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University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ IG/04	urse ID: ÚFV/ Course name: Acquirement of Internal Grant 04		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 10	<i>(</i>)	
Recommended seme	ster/trimester of the cours	e: 6., 8.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 123			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ PVS/04	ID: ÚFV/ Course name: Author's patents, discoveries, software		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 37			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ CM/04	Course ID: ÚFV/ Course name: Citation in monograph		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 20		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 1			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ CZC/04	Irse ID: ÚFV/ Course name: Citation in scientific journal published abroad		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 10		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 60			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ CDC/04	V/ Course name: Citation in scientific journal published in the country of residence		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 4			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SCI/04	V/ Course name: Citation registered in Science Citation Index		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 20		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 177			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SMPR/04	ourse ID: ÚFV/ / IPR/04Course name: Co-worker of project supported by international grant schemes		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr			
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of asses	ssed students: 95		
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SDPR/04	ourse ID: ÚFV/ DPR/04Course name: Co-worker of project supported by national grant schemes		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent		
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cou	ſ\$ e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asse	ssed students: 485		
	abs n		
	100.0 0.0		
Provides:	Provides:		
Date of last modification:			
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ POCF/13Course name: Computational Physics		
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present		
Number of ECTS credits: 8		
Recommended semester/trimester of the course: 2.		
Course level: III.		
Prerequisities:		
Conditions for course completion: Examination		
Learning outcomes: To acquaint students with modern methods of computational physics and their application to different physical systems.		
 Brief outline of the course: Brief outline of the course: 1. Modern Monte Carlo methods targeted for problematic complex systems with multimodal energy surfaces. Multicanonical methods. Parallel tempering (replica exchange) method. Calculation of density of states and free energy by using Wang-Landau method. 2. Molecular Dynamics. Hybrid Monte Carlo method and spin dynamics. Langevin equations. Cellular automata of lattice gas. Quantum Monte Carlo simulations of lattice systems based on Suzuki-Trotter relation. Ising model in transversal field. Anisotropic Heisenberg chain. Monte Carlo Renormalization Group (MCRG) methods. Mao and Swendsen method. Problems of dynamics. 3. Other models and applications. Fitting data with linear models. Pattern recognition. Recurrent neural networks and time series prediction. Hebbian learning. Principal component analysis. Stochastic signal processing. Simulations of neural networks. Socio-physical models motivated by spin models. Galam models. Voter model in hierarchical systems. Model of group decision making. The opinion dynamics. Sznajd model and its applications. Recommended literature: 1. J.C. Principe, N.R. Euliano, Neural and adaptive systems, John Wiley & Sons. INC., New York, 2000. 2. K. Binder, D.W. Heermann, Monte Carlo simulation in statistical physics, Springer-Verlag, Berlin, 2002. 3. J.M. Haile, Molecular dynamics simulations, John Wiley & Sons. INC., New York, 1992. 4. N.G van Kampen, Stochastic processes in physics and chemistry, North-Holland, 1990. 5. B.K. Chakrabarti, A. Chakraborti, A. Chatterjee (Editors), Econophysics and sociophysics: Trends and perspectives, Wiley-VCH, 2006. 		

Notes:	
Course assessment Total number of assessed students: 7	
N	Р
0.0	100.0
Provides: prof. RNDr. Milan Žukovič, PhD.	
Date of last modification: 25.09.2017	
Approved: prof. RNDr. Stanislav Vokál, DrSc.	

University: P. J. Šafá	rik University in K	ošice		
Faculty: Faculty of S	Faculty: Faculty of Science			
Course ID: ÚFV/ ODZP/14	Irse ID: ÚFV/ ZP/14Course name: Defence of Doctoral Thesis			
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: sent			
Number of ECIS cr				
Recommended seme	ster/trimester of the	he course:		
Course level: 111.				
Prerequisities:				
Conditions for course completion:				
Learning outcomes:				
Brief outline of the c	Brief outline of the course:			
Recommended literature:				
Course language:	Course language:			
Notes:				
Course assessment Total number of asses	ssed students: 71			
	N P			
	0.0 100.0			
Provides:	Provides:			
Date of last modification: 03.05.2015				
Approved: prof. RNI	Dr. Stanislav Vokál,	, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice			
Faculty: Faculty of S	cience			
Course ID: ÚFV/ MDU/04	Course name: Detection Methods and Experiments on Large Colliders			
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS cr	edits: 4			
Recommended seme	ster/trimester of the cours	e: 2.		
Course level: III.				
Prerequisities:				
Conditions for cours	e completion:			
Learning outcomes: To extend the knowle	Learning outcomes: To extend the knowledge about the most recent results of nuclear and subnuclear physics.			
Brief outline of the course: Methods of determination of basic physical quantities: coordinates, momenta, energy, time of flight, charge, mass and their use in a given experiment. Description of experiments and physical topics on large accelerators.				
Recommended literature: Dorin N. Poenaru and Walter Greiner: Experimental Techniques in Nuclear Physics, Walter de Gruyter, Berlin-New York, 1997 Kleinknecht k.:Detectors for particle radiation, Cambridge University press,1986				
Course language:				
Notes:				
Course assessment Total number of assessed students: 5				
	N P			
	0.0 100.0			
Provides: RNDr. Ivan Králik, CSc.				
Date of last modification: 03.05.2015				
Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of Science				
Course ID: ÚFV/ DZS/14	urse ID: ÚFV/ Course name: Dissertation examination			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present				
Number of ECTS cr	edits: 20			
Recommended seme	ster/trimester of the cours	e:		
Course level: III.				
Prerequisities:				
Conditions for cours Obtaining required no	e completion: umber of credits as given by	the study plan.		
Learning outcomes: Evaluation of compet	Learning outcomes: Evaluation of competences of the student according to his/her scientific profile.			
Brief outline of the course: Presentation of the results in the thