK	4
	ers, their architecture. ADC, DAC special circuits, DMA, measurement of pulse parameters. Event memories, FIFOs, CAMs, multiport		
	DSP processor concept, fast computing, interface issues. Parallel information processing. Multiprocessor systems. Real-time system,		
Polled loops, phase	e/state driven systems, F/B systems. Interrupt driven system, full featured kernels. Tasks, intertask communication, queues, semapho and issues. SW, HW design examples.	res. Control algori	ithms desigr
XP14MIP	Microprocessor Control of Electric Drives	ZK	4
	ourse is to introduce students to the latest issues of mikroprocessor application in control and regulation of electric drives. The course		
	signal processor (DSP) architecture, computational resources, fixed point, fraction, floating point arithmetic, interrupt system, DMA co		
	O, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buses, protocols, synchronization, multiprocesson aptive RTOS, tasks, queues, semaphors, critical section, control computer programming methods, control computer resources application		
itti systems, preen	of electric drives.		
XP14MIR	Microprocessor Control of Electric Drives	ZK	3
	r, digital signal processor (DSP), digital signal microcontroller (DSC), architecture, computational resources, fixed point, fraction, floati		-
	oller, special blocks, ADC, event memory, FIFO, CAM, Multiport RAM, impulse signal generation, serial communication, methods, buse		-
multiprocessor sy	stems, parallel processing, RT systems, solution methods, systems: INT, BG-FG, FSA, CC, preemptive RTOS, tasks, queues, seman computer programming methods, control computer resources application in scalar and vector control of electric drives.	phors, critical secti	ion, control
XP14MPD	Advanced Control Methods of Electric Drives	ZK	4
	s in electric drive control. Application of microprocessor technology, program realization of algorithms for modern drives, modulators, re		
	e torque control, converter with harmonic current control for synchronous machine, functions and control of compatible rectifier, previ		
	electric drives.		
XP14MPO	Advanced Controlled Drives	ZK	4
XP14MRP	Advanced Controlled Drives	ZK	3
XP14MTD	New Trends in Converter Technology	ZK	4
Up to date power se	emi-conductor devices. Pulse Width Modulation methods for current and voltage control. Single-phase PWM converter. Converters with u	nity power factor.	Single-phase
converter with activ	re current shape control. Three-phase converter with active current shape control. Converter with active voltage shape control. Converter	rs for multisystem	locomotives
	Resonant converters.		1
XP14MZR	New Control Methods for Electric Drives	ZK	4
	rse is to introduce students to the latest issues of control and regulation of electric drives, taking into account the focus of their doctoral v		-
electromechanica	energy conversion parameters in electric drive systems and relevant power electronics, in particular by using modern control and reg is mainly focused on electric AC drives, especially drives with asynchronous and synchronous motors.	ulation algorithms	
XP14NAP	New Trends in Electric Device Apply	ZK	4
XP14NTP	New Trends in Electric Device Apply	ZK	4
XP14RPD	Advanced Controlled Drives	ZK	3
	iable frequency feeding. Current source converter. Voltage source converter, PWM, Electromagnetic torque by feeding from frequenc		-
	Direct and indirect torque control system, Self-controlled synchronous motor drive. Methods for rotor position determination. Switch R	-	
XP14TPD			1
XP14TPD Switching arc latte	New Trends in Electric Device Theory er models and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric arc	ZK	4
Switching arc latte	New Trends in Electric Device Theory er models and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric arc dium on physical process in arcing chamber. Switcher braking capacity and possibility of their inducement. Fuses theory. Electric circu	ZK extinguishment. In	4 nfluence of
Switching arc latte	New Trends in Electric Device Theory er models and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric arc dium on physical process in arcing chamber. Switcher braking capacity and possibility of their inducement. Fuses theory. Electric circu limitation. Electric contact theory.	ZK extinguishment. In uit braking with sh	4 nfluence of ort current
Switching arc latterextinguishing mer	New Trends in Electric Device Theory           er models and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric arc           dium on physical process in arcing chamber. Switcher braking capacity and possibility of their inducement. Fuses theory. Electric circu           limitation. Electric contact theory.           New Trends in Electric Device Theory	ZK extinguishment. Iu uit braking with sh ZK	4 nfluence of ort current 3
Switching arc latte extinguishing mer XP14TPR XP15DVN	New Trends in Electric Device Theory           er models and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric arc           dium on physical process in arcing chamber. Switcher braking capacity and possibility of their inducement. Fuses theory. Electric circu           limitation. Electric contact theory.           New Trends in Electric Device Theory           Diagnostics of HV and EHV Insulating Systems	ZK extinguishment. In uit braking with sh ZK Z,ZK	4 nfluence of ort current 3 4
Switching arc latte extinguishing me XP14TPR XP15DVN Failure rate of opera	New Trends in Electric Device Theory           er models and theory. Switching arc physics. Interaction between switching breaker and electric circuit. New knowledge in electric arc           dium on physical process in arcing chamber. Switcher braking capacity and possibility of their inducement. Fuses theory. Electric circu           limitation. Electric contact theory.           New Trends in Electric Device Theory	ZK extinguishment. In uit braking with sh ZK Z,ZK noice of methods fo	4 nfluence of ort current 3 4 or diagnostic
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Types of networks	Transmission of Electricity	Z,ZK	4				
	and transmission systems. Multiple overhead lines. Symmetrical components. Calculation of load flow. Analysis of faulted power systems						
and series faults and simultaneous faults. Special transients in the integrated power systems. Distance and comparison protection relays, principles and applications. EMC and interferences in power networks, prediction and limitation of disturbances due to non-linear loads. Static stability of the power system and its criteria. Dynamic stability of the power							
system and its criteria. Methods for increasing of the stability in power systems. Multimachine transient stability. Reliability of the power transmission systems.							
XP15RE Control of Power Systems Z,ZK 4							
	is of power system control, feasibility and algorithms of optimization methods, handling of constrain conditions. Hierarchy and decomp	,					
tasks. System state estimation. Load forecasting and load curve civering. Unit commitment. Optimization of operation with respect to net topology constrains. Control of voltage and							
reactive powers	palance. Control of frequency and active powers balance. Optimal power flow. Dynamical models of power stations and systems. Solution	tion of extraordinar	y states				
	Dispatch, system and subsidiary services.						
XP15SPS	Coupled Problems in Heavy Current and Power Engineering	Z,ZK					
Concept of a coupled problem, classification of the coupled problems typical for heavy cur-rent and power applications. Mathematical description of the relevant physical fields, links between corresponding partial differential equations. Characteristics of electromagnetic-thermal problems (with respecting eventual thermoelasticity), electromagnetic-thermal-hydrodynamic							
and electromagnetic-mechanical problems and also problems based on a com-bination of the electromagnetic field and electric circuits. Formulation of their mathematical and computer							
g	models and algorithms of their solution. Information about available SW, its existing capabilities and perspectives.						
XP15TOS	Theory of Light field	Z,ZK	4				
Theory of light field	Mathematical description of emission of unsymmetrical luminaires. Photometry of distante and close point. New characteristics of sp	ace properties of i	llumination.				
Flux method calcu	ation of integral characteristics. Light field of surface type and cube type luminaire. Light flux distribution from point source. Distribution	n of light flux of lin	ear source.				
	Distribution of light flux of surface source. Interreflection theory. Design of indoor illumination using PC.	7 71/					
XP15UEE	Electric Energy Use and Conservation	Z,ZK	4				
XP15VME	Research Methods in th Use of Electrical Energy re mathematics of continuum physics. Physical conservation laws. The laws of electromagnetic field. Similarity theory in thermo-aerod	Z,ZK	4				
	d. Mathematical modeling. Analytical solutions of electromagnetic field. Discrete parameters and their relation with field parameters. Nun						
	mathematical modeling of fields. Non-deterministic modeling. Experiment and data processing, practical examples.		Clerninistic				
XP15ZSS	Light sources and Equipment	Z,ZK	4				
XP16AFM	Advanced Financial Management Methods	ZK	4				
	se is a deeper understanding of the more complex financial management issues. It builds on knowledge of standard financial management	1	•				
	pital market models, other investment valuation methods (generalized NPV method, general IRR method). The student will learn how						
derivatives, evaluat	ing exotic derivatives. In addition, students will assess using the Monte Carlo method the value of derivatives and financial instruments	for which the so-ca	alled closed				
	ailable. Other modern finance issues will be addressed through case studies. An integral part is the question of numerical methods, the	-					
use. Students cre	ate their own models and simulations based on the chosen topic. The output will be a comparative analysis of the proposed methods	and standard met	hods. The				
XP16DEL	wide use of computational tools and models (Matlab, Mathematica, others) is assumed.	71/	2				
XP16ECM1	History of technology and economic Quantitative research methods in economy 1	ZK ZK	2				
	rect sequel to Statistics/Linear regression. The objective of the course is to expose the student to variety of common and practical eco		•				
	ning a stronger appreciation of strengths and weaknesses of econometric methodology and to overview historical developments in appl						
	y with the general linear model and knowledge how to deal with basic model and data deficiencies, simultaneous systems, and simple						
course will start dev	reloping theoretical topics covered in the essential courses on Econometrics. The course will follow with different empirical research proj	jects drawn from th	e literature.				
	be introduced by the relevant economic theory-model. Using own and empirical data sets, the students will apply standard econometri						
economic questi	ons. Exercise sessions will provide introduction into advance use of statistical packages (best is TSP or Stata or their derivatives like E	E-views) and a fee	dback on				
XP16ECM2	possible solutions of problem sets. The course will require intensive work with data and statistical packages. Quantitative research methods in economy 2	ZK	4				
	sic model and data deficiencies, simultaneous systems, and simple time-series processes. Advanced Econometrics is the next course	This course should be a sequel to the basic Econometrics (Basic statistical methods and Linear regression model). It assumes familiarity with the general linear model and knowledge					
in Statistics and on	Regression) designed to introduce tools necessary to understand and implement empirical studies in (micro)economics. The main emp						
(i) to extend regr	ession models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are no	phasis of the cours ot appropriate and	e is twofold: I to study				
(i) to extend regralternative method	ession models in the context of cross section and panel data analysis, (ii) to focus on situations where linear regression models are no s. The objective of the course is to expose the student to variety of basic applied microeconomic challenges with the ultimate goal of ga	ohasis of the cours ot appropriate and aining a stronger a	e is twofold: I to study appreciation				
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from RES into the e	electricity market. These trends require the development of different types of energy accumulation and the implementation of smart te of network operation. The course also includes modeling of the development of energy systems with high RES share.	chnologies in the	managemen
XP16ERU	Accounting	ZK	4
	Inting. International accounting standards (IFRS). Methodology of accounting. Cost, revenues, profit and cash flow. Balance sheet, p of company's financial position.	1	1
XP16FIM	Financial Management	ZK	4
	e, present value and alternative cost of capital, net present value, present value of bonds and stocks, investment decision making an		e, return and
alternative cost of	f capital, risk and return, lease or buy decision, inflation and return, real options, financial options, option valuation, hedging, short te	rm finance, cash f	ow finance.
XP16FVT	Philosophical Problems of Science and Technology	ZK	2
	aged in the evolution of principal ideas on which the science and technology are founded. Philosophical aspects of physics and math		er examined
	Actual themes linked to the so called "Postmodernism" and to the alternative ways of understanding and their social coherences are		
XP16HDS	History of Transport Systems and Communications	ZK	2
XP16HEL	History of Electrical Engineering	NIC	2
XP16HIS	Historiography of the Development of Science, Technology and the Methodology	ZK	4
XP16HKA	Historical structures and technologies in architecture	NIC	2
XP16HKC	Science, Technics and Technology in the Historic Landscape of the Czech Lands	ZK	4
XP16HPH	History of Physic	ZK	4
XP16JAK	Quality Management	ZK	4
Quality assurance	in the organization. Statistical methods in quality management. Models of quality systems. Economic issues in quality assurance. In of ISO 9001 standard. Certification of products and production systems. Recommendations for quality management in the organization.	-	equirements
XP16KVM	Quantitative Research Methods in Management	ZK	4
	ware SPSS for advanced statistical methods as multiple regression and correlation, analysis of variance, factor analysis, cluster anal	1	1 -
Application of Solit	research and management.	yoio and ito doing	in marketing
XP16MAN	Management	ZK	4
	of management and its innovation, modern ways of management, responsibility of managers, manager's ethics, successful manager	1	viour.
XP16MAR	Marketing	ZK	4
The role and function	ons of the marketing management. Marketing research and marketing information system. Concepts of marketing strategy. The use of Product and service policy, pricing and contractation policy, communication, distribution. Marketing mix.	product life cycle	and portfolio
XP16MAS	Marketing Strategies	ZK	4
Broadening of ba	sic knowledge of marketing. The analysis of marketing strategies in different market situations. The firm`s behavior under competitio Case studies in the field of product policy, price and condition policy, communication policy and distribution policy.	and competitive	advantage.
XP16MAU	Accounting for management	ZK	4
The principles of m	anagerial accounting. Relations to the organisational structure of the enterprise and to the production process. Budgets, use for mana analyses. Productivity and measurement of productivity in the production process. The managerial information systems.	agement. Calculat	ons and cos
XP16MAV	Production Management	ZK	4
The role of product	tion process in promoting the marketing concept of the firm and the competitive advantage. The system of operational planning with Standardized basis of production management, standardization. Controlling, production management methods.	respect to product	ion typology
XP16MES	Economics and Management of Energy Systems s of electric power sector, gas systems and central heating systems functions. Marginal revenue in electric power system. Marginal c	ZK	4
	ptimization, subsystem and system optimization in generation and transportation of different kinds of energy. Reliability in energy del		-
	in power industry. Energy price regulation and its consequences	1	
XP16MEU	Economics and Management of Energetics	ZK	4
Organizational stru	acture of electric power sector, heating and gas sector. Principles of integrated source planning. Revenues, costs, prices and tariffs o	f energy. Governm	ental energy
	policy. Development of international cooperation in power industry and its economic and ecology aspects.	71/	4
XP16MVE	Selected Problems of Economy and Management of Energy tion process in promoting the marketing concept of the firm and the competitive advantage. The system of operational planning with	ZK	4
	Standardized basis of production management, standardization. Controlling, production management methods.	respect to product	ion typology
XP16SDE	Building heritage of the industrial era	NIC	2
XP16STM	Selected Statistical Methods	ZK	4
	cs. Transformation of random variables. Aproximation of theoretical distributions. Interval estimates. Hypothesis testing. Simple and multi series. Index number.	1	1 -
XP16STV	Product Strategy	ZK	4
	rvice policy, pricing and contractation policy, communication, distribution. Marketing mix. Inovations. Concepts of marketing strategy. management. The strategic marketing simulation Markstrat.	1	1
XP16VPB	Science, Technology and Industrial Boom	ZK	4
XP16VTK	Everyday Science and Technology	ZK	4
XP16VTS	Development of Technical Universities	ZK	4
XP16ZVP	Fundamentals of Scientific Work	ZK	4
XP17ANS	Selected Chapters from Antennas and Propagation	ZK	4
Summary of anten	nas and modern antenna technology. Selected problems of antennas and propagation for fixed and mobile communication, earth an different services and communication. Topics of near a far field antenna measurement, compact antenna measurement. Measurement	d satellite service	s. Frequency
XP17APL	services. Antenna anechoic chambers design. Applied Optoelectronics in Medicine	ZK	4
	Applied Optoelectronics in Medicine s of non-invasive measurement techniques in medical diagnostics. Fundamental physiology of the vascular system, hemodynamics,		
	on of the cardiovascular system. UV, VIS and IR spectroscopy. Fundamental optics of the eye and color analysis. Optical parameters		-
	of light, Design of optical sensors, Optical visualisation principles of translumiscetion and tomography, Optoelectronic systems in	-	
XP17ELD	Electrodynamics	ZK	4

XP17LAE	Medical Applications of Electromagnetic Field	ZK	4
	es of EM Field medical applications. Principals and technical equipment for EM thermotherapy, hyperthermia applicators. Calculation		
distribution. Deta	ails of microwave thermotherapy apparatus are given, especially from the point of view of applicators for local, intracavitary and regio	nal treatment. Non	-invasive
	thermometry (NMR, ultrasound and radiometry) and special compatible applicators are described.		
XP17MAPP	Analysis Methods for Passive Elements of Microwave and Millimeter-wave Technique	ZK	4
	nsmission lines parameters. Computation of microwave circuits scattering parameters, analysis of planar antennas. Survey of basic m stress on methods: spectral domain, integration equation, finite differences, finite elements, mode matching, transversal resonance. S		•
	electromagnetic fields, moment method, disturbance method.	survey or basic the	
XP17MT	Microwave Technique	ZK	4
1	ission lines and its circuit elements including hybrid and monolithic integrated circuits technology. Resonators and other type of pass		1
	plers, isolators and circulators, modulators etc.) and active microwave circuits (e.g. oscillators, mixers and amplifiers), microwave filter		
	CAD of microwave circuits.	-,	
XP17MVP	Methodology of Science	ZK	
XP17NME	Numerical Methods in Electromagnetic Field	ZK	4
	noholtz and wave equations. Analytical, semianalytical, seminumerical and numerical methods. Matrix equations and algorithms: Moc		-
	Nethod of Moments, Multiple MultiPoles, Boundary Element Method, Finite Difference Method, Finite Element Method, Finite Integration	•	•
Solution	of matrix equations: direct methods, Gauss-JordanOs elimination, pivotation, LU-decomposition, banded and sparse matrix, conjuga	te-gradient method	d.
XP17OV	Optical Fibers	ZK	4
Waveguiding in o	ptical fibers, attenuation and dispersion, step-index fibers, gradient fibers, single and f1ibers, optical cables, splices and connectors, d	optical fibers meas	urements,
	fabrication, nonlinear phenomena in optical, fibers, fibers for sensors.		
XP17PEM	Advanced Electromagnetism	ZK	3
The course present	ts advanced topics of classical electromagnetic field theory, especially: electric and magnetic vector potential; reciprocity, duality, and	equivalence princi	ple; Green's
function; multipole	expansion; scattering and characteristic modes; homogenization and Bloch's theorem; synthesis and topological optimization The kn	owledge gained in	this course
	can be used in many branches of applied electromagnetism, especially in antenna theory and microwave circuit design.		
XP17TAM	Evaluation of Applicators for Microwave Thermotherapy	ZK	4
	sed on methodology of evaluation of microwave applicators, which means measurements of SAR distribution in water phantom and r		
	ous types of agar phantoms. Further design and optimisation of measuring probes is discussed, methodology of probes calibration a		evaluation
	lescribed. Numerical modelling of microwave applicators by aid of software product FEMLAB, comparison of mathematical and exper		-
XP17TOM	Theoretical Optoelectronics in Medicine	ZK	5
-	o doctoral students from different disciplines the opportunity of both highly theoretical studies and numerical simulations of interaction ne spectrum (and adjacent UV and IR bands) with biological tissues. And to learn about modern optoelectronic sensor concepts and the spectrum of the second se	-	
	Ind diagnostics. Interdisciplinary topics will be discussed and focused on the benefits and current applications of optoelectronics in m	••	
	n intensity, etc.) will be formulated and important methods will be described, in particular: radiometry, photometry, eye as a radiation		
	erometry, scattering measurements, integration of spherical theory, etc. Emphasis will be placed on modern theoretical approaches (		
models), e.g. calcu	ulation of the light intensity distribution in biological tissue, theory of radiation transmission (e.g. theory and model Kubelka-Munk), etc	. Students will be	acquainted
with the possibilities	s of numerical simulations of the given problems by aid of modern SW products (like e.g. COMSOL Multiphysics, SEMCAD / Sim4Life	, CST, etc.) which	are working
	I methods FDTD, FEM, MoM, Monte-Carlo etc. Operating principle of the optoelectronic reflective and transmissive sensors. Measure		
	eral blood volume dynamics, clinical examples and typical examination tests. Principles and applications of functional optical imaging		al biopsy, IR
	anoscopy, IR thermography, Laser Doppler perfusion imaging (LDPI), Photoplethysmo-graphy imaging (PPGI), optical coherence tor		4
XP17TVC	Technique of Highly Sensitive Receivers	ZK	4
	v sensitive microwave receivers, mm - wave and submm - wave receivers. Electromagnetic spectrum and noise properties of the Eart tre wave communication. Semiconductors for microwave and millimetre wave bands, SIS detectors, mixers, infrared receivers. High freq	-	
	surement of noise parameters. Multispectral radiometry and remote sensing, electromagnetic radiation - interference, EMC theory and	-	teennology,
XP31AEO	Electric Circuit Analysis	ZK	4
	devices and structures. Methods of analysis and algorithms for linearized circuit models in time domain and frequency domain. Trans		1
	nalysis of nonlinear circuits in time and frequency domains. Parametric models. Circuits with non-linear energy storing elements. Circ		
	professional software packages.	,	•
XP31ART	Architectures for Real Time Implementation	ZK	4
Architectures of ce	ntral processing units and synthesis of data paths for DSP. Implementation strategies of DSP algorithms. Influence of algorithm modi	rication on the imp	lementation
processing time. S	equential and parallel processing. Numerical characteristics of algorithms. Implementation alternatives, dedicated hardware and proc	jrammable signal p	processors.
Architectures of dig	ital signal processors with fixed point and floating points. Developments tools for real time processing. Analysis of real time implemen	tation of FFT, digita	al filters and
	special algorithms for communications.		
XP31ASN	Algorithms and Structures of Neurocomputers	ZK	4
	the basic principles and possibility of the application of the neural informative technology for the signal processing are the main topic		
	o the artificial neural networks (ANN) theory and applications, to the choice and the optimisation of the structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures are structures and the neural networks (ANN) theory and applications is the kine and the optimisation of the structures are struc		at the signal
	ssing are investigated in detail. Some neural network applications in the biomedical engineering and hardware realization of the KSO		4
XP31CZS	Digital signal processing	ZK	4
XP31DIF	Digital filter synthesis	ZK	4
	gital signals. Impulse response, step response, convolution. Elements of z-transform and Fourier transform. Difference equation, trans	-	-
	esign methods for finite impulse response (FIR) digital filters - windowing and frequency sampling methods, optimal design algorithms w-band filters. Design methods for infinite impulse response (IIR) digital filters. Bilinear transformation. Analytic design methods in digi		
	as building blocks for signal processing. Group delay equalization, phase shift and notch filters. Wave digital filters.		
XP31DSP	Digital signal processing	ZK	4
	s on the basic courses of digital signal processing in master's degree, develops and deepens the knowledge corresponding to the ne		1
	processing. It covers spectral and cepstral analysis, parametric methods, optimal LTI filters, frequency analysis, methods of analysis of		
XP31FON	Speech Phonetics and Advanced Voice Technologies	ZK	4
XP31FSK	Phonetic signals and their coding	ZK	4
	uces the processing of speech signals. Within the subject students should manage from basic to advanced and modern algorithms of		
-	nent. Further reasonable part is focused on speech recognition, where students will get to know modern and advanced technique in task		-
-	on or speaker recognition. Special attention is devoted to usage of classification techniques based on GMM, DTW, HMM, ANN/DNN,	-	-

XP31NOS	Design and circuit structures of electronic systems	ZK	4
The course deals w	ith important applications of analogue technique. The subject is divided into the three basic parts. The first part is devoted to amplifier	s and analog funct	ional blocks
	and signal processing. Special application amplifiers, nonlinear and parametric analog functional blocks and fast analog circuits opera	-	
	cond part is devoted to linear analog systems, their characteristics, description and synthesis capabilities. There are discussed: the ty	-	
	hods of filter synthesis and their optimization with regard to real properties and value variances of the circuit elements, implementation		-
	s, i.e. switched capacitor (SC) and switched-current (SI) circuits. The last part deals with computer-aided circuit design. The principles models of functional blocks and circuit elements are discussed together with simulation result processing and their utilization for circ	-	-
XP31TSS		ZK	4
	Signal and system theory sformations - Laplace and Z-transforms, Fourier transform, cepstra, wavelet transforms. Signal parameterization - AR, MA, ARMA mo		
	classification - spectral distances, Markov models, neural nets, signal parameterization - arx, way, arxiva mod		in. Olghai
XP31ZBS	Biological Signal Processing	ZK	4
	ith the processing of biosignals and advanced methods of processing resulting from current research in solving common projects in c		-
	al faculties, institutes of the ASCR, foreign universities). The subject concept allows us to respond flexibly to new directions and know		
XP32AKR	Applied Cryptography	ZK	4
Introduction to C	yptography.Mathematics Foundations of Cryptography.Related Problems of Number Theory.Public Key Parameters. Pseudorandom	Bits and Sequence	s. Stream
Ciphers. Block Ciph	ers.Public Key Enciphering. Hash Functions and Data Integrity. Entity Identification and Autentication.Digital Signatures. Key Manageme	ent Protocols.Key M	lanagement
	Techniques.Effective Implementations of Supporting Algorithms. Patent Pendings and Standards.		
XP32DKS	Sizing of communications networks	ZK	4
XP32DZS	Digital Signal Procesing in Telecommunications	ZK	4
XP32MOS	Mobile Networks	ZK	4
The course familiar	zes students with evolution and standardization of mobile networks and mainly provides a detailed description of network architectures	and discusses bas	ic principles
	used in mobile networks. The course as well depicts trends and the future development of mobile networks.		
XP32NMR	Numerical Methodes of Electromagnetic Tasks Solution	ZK	4
-	vith analysis of electromagnetic field distribution through both air and other environment. It offers a view deep inside to popular numerica		
Method, Boundary	Element Method and Finite Element Method. Handling the software is obvious nowadays; nevertheless, the mayor attention is paid to ur	•	athematical
	background of the used apparatus and understanding the physical principles of the solved tasks in symbiosis to particular used s		
XP32ODV	Intellectual property protection	ZK	4
	Ices the basic issues of intellectual property (IP) protection. Students learn why it is necessary to protect research results, how they depend with IP protection at the interpretional level. The source deals with lice		
	signs, how to obtain a trademark and also how to succeed with IP protection at the international level. The course also deals with lice ion methods as part of a standard way of commercializing original IP. Emphasis is put on quality methodology for database searching		
	earch and development projects. Motto: Those who do not protect the results of their research work can never dream of being on par		000000101
XP32OSY	Optical Systems	ZK	4
	on systems are being more extensively used in a practice, particularly in a telecommunication networks. Tremendous transmission ca		-
	wo key factors making it attractive. The objective of this subject is to provide students with a more rigorous theoretical background of fi		
	function.		
XP32RTS	Telecommunications Systems Management	ZK	4
Telecommunication	is Systems Management is a discipline which deals problems of interactions of technical and business aspects of management of tele	ecommunication ne	etworks and
	services provided.		
XP32TPZ	Teletraffic Theory	ZK	4
	rse is to present an overlook of dimensioning of telecommunications networks on the basis of results of the queuing theory (QT). Intro-		
	networks both from the point of view of grade of service GoS and quality of service QoS as well. Results of the QT are applied on diffe		
telecommunication	networks deploying and operating at time being. Theoretical knowledge about models of service systems can be utilized for dimensioni	ng of different servi	ice systems
	in real life - not only in the telecommunication.	71/	4
XP33BID	Bionics ogy + technology = bionics. Bionics Classification. An overview of biological principles and its technological parallels: reproduction, gi	ZK ZK	4
	ion, excrementation, thermoregulation, vision, hearing, taste, smell, sense of touch, speech, memory. Neural and neuronal systems.		-
-	ics. Information transfer in biotechnological systems. Biosystems modelling, Biosystems diagnostics. Orientation and navigation. Func		
	s, bioprotheses. Artificial organs and its control. Intelligent interaction and communication in biotechnical systems. Intelligent input and		
	for creative thinking.		
XP33CHM	Chapters in higher mathematics	ZK	4
	ts of several deeper results in a few mathematical disciplines. The idea is to help a student to read, with a certain comfort, the monog	ہ raphs in given line:	s of applied
mathematics. The	contents of the course are fundamental results (principles) of nowadays mathematics. More specifically, the course concerns the Sto	ne representation t	heorem for
Boolean algebras	(as applied in mathematical logics and probability theory), the Banach fixed-point theorem for complete metric spaces (as applied in	numerical mathem	natics), the
	on compact spaces (as applied in measure theory), the Riesz representation theorem for linear forms in a Hilbert space (as applied in the space) and the space is a space of the space of t		277
Brower theorem fo	r balls in Rn (as applied in linear algebra the Perron theorem), the elements of category theory for a practical man, etc. The asset ma	y be a certain enco	ouragement
	in a students research.		
XP33DID	Distributed Artificial Intelligence		. 4
	2023/24 the course runs for the last time. In future years, it will not be opened anymore. Distributed problem solving. Multiagent planni		
	Communication strategies, message passing. Various AI approaches, case studies. Types of agent behavior. Negotiation. Organizatio board systems. Client-server systems. Peer-to-peer systems. Implementation aspects of distributed knowledge-based systems. Learr	-	-
	leta-agent. Agents acquitance models, social knowledge, reflectivity in MAS. Coalition formation, team work. Formal models of agent		ysterns.
XP33ECD	Evolutionary Computing	ZK	4
	utionary computing in contrast to classical computing techniques, Genetic algorithms (GA) for optimisation. The Simple Genetic Algo		
	regative phenomena. GA and constrained tasks, special representations. Genetic Programming (GP), relationship to GA. GP typical tas		
	GA and GP applications. Special methods for improving GA performance.		5
XP33FLO	Fuzzy Logic	ZK	4
	Basics of fuzzy sets and fuzzy logic. Measures on collections of fuzzy sets. Principles of fuzzy control.	I	
XP33GAD	Geometrical Algebras	ZK	4
Algebraic structur	es used in geometry: Groups and linear spaces, ordered groups and fields, othogonal groups, Clifford algebras, etc. Discussion of po	tentital application	s in image
	processing.		
XP33ICT	Modern ICT for Industry and Smart Grids	ZK	4

XP33IMD	Informatics in Clinical Medicine	ZK	4
Medical data pr	ocessed by automatized systems. Specific problems of medical informatics. Computer supported documentation in doctor's work. Ho	spital information	systems.
	nformation system projects from the point of view of medicine. Introduced hospital information systems. Diagnosis theory, computer aided	-	-
	eir application in medicine. Database systems, biomedical databases. Computers in clinical biochemical laboratories. Computers in mo		sive care.
	Computer aided therapy planning. Standardiyation and communication between information systems in medicine. Specialized computer		
XP33KHD	Introduction to Game Theory	ZK	4
	brief survey on classical and contemporary theory of games. It includes the elements of the utility theory, decision-making theory, solution	•	cooperative
-	mes (balance and minimax) and the basic concepts of coalition games, especially its solutions (core and value) and relation to the m		
XP33KSI	Sotware Engineering - Selected chapters	ZK	4
XP33LPD	Logic and Logic Programming	ZK	4
-	s and its relation to technical disciplines. Formal system and its essential properties - validity, completeness. Syntax and semantics, b		-
	der language and its interpretation. Theory and its model, Herbrand's model. Herbrand's theorem, Gödel's completeness theorem an		
	ility and probability. Logic programming and Prolog language. Metodology of logic programming. Introduction of extralogical features an	-	New trends
	straint logic programming (CLP)and inductive logic programming (ILP). Some practical examples of complex logic programs and pract		
XP33MAD	Mathematical Analysis of Dempster-Shafer Theory	ZK	2
	neory (DST) presents a model for uncertainty quantification and processing in knowledge-based systems. The belief function, which is the		
-	duced and investigated in this theory, can be taken as a generalization of probability measure. The model of DST will be presented. Ge		-
	ed as well as to the case when only a fragment of the outcoming knowledge demanded by the classical DST is at our disposal. Belief i ean values will be also briefly mentioned. The intended goal of the course is to offer a solid basis for the practical and critical application of the second s	-	
	application oriented toward decision making under uncertainty.		
XP33MKD	Mathematics for Cybernetics - Selected Topics	ZK	4
	dern mathematics. Ordering, lattices, Boolean algebras, representations. Topological spaces. Metric spaces, completeness, fixed-poin		
	ces, constructions with linear spaces. Systems of linear equations, spectral theory. Matrix calculus, matrix inequalities. Least squares and		
indotalo. Elitotal opu	Tensor product. Elementary theory of Hilbert spaces. Introduction to category theory.	lonigular value dec	ompooldon.
XP33MMD	Analysis and visualization methods for medical data	Z,ZK	4
XP33MOL	Modal Logics for Distributed Systems	ZK	4
	ledge in distributed environment and "muddy children puzzle". Introduction of modal operators and their semantics based on possible		
	vledge. Correspondence between axioms and properties of possibility relation in the model. Knowledge in MAS. Common knowledge		
XP33MZT	Management of Knowledge and Information Technologies	ZK	4
	ch to the design of knowledge-based and information systems. Configuration of information systems. User interfaces, especially cogniti		-
	ysis of the problem solving processes based on description of the workflows. Simplification of the processes by the support of IT (Proces		-
	dels and tools for modelling. IT applications in enterpreneurship as well as in the project management. Business Intelligence. Value ch	0 0	
	manufacturers and customers. E-commerce. Role of knowledge in globalization of businesses. Virtual enterprises and organization	-	ouppiioio,
XP33NUM	Numerical Analysis	Z,ZK	4
	ces to basic numerical methods of interpolation and approximation of functions, numerical differentiation and integration, solution of tr	,	-
	al equations and systems of linear equations. Emphasis is put on estimation of errors, practical skills with the methods and demonstra	•	
	Maple and computer graphics.		0
XP33OSD	Real Time Operating Systems	ZK	4
	for operating systems, system and user modes, memory protection, operating systems (OS) classification and types, special requirem		
	m processes and application programs, kernel and its services, system calls. Concurrent processes and threads, inter-process communication		
Client-server archit	ectures. Process scheduling, scheduling in single- and multiprocessor systems. Processor management, process creation and termination	n, parent-child sync	hronization.
File management	file system functions, disk allocation strategies, device drivers. Inter-process communication (IPC), IPC based on shared memory an	d pipes. Resource	allocation,
time errors, errors o	letection, critical section, deadlocks. Synchronization tools: semaphores, monitors, looks, deadlock detection and prevention. OS kernel co	omponents for inter	networking,
	TCP/IP.		
XP33PAD	Probabilistic Algorithms	ZK	2
A survey of basic	notions of statistic and probability. An analysis of the notion of non-deterministic algorithm. Effectivity criteria for non-deterministic algorithm.	orithms. Theoretica	l apparatus
of probabilistic algo	orithms. The probability of failure. Loss function. The expected risk. Probabilistic analysis of deterministic algorithms. Criteria for applicat	tion of probabilistic	algorithms.
	Probabilistic algorithms and their practical importance.		
XP33PAM	Industrial application of multi-agent systems	ZK	4
XP33PMD	Probabilistic Models of Uncertainty in AI	ZK	4
	bbability. Foundations of graph theory. Triangulated graphs and their characteristics. Information as a measure of dependence. Conditiona		
Lemma, Block Ind	ependence Lemma). Knowledge representation by multidimensional distributions. Qualitative knowledge represented by dependence		cal Markov
	models and Bayesain networks. Decomposable models for computation in Graphical Markov models. Examples of application		
XP33POS	Fundamentals of Possibilistic Measures	ZK	4
	res present a mathematical tool for uncertainty (randomness) quantification and processing applying the notions and apparatus of the	-	-
	abilistic measures in the sense that they are based on the maxitivity priciple in spite to the additivity principle applied in the standard m		
	that the operation of maximum (supremum) can be defined also in certain non-numerical structures, possibilistic measures taking the		-
sets and, in part	icular, in complete lattices, are worth being investigated. The lecture will not suppose any preliminary knowledge in fuzzy set theory, la	attice theory or the	standard
	measure and probability theory.	71/	4
XP33PPD	Practical Data Mining Problems	ZK suitable data minir	4
	sed on solving of practical data mining problems. Lectures deal with data transformation, pre-processing and verification, selection of a process evaluation and results interpretation. The attention is paid to solving of an individual data mining problem based on real-life d		
	process evaluation and results interpretation. The attention is paid to solving or an individual data mining problem based on real-life d		
XP33PUD	Artificial Intelligence	ZK	4
	Al finicial intelligence communication with a computer, phases of processing, syntactic analysis, grammars including DCG. Understanding a sentence, sem		
	rganization. Knowledge engineering and knowledge elicitation. Machine learning -review of methods and tools. PAC learning. Learning i		-
	and scheduling.		
XP33RCV	Reading group in Pattern Recognition and Computer Vision	ZK	4
	with fundamental results in computer vision and pattern recognition. It targets the detailed study of principles which substantially influ		
	performed in the form of a reading group. Each time, a person in charge presents a paper and the reading group participants join in v	-	
1	discussion about the paper.	•	

XP33RG2	Reading Group	ZK	4
	oup type course, where the student should get acquainted with important scientific articles in their field through critical analysis and n will each present one or more articles.	1	n. Students
XP33RMD	Control of Mobile Robots	ZK	4
	Mobile Robots. Known Control Architectures. Top-Down and Bottom-Up Approaches. Overview and Comparison. Distributed Autonom		
	hbourhood Mapping. Needed Sensors. Ground of Ethology. Imprinting. Taxe. Stimuli, Receptors. Multiple Motivated Behaviour. Reacti		
-	uunity Robots Structure. Task- or Behaviour-Oriented Robots. Ways and Realisation of Robots Co-operation, Motivation, Observation,	-	
and Imitation. Mul	ti-Agent reinforcement Learning. Q-Learning. Action Selection Mechanism, Learning Method, Exploration Strategy. Emotional Learnir	ng. Evolutionary Ap	proach to
Synt	hetic Biology. Artificial Life. Virtual World Different Approaches. Robots Competition, RoboCup, Strategy Selection, Implementation. C	pen Problems.	
XP33ROD	Pattern Recognition See https://cw.fel.cvut.cz/wiki/courses/xp33rod/start	ZK	4
XP33ROZ	Selected Topics in Pattern Recognition	ZK	4
	ic course in pattern recognition (e.g. P33ROD, 33RPZ). Selected topics: Anderson's problem, Kozince algorithm, kernel perceptron, r		-
	theorz. Deterministic learning. Unsupervised learning: Robbins algorithm and emprirical Bayesian approach. Expectation-minimization		
	sequences and directed acyclic graphs. Markov models. Combination of weak classifiers: boosting and bagging. AdaBoost	•	
XP33RSK	Robust Statistics for Cybernetics	ZK	4
	ls are basic tools of control and decision making theory. Classical statistical methods (e.g. MLE) are usually very sensitive to deviation	ns from our idealiz	ed model.
Thus many method	Is which are robust have been developed. It means that these methods are not so sensitive to small deviations from an underlying me	odel. So we briefly	explain the
parametric conc	ept of estimation and then we introduce the robust approach, some basic robust estimators of location (e.g. trimmed mean, Hampel e	estimator) and mea	asures of
	robustness (influence function, breakdown point).		
XP33RSP	Management of Software Projects	ZK	4
XP33SCD	Man-Machine Systems	ZK	4
History of man-mad	hine systems development. Human operator tasks. Manual control, supervisory control cognitive control. Typical structure of a control s	ystem. Distribution	of priorities
in control between	operator and machine. Control levels after Rasmussen. Skill based, role based and knowledge based operator behavior models. Fuz	zy models. Cogniti	ve models.
Operator psycholog	y. Mental models. Human-machine interaction. Intelligent interface. Factors influencing operator behavior. Stress. Mental load. Human	error detection. Ma	an-machine
	system reliability. Man-machine systems simulators. User-centered system design.		
XP33SDD	Discrete Event Systems	ZK	4
Introduction to disc	srete event systems. Modeling of discrete event systems, GRAFCET and it is applications with practical examples. Petri nets overview	v. Properties of Pet	ri nets and
relations to real sys	tems. Reduction methods, formal languages and algebraic description of PNs. Timed PNs and modeling in P- and T-timed PNs. Practi	cal examples and a	applications
	in CIM systems.		
XP33TPS	Foundations of the Possibilistic Measures	ZK	4
	lity measures can be sen as an alternative mathematical model for uncertainty quantification and processing, topical and intensively		
are based on the	e maxitivity principle replacing the additivity principle applied in the classical measure theory. Besides the real-valued possibilistic me	asures also non-ni	umerical
VDOOTTM	possibilistic measures taking their values in complete lattices will be introduced and analyzed.	71/	4
XP33TTM	Text mining	ZK	4
XP33UID	Artificial Intelligence	ZK	4
-	I issues. Knowledge representation: production systems, predicate logics, semantic nets, frames, and scenarios. Problem solving, sta	-	-
	f the search algorithms. Expert systems for diagnostics and planning tasks. Uncertainty processing. Hajek's algebraic theory. Creation of sition, induction from examples. Distributed expert systems with the blackboard architecture, multi-agent systems. Backgrounds of pai	-	Knowledge
XP33VID	3D Computer Vision	ZK	4
	spective geometry, perspective camera. Fundamental and essential matrices, their robust estimation, camera calibration. Correspond	I	-
-	copic vision problem, cyclopean representation, disparity, disparity gradient limit, ordering constraint, four basic formulations of the de	-	
	econstruction from stereovision, error propagation, examples. Physics of image reflection, image irradiance equation, basic reflectance		
Lambertian s	shading problem. Local shading analysis. Overview of other Shape-from-X methods. Up-to-date info at https://cw.felk.cvut.cz/doku.ph	p/courses/xp33vid/	start
XP33VTP	Computer Vision Theory and Practice	ZK	4
In the course, the	PhD students will study selected sophisticated state-of-the-art computer-vision methods that have an efficient implementation public	ally available. The	course will
focus on general m	ethods that have been successfully used in a number of applications, including large scale search in high-dimensional spaces, deep n	eural networks, an	d the graph
labelling algorithm	s. The methods selected for the course evolve based on the current progress in the field; the selection is also alternated by the stude	nts interests. The g	goal for the
	dents is to understand the method, to understand the implementation, and to be able to use the implementation as a tool to solve oth	ner problems.	
XP33ZDD	Processing of Biological Data	Z,ZK	
XP33ZPM		ZK	4
XP33ZVD	Introduction to Computer Vision	ZK	4
	The subject does not exist anymore. Its last lecture run in the academic year 2021/2022.	'	
XP34ADM	Principles and Applications of Device Models	ZK	4
Fundamentals of th	e computer-aided technological design. Device simulators Silvaco Atlas and Synopsys Quantum ATK: principles, applications. Basic ec	quations. Boundary	conditions.
	. Recombination models. Avalanche ionisation models. Mobility models. Practical exercises (individual projects) according to the tasks	of students' individ	dual theses.
XP34AIC		ZK	3
	es of the IC's. Bipolar and unipolar structures. BiCMOS structures. 3D structures. Sub-micron structures. Memory structures. Testing		chnological
	sses. Advanced semiconductor technology. IC design, design of technology. Design rules. Reliability, yield. Outlooks and limitations of		
XP34APD	Advanced Power Semiconductor Devices and ICs	ZK	4
-	nological structures. Development trends. Parameters and applications. Bipolar structures. MOS structures. BiMOS structures. PN dio	-	-
transistors. MOS an	d IGBT transistors. Thyristors (including GTO and MCT). Secondary breakdown, mechanism, safe area. Smart-power devices. High vol	tage ICs, operation	, principles,
	applications	71/	4
XP34ASD	Physics of Advanced Semiconductor Devices and Materials	ZK	4
	ctor devices and integrated circuits are based on unique energy band, carrier transport, and optical properties of semiconductor mater		
	e properties for operation of semiconductor devices. Emphasis is on quantum mechanical foundations of the properties of solids, ene atistics, semi-classical transport theory (Boltzmann transport equation), carrier scattering, electro-magneto transport effects, high fie		-
	adiative and non-radiative recombination. These principles will be studied on the experimental basis as well. Students will prepare ov	-	-
	thesis subjects and they will characterise them during their individual projects		

	TCAD Tools Applications	ZK	4
	he computer-aided technological design. Device simulators Atlas and Sentaurus: principle, applications. Basic equations. Boundary cr		
	ation models. Avalanche ionisation models. Mobility models. Hands-on exercises on SUN workstations according to the tasks of stude		
XP34CNO Theoretical and tec	Integrated Optics choological principles of IO Basic materials for IO. Light propagation in waveguide structures. Methods of waveguide structure design. P	ZK	4 Ile coupling
	ule structures. Modal spectroscopy. Fundamental physical effects and interactions for IO. Preparation of dielectric waveguides and str	-	
	s. Electro-optical modulators. Applicable measurement methods. Devices based on nonlinear effects. Semiconductor integrated opto-		-
XP34DTM	DIAGNOSTICS AND TESTING IN MICROELECTRONICS	ZK	3
XP34EHA	Renewable Energy Microsources for Electronics - Energy Harvesting	ZK	4
	with system integration applied in the design of digital and analog systems with application of system engineering, in i tis solved inter-		
	systems on a chip as well as external. The course shows new possibilities of realization and application of integrated micro-component:	-	
	ntities using mainly MEMS technology, increasing reliability with all its attributes. The course introduces modern elements - microactu uding basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoelectro		
	extends students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biomec		
,	industry etc.	, <b>,</b> ,	
XP34ETS	Electrical Transport in Semiconductors	ZK	4
	ransport in semiconductor crystals. Effective mass, mobility Boltzmann's transport equation. Scatter mechanisms, frequency. Scattering	-	-
-	on. Relaxation time approximation Carrier transport in a strong electric field, velocity saturation. Carrier transport in magnetic field. Ca	-	
structures. Quan	tum transport, density matrix, Green's and Wigner's functions. Resonance tunnelling, transport of electrons in superlattices. Single el blockade. Ballistic transport. Quantum Hall's effect. Simulation of transport effects.	ectron transport, Co	oulomb's
XP34IO	Integrated Optics	ZK	4
	in waveguide structures. Methods of waveguide structure design. Waveguide coupling elements. Gratings structures at waveguides.	I I	
	or IO. Design and preparation of dielectric and polymer waveguides and structures. Optical waveguide gratings. Passive waveguide s		
electro-optical ar	nd thermo-optical effects and their use for IO. Structures for control of optical radiation Devices based on nonlinear effects. Semicon	ductor integrated st	tructures,
optical amplifiers.	Optical components for informatics and sensors, multiplexing and optical processing. Applicable measurement methods, principles of	nanophotonics and	d integrated
	optics application.	71/	
XP34MSA	Microsystems and Microactuators	ZK	3
	with system integration applied in the design of digital and analog systems with application of system engineering, in i tis solved inter systems on a chip as well as external. The course shows new possibilities of realization and application of integrated micro-component:		
	ntities using mainly MEMS technology, increasing reliability with all its attributes. The course introduces modern elements - microactu	-	
their activities incl	uding basic applications in industry, medicine, regulation, automotive control, etc. Basic elements of nanotechnology and nanoelectro	onic structures are r	mentioned
here. The subject	extends students' expertise with the latest multidisciplinary chip elements and their wide use in information technologies, IoT, biomed	licine, aerospace, a	automotive
	industry etc.	71/	4
XP34MSY	Microsystems epts and classification of microsystems. Micro-sensors. Micro-actuators. Signal processing within the system. MEMS (micro-electrical-	ZK	
	ectrical structures). MEMOS (micro-electrical-mechanical-optical structures). Microsystem design. Microsystem modelling. Manufactu		,
(	Industrial applications. Medical applications.		
XP34MTP	Materials and Technologies for Photonic Devices and Structures	ZK	3
The students get a	Materials and Technologies for Photonic Devices and Structures cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with	technologies for the	fabrication
The students get and optical and optical	Materials and Technologies for Photonic Devices and Structures cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with pelectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will	technologies for the be introduced to ne	e fabrication ew modern
The students get and optical and optical	Materials and Technologies for Photonic Devices and Structures equainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with pelectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will t will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure	technologies for the be introduced to ne	e fabrication ew modern
The students get and of optical and opto technologies and in	Materials and Technologies for Photonic Devices and Structures equainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with belectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will t will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.	technologies for the be introduced to ne and diagnostic r	e fabrication ew modern nethods for
The students get and of optical and opto technologies and in XP34ORD	Materials and Technologies for Photonic Devices and Structures equainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with pelectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will t will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure	technologies for the be introduced to ne es and diagnostic m	e fabrication ew modern nethods for 4
The students get at of optical and opto technologies and i XP34ORD Spectrum of electro	Materials and Technologies for Photonic Devices and Structures           cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with the present technologies for deposition of the micro and nano layers deposition. Students will the shown principles of integrated optoelectronic devices and structures. It will be present to for the optical and optoelectronic properties.           Optical Radiation Detection and Detectors	be introduced to ne es and diagnostic m ZK	e fabrication ew modern nethods for 4 ct detectors,
The students get and of optical and opto technologies and in XP34ORD Spectrum of electro photomultipliers. I	Materials and Technologies for Photonic Devices and Structures           cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with a pelectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will t will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.           Optical Radiation Detection and Detectors           omagnetic radiation, radiometric and photometric units. Detection of optical radiation. Ideal detectors, internal and external photo-effect. Internal photo-effect detectors, PN junction. PIN photodiode, physical principles, properties. Avalanche photodiode, physical principles, properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optical principles.	technologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo	e fabrication ew modern nethods for 4 ct detectors, -resistors,
The students get and of optical and opto technologies and in XP34ORD Spectrum of electro photomultipliers. I physical principles,	Materials and Technologies for Photonic Devices and Structures           cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with a pelectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will t will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.           Optical Radiation Detection and Detectors           pragnetic radiation, radiometric and photometric units. Detection of optical radiation. Ideal detectors, internal and external photo-effect. Internal photo-effect detectors, PN junction. PIN photodiode, physical principles, properties. Avalanche photodiode, physical principles, properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optical properties, noise. Solar cells, properties. Measurement methods, applications.	technologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo cal receivers, design	e fabrication ew modern nethods for 4 et detectors, -resistors, n principles,
The students get and of optical and option technologies and in XP34ORD Spectrum of electron photomultipliers. I physical principles, XP34PED	Materials and Technologies for Photonic Devices and Structures           cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with the peteronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will the will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.           Optical Radiation Detection and Detectors           properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optical properties. Neasurement methods, applications.           Advanced Electronic Devices	echnologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo cal receivers, design ZK	e fabrication ew modern nethods for 4 et detectors, -resistors, n principles, 4
The students get and of optical and option technologies and it XP34ORD Spectrum of electron photomultipliers. I physical principles, XP34PED Energy band engin	Materials and Technologies for Photonic Devices and Structures         cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with the persent technologies for deposition of the micro and nano layers deposition. Students will to will be shown principles of integrated optoelectronic devices and structures. It will be present technologies and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.         Optical Radiation Detection and Detectors         pragnetic radiation, radiometric and photometric units. Detection of optical radiation. Ideal detectors, internal and external photo-effect. If internal photo-effect detectors, PN junction. PIN photodiode, physical principles, properties. Avalanche photodiode, physical principles properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optical Properties. Neasurement methods, applications.         Advanced Electronic Devices         eering. Quantum well, wire, point. 2D electron gas based devices (HEMT, MOD FET). Devices based on resonance double-barrier turner	echnologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo cal receivers, design ZK elling. 3D structure:	e fabrication ew modern nethods for 4 et detectors, -resistors, n principles, 4 s. Quantum
The students get and of optical and option technologies and it XP34ORD Spectrum of electron photomultipliers. I physical principles, XP34PED Energy band engin	Materials and Technologies for Photonic Devices and Structures           cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with the peteronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will the will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.           Optical Radiation Detection and Detectors           properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optical properties. Neasurement methods, applications.           Advanced Electronic Devices	echnologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo cal receivers, design ZK elling. 3D structure:	e fabrication ew modern nethods for 4 et detectors, -resistors, n principles, 4 s. Quantum
The students get and of optical and option technologies and it XP34ORD Spectrum of electron photomultipliers. I physical principles, XP34PED Energy band engin	Materials and Technologies for Photonic Devices and Structures         cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with the pelectronic devices and structures. It will be present technologies for deposition of the micro and nano layers deposition. Students will the will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.         Optical Radiation Detection and Detectors         pragnetic radiation, radiometric and photometric units. Detection of optical radiation. Ideal detectors, internal and external photo-effect. If internal photo-effect detectors, PN junction. PIN photodiode, physical principles, properties. Avalanche photodiode, physical principles properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optical Radvanced Electronic Devices         eering. Quantum well, wire, point. 2D electron gas based devices (HEMT, MOD FET). Devices based on resonance double-barrier turn is (memories, generators, multipliers). Heterogeneous structures. Microwave devices, HBT, Gunn diodes. Microwave device application	echnologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo cal receivers, design ZK elling. 3D structure:	e fabrication ew modern nethods for 4 et detectors, -resistors, n principles, 4 s. Quantum
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The students get ar of optical and optic technologies and it XP34ORD Spectrum of electro photomultipliers. I physical principles, XP34PED Energy band engin device application XP34PIC The aim of the co Students will learn synthesis. They will XP34RSD The students get ar Complex lasers, Radiating characte for optical commun Students will be XP34SDS The aim of this cou Completion of this structures and elem structures. The students will be further the students will structure will be further	Materials and Technologies for Photonic Devices and Structures           cquainted with optical materials such as semiconductors, optical glass, crystals, and polymers. The students get acquainted also with i lelectronic devices and structures. It will be present technologies for deposition of the more and nano layers deposition. Students will will be shown principles of integrated optoelectronic devices and structures. It will be also shown the design of the photonic structure the measurement of the optical and optoelectronic properties.           Optical Radiation Detection and Detectors           progenitic radiation, radiometric and photometric units. Detection of optical radiation. Ideal detectors, internal and external photo-effect. If internal photo-effect detectors, PN junction. PIN photodiode, physical principles, properties. Avalanche photodiode, physical principles properties. Thermal energy conversion detectors. Bolometers, thermocouples. Pyroelectric detectors. Some other detector types. Optic properties, noise. Solar cells, properties. Measurement methods, applications.           Advanced Electronic Devices           eering. Quantum well, wire, point. 2D electron gas based devices (HEMT, MOD FET). Devices based on resonance double-barrier turn is (memories, generators, multipliers). Heterogeneous structures. Microwave devices, HBT, Gunn diodes. Microwave device applicati with internal optical coupling. Cryotronic devices. Recording media. IC development trends. Programmable IC Design           urse is to acquaint students with advanced methods of design, synthesis and verification of programmable systems and systems with the basic building elements, architecture and design procedures used to implement complex integrated systems, methods of describ programmable integrated system whose application would be linked to the to	technologies for the be introduced to ne es and diagnostic m ZK External photo-effec s, properties. Photo cal receivers, design ZK elling. 3D structure: ons. Heterogeneou ZK high integration or ing them, and proce to implement a com ZK de resonators, DFB I line width and line asers and non-cohe rement methods, ap methods and techn ZK and optoelectronic in the field of semic d electronic and opto semiconductor tech whose knowledge	4 abrication aw modern nethods for 4 at detectors, -resistors, n principles, 4 s. Quantum s devices 4 a the chip. edures their prehensive 4 structures. stability. rent diodes pplications. nologies. 3 s structures. sconductor toelectronic nology. The is essential

	Semiconductor Radiation Sources	ZK	4
	ision in semiconductors. Homogeneous and heterogeneous junction, double heterostructure lasers and LEDs. Non-coherent LED's, s		
-	fields in semiconductor lasers. Types of lasers and their properties. Waveguide lasers, DFB and BFR structures. SQW and MQW las	-	
	ectral line width and line stability. Radiating characteristic, coupling of the radiation source to a waveguide. Bi-stable and memory element		miconductor
	ction, waveguide amplifiers and wave convertors. Lasers and non-coherent diodes for optical communications. Measurement method		
XP34STV	VLSI Structures and Technologies	Contructures V/LSL to	
	res of the IC's. Bipolar and unipolar structures. BiCMOS structures. 3D structures. Sub-micron structures. Memory structures. Testing sses. Advanced semiconductor technology. IC design, design of technology. Design rules. Reliability, yield. Outlooks and limitations o		chnological
XP34TOS	Technology of Optical Devices	ZK	4
	pelectronic materials and structures. Diagnostic and testing methods. Design and preparation of double heterostructures. Preparation	1	1
	ED's, lasers, photo-resistors. Preparation of QW structures. Design of dielectric waveguide structures. Preparation of dielectric waveg		-
	al radiation distributing structures. Design and preparation of optical radiation control structures. Measurement methods. Testing method		
	structures. Examples of dielectric structures.	·	
XP35CCM	Cooperative Control of Multi-agent systems	ZK	4
Cooperative distri	buted control is a relatively novel and rapidly developing area of control theory and engineering. Instead of centralized, large systems	are considered co	mposed of
autonomous subs	ystems, with local computation and communication capabilities. The broad aim is solving classical problems e.g. stabilization, tracking	g, estimation and o	ptimization,
	ation and team cooperation robust to changes in communication topology and disturbance. Relevant topics of classical control theory		
-	thematics needed for the course is also provided. The potential use of multi-agent cooperation in challenging applications involving e		
	ssed. Theory: Review of qualitative properties of dynamical systems, Motivation for distributed multi-agent systems, Elements of algel		
estimation and con	trol, Consensus and synchronization of linear/nonlinear, continuous/discrete-time systems, Cooperative stability, optimality and robust multi-player game theory, Interactions with environment.	iness, Distributed (	pumization.
XP35CCM1	Cooperative control of multi-agent systems	ZK	4
	buted control is a relatively novel and rapidly developing area of control theory and engineering. Instead of centralized, large systems	1	-
	ystems, with local computation and communication capabilities. The broad aim is solving classical problems e.g. stabilization, tracking		-
	ation and team cooperation robust to changes in communication topology and disturbance. Relevant topics of classical control theory	-	-
of background ma	thematics needed for the course is also provided. The potential use of multi-agent cooperation in challenging applications involving e	nvironment to be c	ontrolled or
observed is discus	ssed. Theory: Review of qualitative properties of dynamical systems, Motivation for distributed multi-agent systems, Elements of algel	braic graph theory,	Distributed
estimation and con	trol, Consensus and synchronization of linear/nonlinear, continuous/discrete-time systems, Cooperative stability, optimality and robust	tness, Distributed o	ptimization:
	multi-player game theory, Interactions with environment.		
XP35ESF1	Estimation and filtering	ZK	4
	riment design, structure selection and parameter estimation. Bayesian approach to uncertainty description. Posterior probability densit MAP. Robust numerical implementation of least squares estimation for Gaussian distribution. Parameter estimation and state filtering		
	filter for white noise. Properties of Kalman filter. Kalman filter for colored/correlated noise.	Dayoolan approc	
XP35FMC1	Fuzzy modeling and control	ZK	4
	es, the control-related fundamentals of fuzzy logic, fuzzy sets, fuzzy operations and relations are covered. Then the methodology of a	1	ning and its
	g a basis of fuzzy rules is explained while deriving various types of inference mechanisms. Fuzzy system is interpreted as a nonlinea		-
possibilities for ap	proximation are discussed. These are then exploited for modeling fuzzy systems from measured data using gradient and least-squar	es techniques. We	then cover
	ds of fuzzy clustering analysis using three most popular algorithms: fuzzy c-means, Gustafson-Kessel and Gath-Geva algorithms. We		
-	ynthesis of Takagi-Sugeno fuzzy systems, that is, systems based on a model that was obtained either by linearizing along a trajector	-	
	en compared. Careful discussion of various Lyapunov functions is included - quadratic, piecewise quadratic, fuzzy sharing the same se	egmentation of the	state space
	odels. The problems are formulated as convex optimization invoking the frameworks of linear matrix inequalities (LMI) and sums of so		
	methods for fuzzy adaptive regulators, both direct (backstepping, fuzzy sliding mode control) and indirect (Fuzzy Model Reference Ada	,	
chew bable design	methods for fuzzy adaptive regulators, both direct (backstepping, fuzzy sliding mode control) and indirect (Fuzzy Model Reference Ada are finally applied for control using neural networks.	,	
_	are finally applied for control using neural networks.	ptive Control). Simi	
XP35FMD		ptive Control). Simi	lar methods
XP35FMD The goal of the sub	are finally applied for control using neural networks. Fuzzy Modelling and Control	ptive Control). Simi	lar methods 4 his includes
XP35FMD The goal of the sub	are finally applied for control using neural networks. Fuzzy Modelling and Control ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and	ptive Control). Simi	lar methods 4 his includes
XP35FMD The goal of the sub	are finally applied for control using neural networks. Fuzzy Modelling and Control ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems by	ptive Control). Simi	lar methods 4 his includes
XP35FMD The goal of the sub especially analy XP35FSC	are finally applied for control using neural networks.  Fuzzy Modelling and Control  ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems b functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and	Pitive Control). Simi ZK neural networks. T y approximation of ZK	llar methods 4 'his includes unknown 4
XP35FMD The goal of the sub especially analy: XP35FSC The main aim of	are finally applied for control using neural networks.  Fuzzy Modelling and Control  ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems b functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.	ptive Control). Simi	lar methods 4 his includes unknown 4 ust control
XP35FMD The goal of the sub especially analy XP35FSC The main aim of XP35FSC1	are finally applied for control using neural networks.  Fuzzy Modelling and Control  ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems b functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.  Flexible structures control	Pitve Control). Simi ZK neural networks. T y approximation of ZK actuators. The rob	lar methods 4 his includes unknown 4 ust control 4
XP35FMD The goal of the sub especially analy XP35FSC The main aim of XP35FSC1	are finally applied for control using neural networks.  Fuzzy Modelling and Control  ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems b functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.  Flexible structures control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes structures in order to optimization of placement of sensors and this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.	Pitve Control). Simi ZK neural networks. T y approximation of ZK actuators. The rob	lar methods 4 his includes unknown 4 ust control 4
XP35FMD The goal of the sub especially analy XP35FSC The main aim of XP35FSC1 The main aim of	are finally applied for control using neural networks.  Fuzzy Modelling and Control ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems by functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.  Flexible structures in order to optimization of placement of sensors and design of space modes will be follow.	ptive Control). Simi ZK neural networks. T y approximation of ZK actuators. The rob ZK actuators. The rob	lar methods 4 his includes unknown 4 ust control 4 ust control
XP35FMD The goal of the sub especially analy XP35FSC The main aim of XP35FSC1 The main aim of XP35LMI	are finally applied for control using neural networks.  Fuzzy Modelling and Control ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems b functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.  Flexible structures in order to optimization of placement of sensors and design of space modes will be follow.  Linear Matrix Inequalities	Pitve Control). Simi ZK neural networks. T y approximation of ZK actuators. The rob ZK actuators. The rob	lar methods 4 his includes unknown 4 ust control 4 ust control 4
XP35FMD The goal of the sub especially analy XP35FSC The main aim of XP35FSC1 The main aim of XP35LMI Semidefinite prog	are finally applied for control using neural networks.  Fuzzy Modelling and Control ject is to introduce the up-to-date trends and results in the area of modelling and control of nonlinear systems based on fuzzy logic and sis and synthesis of Takagi-Sugeno fuzzy systems, utilization of fuzzy systems and neural networks in control of nonlinear systems b functions appearing in the description of the system, and design of adaptive fuzzy systems both direct and indirect.  Flexible Structure Control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.  Flexible structures control this course is introduction to methods of modeling flexible mechanics structures in order to optimization of placement of sensors and design of space modes will be follow.  Linear Matrix Inequalities ramming or optimization over linear matrix inequalities (LMIs) is an extension of linear programming to the cone of positive semidefini	Pitve Control). Simi ZK neural networks. T y approximation of ZK actuators. The rob ZK actuators. The rob	lar methods 4 his includes unknown 4 ust control 4
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as well and their relation to detectability and stabilizability investigated. Finally, elements of nonlinear output regulation as well as of nonlinear robust and adaptive design will be presented. Exercises will be, in particular, based on MATLAB and SIMULINK use.

	presented. Exercises will be, in particular, based on MATLAB and SIMULINK use.		
XP35NES1	Nonlinear systems	ZK	4
The goal of this co	urse is to help student develop a deeper and broader perspective on theory and applications of nonlinear systems. At the hearth of the	ne course will be th	e so-called
•	tric approach, which can be used for controllability and observability analysis of nonlinear systems, characterization of various types of		
-	isks. Great attention is paid to analysis of the structure of nonlinear systems from the perspective of control design. It follows from the	-	
	state transformations of the nonlinear model into a simpler form that is usable for control design. Differential-geometric conditions for exis		
	course. Concepts of nonlinear controllability and observability are introduced in this course and their relation to stabilization and recore for linear systems. Some additional topics such nonsmooth stabilization and discontinuous stabilization will be covered. Examples of		
It is not as clear as	in underactuated robotic walking, nonholonomic systems and optimization of biosystems will be given.	use of the present	
XP35OFD	Estimation and Filtering	ZK	4
	riment design, structure selection and parameter estimation. Bayesian approach to uncertainty description. Posterior probability densit		-
	MAP. Robust numerical implementation of least squares estimation for Gaussian distribution. Parameter estimation and state filtering		
, ,	filter for white noise. Properties of Kalman filter. Kalman filter for colored/correlated noise.	, ,,	
XP35ORC1	Optimal and robust control	ZK	4
	ed course about modern control design methods that formulate the design as a mathematical optimization. Besides teaching practica	l design skills, the	course will
also help develop	deeper understanding of fundamental concepts as well as build awareness of the latest results. Thanks to its background in mathema	tical optimization,	the benefits
of the course car	n certainly be seen beyond the borders of automatic control domain. The course can be viewed as an extension of the equal-named c	ourse in the maste	r program
	lowever, numerous topics are new and those few topics that already appeared in the master version will be discussed at a significantly		
-	st to give practical tool but also to go through the proofs, discuss various interpretations, and survey the results from the latest literature.		-
-	urse is to acquire advanced competences (knowledge and skills) in the area of computational design of control systems (or rather con		
	ely assume availability of a mathematical model of the system to be controlled (hence model-based control design). We will consider dyn time, linear and nonlinear, single and multiple inputs and outputs. Since all the design methods introduced in this course formulate the o	-	
	ences will come from the areas of optimization, both finite-dimensional (linear, quadratic, nonlinear and semidefinite programming) and		•
	of variations, operator theory, differential games).		
XP35RRD	Robust Control	ZK	4
	Advanced course on selected topics in robust control.		
XP36ASP	Architecture of Symbolic Computers	ZK	4
	bns and abstract programs, lambda calculus, formal basis for abstract programming, self-interpretation, SECD abstract machine, memory		
	plementations, predicate logic and its inference engine, Prolog inference engine and dynamic algebras, Warren abstract machine, optimis	-	
	parallel inference engines.		
XP36DRO	Diagnostics and Reconfiguration of Programmable Circuits	ZK	4
The subject	is aimed to help PhD students to understand better methods of reliability and availability improvement of SOC and NOC circuits built	on FPGAs and AS	SICs.
XP36DSV	Distributed Systems	ZK	4
Communication m	nechanisms - message exchange, procedural communication (RPC, ORB), distributed shared memory. Process algebras - CSP, CCS	, and pi-calculus, c	ooperating
automata, Petri r	nets. Distributed execution, global state, causality, logical time. Algorithms of: exclusive access, leader election, deadlock detection/pre	evention, termination	on. Faults,
	resiliency, qourum algorithms, replication. Mobility, search in distributed systems - DHT.		
XP36DSY	Distributed Systems	ZK	4
	nechanisms - message exchange, procedural communication (RPC, ORB), distributed shared memory. Process algebras - CSP, CCS,		
automata, Petri r	nets. Distributed execution, global state, causality, logical time. Algorithms of: exclusive access, leader election, deadlock detection/pre resiliency, qourum algorithms, replication. Mobility, search in distributed systems - DHT.	evention, termination	on. Faults,
XP36HS	Hypermedia Systems and Internet Computing	ZK	4
	ms, basic models. Intelligent searching, adaptive navigation, personalization of access to web applications. Web intelligence, semantic		-
Typermedia syste	topics and the ways out. Internet computing. Modern technologies for web applications design.	o web. Web engine	cring, main
XP36JAI	Languages for Artificial Intelligence	ZK	4
	rs a deep insight into the two programming languages that are most frequently used in the domain of artificial intelligence (Lisp, Prolo		
	paradigms used to build typical AI algorithms and gives some basics concerning the implementation of the two languages.		Ū
XP36KP	Communication Protocols	ZK	4
Communication pr	otocol principles, SDL language, protocol architecture: ISO OSI, error control, data-link layer protocols: X.25, higher layer protocols (T	CP, TP4), commun	icating finite
state machines,	implementation tools (FSM language ESTELLE, regular grammars), use of Petri nets, specification language LOTOS, protocol transfe	ormation, design, s	synthesis,
	validation and verification of protocols.		
XP36LSM	Logical Simulation	ZK	4
	n to simulation: fundamental ideas and principles of simulation systems, synchronous and asynchronous simulation. Simulation system \		
of digital circuits:	data types, entities, architectures, sequential environment (processes, functions, procedures), signals and their attributes, resolution f		nvironment
VEGANION	(data-flow description, blocks, structural description), configuration of structural models. Students who completed course 36SIM can		
XP36NSN	Neural Networks and Neurocomputers	ZK	4
•	ound, paradigm classification and artificial neural networks learning methods. Student is supposed to propose and test the application		
101 a partial 15508 (	concerning his dissertation theme during the semester. Procedure and results would be concluded in the preliminary publication form a scientific forum.	acorgined to be ple	Semable UI
XP36PAS	Algebraic Specifications Prototyping	ZK	4
	fication, syntax and semantics of a specification language (OBJ3), structured specifications, generic specifications, implementation of		
	prolog, translation into Lisp, term rewriting systems, abstract rewriting machine, prototyping of a specification, prototyping in OBJ3, con-		
	(C++).		0.00
XP36POA	Advanced Parallel Algorithms	ZK	4
	rsis of time-, and cost-efficient PRAM algorithms and parallel algorithms for distributed memory machines. The collection of algorithms		
	ithms, distributed list ranking, Cole's MergeSort, optimal mesh sort, connected components, tree contraction and tree evaluation, patt		-
XP36PSV	Parallel Systems and Algorithms	ZK	4
Complexity mea	asures and scalability of parallel algorithms. Parallel computer architectures, models, PRAM, APRAM. Direct and indirect interconnect	ion networks, emb	eddings,
	nunication algorithms - routing, switching techniques, deadlock problem, permutation routing, collective communication operations. Fu	•	•
- reduction, prefix c	computation, Euler tour technique. Parallel sorting. Parallel linear algebra algorithms. Parallel combinatorial search. Parallel complexity th	eory Graduates of	engineering
	studies in specialization Computer Science and Informatics FEE CTU cannot register.		

		71/	
XP36RSY	Reconfigurable Systems	ZK	4
Systems that have	reconfigurability as a part of normal function. Technology of reconfiguration., partially reconfigurable devices. Reconfiguration control a	nd management. c	ollaboration
		<b>.</b> .	
with operating syste	ems, software support. Design and verification of reconfigurable systems, algorithms, EDA tools. Reconfiguration in System on Chip (	Soc). Codesign iss	ues in Soc.
	Seminars, experiments with reconfigurable devices, case study, literature research.		
VD266ED	Comingra on Architectures of Decellel Computers	71/	4
XP36SEP	Seminars on Architectures of Parallel Computers	ZK	4
Overview of archit	tectures of high-performance computers and trends in technologies. Memory coherence and sequential consistency models. Shared-	memory architectu	res: buses
and switches, bus-	based cache coherence protocols and synchronization mechanisms. Virtual shared memory architectures: distributed cache-coherer	nce protocols. Svnc	hronization
,			
	mechanisms - barriers. Clusters: fast communication networks and protocols.		
XP36STR	Stringology	ZK	4
	ngs and sequences. General, ordered alphabet. Generalized and weighted strings. Finite and infinite alphabet. Searching in text, dicti	I naries and langua	des Exact
-		-	-
and approximate ma	atching. Forward and backward matching. Searching in compressed text. Searching in more-dimensional text. Searching for longest comr	non factors and sub	sequences.
S	Searching for regularities in text. Construction of covering of text. Representation of text, prefix, suffix and factor automata, suffix trees	and arrays.	
		71/	4
XP36VAP	Advaced Computer Architecture	ZK	4
Instruction level pa	arallelism (pipelined, superpipelined and superscalar systems). Basic limitations to parallelism (structural, data and control hazards). I	nstruction fetch and	d execution
methods (in order o	out of order). Register data flow, software and hardware solutions, interlocking, scoreboard, control stack. Memory reuse, register renam	ning Modern RISC	nrocessors
		•	
	, performace evaluation, HPCC, supercomputers. Shared memory multiprocessors (bus, switch, switched memory). Interconnection s		
mechanisms for mu	ultiprocessor systems. MIMD systems UMA, NUMA, COMA. Distributed memory multiprocessors (crossbar switch). Data flow systems	s, multithreading. A	ccelerators,
	special architectures.		
		71/	
XP36VAV		ZK	4
XP36VPD	Selected Parts of Data Mining	ZK	4
		_··	
Data mining aims a	at revealing non-trivial, hidden and ultimately applicable knowledge in large data. This course focuses on two key data mining issues: da	ta size and their he	terogeneity.
When dealing with	I large data, it is important to resolve both the technical issues such as distributed computing or hashing and general algorithmic com	plexity. In this part,	the course
-	nainly by case studies on web and social network mining. The second part will discuss approaches that merge heterogeneous prior kr		
		-	
Bioinformatics	will make the main application field here. It is assumed that students have completed the master course on Machine Learning and Da	ata Analysis (A4M3	33AD).
XP37AEA	Applied Electroacoustics	ZK	4
-			-
	uations in acoustics, modeling of miniature acoustic elements in thermoviscous fluid, equivalent circuits based approximation, review		
transduction, acou	istic transmitters and receivers, waveguides for transducers, membranes and plates in transducers, modeling of coupling between me	echanical and acou	stical parts
	in transducers, electrostatic microphones and their models, MEMS microphones.		
XP37AEM	Acoustic and Electroacoustic Measurements	Z,ZK	4
Measurement of ad	coustic pressure, measuring microphones. Measurement of acoustic impedance. Foundamental audiometric measurements, artificial	ear. Measurement	of acoustic
-	calibration of measuring microphones. Method of reciprocity. Method of reciprocity in the field of the spherical wave, in the diffusion so		
for accelerometers	and sensors of velocity and displacement. Measurement of mechanical impedance, impedance head, artificial mastoid. Electrostatic	transducer and its	application
for ele	ectroacoustic measurements. Measurement of thin membranes and air-gaps. Acoustic intensity measurement. Measurements of acou	ustic transmitters.	
			4
XP37APF	Acoustics and Electroacoustics of Solid State	Z,ZK	4
Wayos in alastic is			
	soptropic unbounded continuum. Wave equation. Scalar and vector potential. Plane harmonic uniform and non-uniform wave. Energy	and power in plane	harmonic
	soptropic unbounded continuum. Wave equation. Scalar and vector potential. Plane harmonic uniform and non-uniform wave. Energy e in half-space, reflection and refraction of a plane wave at an interface between too solids. P-wave, SV and SH waves, Ravleigh wave		
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	Physiological, Psychological and Musical Acoustics 2	ZK	4
	sical signal in temporal and frequency domains, methods of sound synthesis, timbre and interpretation of sound spectra, objective as		
sound quality, intro	duction to acoustics of speech and singing, physicalacoustic principles of musical instruments, tuning, dynamics, timbre of the tone, instruments, introduction to methodology of measurement of musical instruments.	radiation properties	s of musical
XP37FOS		ZK	4
	Photonic Imaging Systems resentation. Energetic image description. Principles of image acquisition, transferring and storing. Image entropy function, 2 dimensio	I I	-
	lescription. Novel compression techniques. Image reproduction, matrix description. Light diffraction. 2D transfer functions - PSF, MTF,		
	s. 2D transfer systems and their signal distortion, image aberration and their correction, toleration analysis of optical system. Receiver		
-	application. Photonic processors, computers and memories.		
XP37FOT	Selected Parts from Photonics	Z,ZK	3
The subject is focu	sed on the overview of recent applied photonic topics esp. integral and panoramic photonics receivers, transmitters and other special	elements and subs	ystems incl.
	al background. Selected examples of applied photonic elements and subsystems will be demonstrated in lab experiments and result		,
exercises will take	place in the specialized departmental laser lab for limited number of participants. Selected experiments will also be presented during le	ctures. The durable	equipment
	purchased under the project frame will be exploited.		
XP37FZS	Fuzzy Signal Processing	Z,ZK	4
PhD students educ	ation and their research activities are focused on the problems of utilize fuzzy logic and neural network for optimization algorithm used as adaptive filtration, diagnostic of the signal, control phase lock and so on.	at numerical signal	processing
XP37GAB	Genesis and Analysis of Biosignals	ZK	4
	with genesis and description of the most important biological signals of both electric and non-electric nature. Properties of the biosignal,		-
	rocessing, are studied. Finally, simple and advanced methods of biosignals pre-processing, analysis and evaluation are presented for		-
XP37IAR	Implementation algoritms in radioelecronics	Z,ZK	4
	ucation and their research activities are focused on the problems of effective implementation algorithms in radio electronics by signal		
	units (universal and signal processors) and with support hardware accelerators in FPGA circuits. Optimization of the algorithm is cor		
	computational complexity by utilization multirate digital signal processing and hardware accelerators.		
XP37IPP	Image Processing and Photonics	ZK	4
	c discipline used in space technology. Students will become acquainted with advanced imaging photonics used in space sciences, inclu	<b>v</b>	
of optical instrume	nts and the influence of the environment. In addition, there are included parts describing the parameters of optical instruments (PSF,	MTF, OTF, resolution	on, SWATH,
	eformation modeling and removal methods for IR - VIS electromagnetic radiation. The subject also includes a description of the sense		
	and the reconstruction of the acquired image, and discusses its use in space applications. In addition, there are parts including Earth Re	-	-
and the use of mod	dern instruments in this area, including optical Fourier transform, electromagnetic wave polarization research, and hyperspectral imagination in the second se	ing and data proce	ssing in this
VD27ICC	area, including image data telemetry.	ZK	4
XP37ISS	Introduction to space science and technology space sciences and technology on PhD level. Methods and resources of space research and their applications. Satellites, space prol	I I	4
	space sciences and technology of this level, methods and resources of space research and their applications. Satellites, space pro		-
	nology. Remote sensing and multispectral images, applications. Space physics, cosmic environment, cosmic radiation and particles.	-	-
	of space systems, space software, archiving and data reduction, organization international co-operation.		,
XP37LN	Aircraft Navigation	ZK	4
XP37MPS	IVIUItimedia Signals Transmission	ZK	4
	Multimedia Signals Transmission nunication system scheme. Extended knowledges in radio transmitters and radio receivers. Radio transmitters and receivers system d	I I	4
Generalized comm		esign. Satellite com	4 nmunication
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Electrochemical, optical, biochemical sensors. Haematology analysers. Interference, corrections of measured values, standardisation in medicine. Electrostimulation. of internal organs

and skele	tal muscles. Electrodes and circuits for biopotential measurement and electrical stimulation. Indirect measuring methods of biological	and physical value	es.
XP37RAD	Radioelectronics	ZK	4
XP37RUP	Radio determination of position, theory and practice, experience	Z,ZK	5
		· · ·	
	subject is to acquaint a doctoral student with receiver position determination methods in systems using different measurements and pos		•
	nods) and with their accuracy. The student will study error magnitude derivation and will get information concerning the choice of comp		-
•	. It will be revealed that massively used satellite navigation methods suffer from many deficiencies under real environment conditions. I		
	es can be reduced by the assistance from other sensors based on radio as well as non-radio principles. Moreover, there are very pros		
-	s of opportunity processing; they are included in the course, too. The student will verify the achieved results by individual laboratory pr		
equipment like a	signal generator with simulator of satellite signals and generators of communication signals (DVB-T, LTE). The acquisition of the equi	oment was support	ted by the
	development project OP VVV.		
XP37SFA	Fundamentals of Physical Acoustics	ZK	4
Classical theory	of elasticity, Carthesian tensors. Theory of small deformations, dynamic equations of isotropic elastic medium. Microscopic model of	fluids. Cinematics	of fluids.
	Dynamics of vascous fluids. Stationary flow of vascous fluid.		
XP37SRP	Radio Receivers Special Technology	ZK	4
	Ivanced radio receivers technology. Basic structure classical and modern software defined radio receivers. Technical parameters radio		
	and television receivers. Professional radiocommunication receivers and transceivers. Diversity techniques. Spread spectrum radio rec		
rudios cudououng (	and broadband amplifiers. Oscillators and frequency synthesizers. Mixers and demodulators. Radio receivers system design		anondana
VD27070			4
XP37SZS	Statistical Signal Processing	Z,ZK	4
Parameter estima	tion and detection theory. General properties and fundamental limits. ML, LS, Bayes (MAP,MSE), NP, MM estimators and detectors. A	daptive filter theory	y (Kaiman,
	RLS). Iterative detection and parameter estimation.		
XP37TAS	Acoustic signal processing and theory	Z,ZK	4
Acoustic signal c	lassification, sources, description of properties. Statistical analysis of acoustic signals. Spectral analysis of signals, Fourier transform	application. Time-f	requency
analysis, Short-time	e Fourier Transform, Wavelet transform, Wigner-Ville distribution. Cepstral analysis and its application in acoustics. Discrete signal pro	cessing and its effe	ect to sound
perception. Oversar	npling, noise shaping. Granulation noise, dithering, signal requantization. Acoustic signal acquisition and data pre-processing. Impulse me	asurements of elec	tro-acoustic
systems. System a	nalysis using swept and time delayed acoustic signals. Pseudorandom signals and their application in acoustic system analysis. Digital	processing of mus	ical signals.
XP37TEA	Theoretical Eletroacoustics	Z,ZK	4
Vibrating systems i	n fluids and solids. Systems of lumped and distributed parameters in solids. Equivalent circuits of membranes and plates. Reciprocal t	<i>'</i> 1	agnetic and
	reciprocal transducers (opto and thermoacoustical transducers, piezoresistive transducer). Electromechanical and electroacoustical		-
	s. Radiation, radiation impedance. Acoustic transmitters, directivity. Acoustic receivers. Acoustical systems with lumped and distributed e		-
	air-gaps. Coupled systems.		·····g·····,
XP37TEM	Theoretical Electroacoustics and Measurement	Z.ZK	3
-	d at selected parts of electroacoustics and related fields with the emphasis on the theoretical aspect. The main interest lies in electro	_,	-
parts. Their descr	iption will include non-linear mode. The part on measurement will include mainly calibration methods and their usage in cases close t	o topics of theses o	or doctoral
VDOTIND	students.	71/	
XP37TMP	Medical Instrumentation	ZK	4
-	with principles and properties of medical systems for analysis of body fluids, blood gas analysis, medical minors of basic life functions		
	ermodynamic principles of anaesthetic equipment and equipment for artificial lung ventilation, haematological analysers and other me	edical apparatuses	
XP37VKF	Selected Parts from Photonics	ZK	4
Anatomy and phys	ology of vision. Integral photonic sensors. Panoramatic (image) photonic sensors. Integral photonic displays. Panoramatic photonic di	splays. Electron op	otics. Image
converters. Special	photonic elements. Basic elements of optical systems. Fundamentals of illumination. Fiber-optics elements and systems. Optical meth	ods of information	processing.
	Optical (photonic) processors.		
XP37VRA	Research Seminars in Radioelectronics and Acoustics	Z,ZK	4
The course is inten	ded for PhD students of the radioelectronics and acoustics specialization. It develops the presentation skills and serves as a platform		defence of
	students' research results.		
XP37ZI	Information recording	Z,ZK	4
	in theory. FM signal recording. Video information recording systems. High density recording, tape recorder thin heads. Impulse record		
•	-audio, DAT. Digital recording on CD-ROM, CD-video. WORM, CD-R recording. Erasable magneto-optical recording on MD. Digital video and the second state of the second state state of the second state of the se	•	•
recording on CL		leo recording. Cou	ing, uata
	compression.	7 71/	
XP37ZSN1	Signal processing in satellite navigation systems 1	Z,ZK	4
Distance measu	rement with pseudorandom signals and with carrier. Position determination based on measured distances. Time delay discriminator.	-	avigation
	receiver. GDOP, PDOP, HDOP, VDOP. GPS system, precision. Glonass and its precision. GALLILEO. Comparison of these syst		
XP37ZSN2	Signal processing in satellite navigation systems 2	Z,ZK	4
Doppler satellite	navigation systems, structure of receiver and precision of position measurement. Shortcomings of satellite systems: limited access a	nd integrity, RAIM	and GIC,
augmentation.	Differential systems DGPS and DGLONASS, RTCM-104 standard. Systems SKY-FIX, FUGRO, RACAL, WAAS, EGNOS. GALILEO a	nd its prospective.	GPS III.
XP38ATM		ZK	3
	ا Jces the principles and technical means of data acquisition in the laboratory and industrial environment. Attention is paid to both hard	1	
-	stems for data acquisition and process control. Laboratory exercises are designed in part in the form of classical tasks, partly in the f		
	in the field of programming of automated measurement systems and control of measurement processes.		
VD20EMC		ZK	4
XP38EMC	Electromagnetic Compatibility of Data Acquisition Systems	1	4 nd inductry
LIVIC - Dasic terms.	Measurement of electromagnetic emission and immission. EMC standards. Modelling of disturbing signals. Electromagnetic disturba	nce in appratory a	na maustry.
	Design of DAQ systems with regard to EMC. EMC of data transmitting lines.	<b></b> .,	
XP38MDR	Methods of Signals Digitalization and Reconstruction	ZK	4
The up-to-date and	unconventional methods of analog preprocessing of typical sensors signals, selection of optimal digitization methods and optimization	of hardware solution	on including
	of processing of measurement results to achieve high accuracy and effective suppression of disturbing signals.		
XP38MET	Metrology	ZK	3
	sed on solving problems connected with the metrology of electrical quantities and application of modern tools to it. The lectures acquai		
	methods of precise measurement of electrical quantities with an accent to correct evaluation of accuracy.		
XP38MMN	Measurement of Nonelectric Quantities	ZK	4
	s of sensors. Measurement of temperature, pressure, flow, movement, position and other physical quantities. Chemical sensors and		
	on of explosives. New types of signal conditioning circuits. Sensor Applications in industry, transport and consumer electronics. Secu		
	, set of the set of th	,	
	Sensor design and technology. Signal processing in sensor systems, intelligent sensors.		I

XP38MPM Methods for Precision Measurement of Electrical Quantities and Measurement Data Processing	ZK	4
Quantum standards of electrical quantities. Collective standards. Inductive ratio devices for precision electrical measurements and possibilities of improving Modern methods for precision measurement of active and passive electrical quantities. Evaluation of measurement errors and uncertainties. Metrologica		
of measurement data.	ai reliability. Otatistit	cai anaiyoio
XP38MPX Magnetism in Engineering Practice	ZK	4
Students will be introduced into the magnetic materials, magnetic sensors and engineering magnetism including FEM design and magnetic measureme	I I	
this advanced course can be modified according to the students' needs.		
XP38PSL Aircraft Instrumentation	ZK	4
The subject acquaints students with the current technology used in aircraft with respect to instruments, systems and sensors working in the low-frequence of the subject acquaints students with the current technology used in aircraft with respect to instruments, systems and sensors working in the low-frequence of the subject acquaints students with the current technology used in aircraft with respect to instruments, systems and sensors working in the low-frequence of the subject acquaints students with the current technology used in aircraft with respect to instruments, systems and sensors working in the low-frequence of the subject acquaints students with the current technology used in aircraft with respect to instruments, systems and sensors working in the low-frequence of the subject acquaints	-	
basic processing of system data. The course includes a detailed description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description of aircraft instrumentation and its resistance to external influences, a description and aircraft instrumentation and aircr		
and power electrical engineering, analysis of instruments and systems for measurement of engine and aerometric quantities, and a description of emergen It thus develops the background related to nowadays technology and methodology utilized on aircraft. The course provides a detailed overview of quanti	, ,	0
and analytical methods and their integration into signal/data processing and aircraft system design principles. The last part of the course discusses the	-	
the field of aircraft instrumentation.	1 0	
XP38PUC	ZK	2
XP38SSA	ZK	3
The course is focused on advanced sensors and data communication principles within heterogeneous automotive networks. It especially deals with m	odern wideband au	utomotive
sensors communication over the internal vehicle communication infrastructure.		
XP38SSB Sensors and Buses		4 dimportant
The student will be introduced into the advanced topics of engineering sensors and sensor networks. Topics include: Sensor applications, physical principle parameters, the concept of smart sensors, measurement systems, analog circuits for sensor signal processing, sensor error correction, calibration and diagonal sensors and sensor signal processing.		-
immunity.		alotarbarioo
XP38SYS Measurement and Data Acquisition Systems	ZK	4
The subject introduces the principles and technical means of data acquisition in the laboratory and industrial environment. Attention is paid to both hard	ware and software	aspects of
the integration of systems for data acquisition and process control. Laboratory exercises are designed in part in the form of classical tasks, partly in the f	form of problem-ori	ented tasks
in the field of programming of automated measurement systems and control of measurement processes.		
XP38VDI Selected Chapters of Diagnostics	ZK	4
This course introduces advanced concepts of fault detection, isolation and diagnostics, signal analysis methods for machine condition monitoring, and of non-destructive testing, the corresponding advanced signal processing, and self-acting evaluation in order to improve reliability, availability, ma		
XP38VKP Selected Parts of Instrumentation	ZK	4
The course is dedicated to principle, properties and applications of selected special measuring instruments. It deals mainly with calibrators and other s	I I	
devices for measurement of extremely low voltage and current signals, lock-in amplifiers, power analyzers and electronic loads, devices used for EMC mea		-
analyzers, metallic and optical reflectometers and radio testers (Bluetooth, NMT, GSM, UMTS). A special part is devoted to sampling measurement method	ods and virtual instru	umentation.
XP38VKZ Selected Chapters of Signal Processing	ZK	4
The course is dedicated to advanced signals processing methods used in contemporary electronic devices and measuring instruments. It concerns e.		-
transformation (except Fourier), stochastic methods, processing of the multimedia signal, suppressing of unwanted effect, methods used for quality inc	creasing of multime	edia signal
transmission ato		
transmission, etc.	7K	1
XP39CG Advanced Computational Geometry	ZK bic related to data s	4 structures in
	bic related to data s	tructures in
XP39CG         Advanced Computational Geometry           The aim of the course is to deepen the knowledge of computational geometry. The course is designed primarily for students who have a dissertation top computer graphics and effective work with them. The starting point of the study will be chapters from the compulsory literature, specific topics will be be develop the issue. Students will have the latest articles on the subject and will creatively process the theme. This is mainly about mastering the method	bic related to data s ased on scientific a lology of scientific v	tructures in rticles that vork taking
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## Scientific Writing

1) LECTURES [Chang-Hee Won]: With the assistance of a Fulbright Distinguished Chair at CTU and a Professor in Electrical Engineering for Temple University (a research university located in Philadelpia, Pennsyvania, USA), researchers will be instructed on how to organize and effectively communicate their scientific results. While this instructor is an Electrical Engineer, the approaches will be applicable to all technical disciplines. 2) SEMINARS [Michael Ynsua]: Under the guidance of a native-speaking English teacher participants will focus on the fundamentals of academic writing with the goal of sharpening critical writing skills (reasoning, formulating, and developing arguments and explanations). Special attention will also be paid to mechanics, usage, and style (grammar, etc).

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For updated information see <u>http://bilakniha.cvut.cz/en/f3.html</u> Generated: day 2025-07-04, time 02:33.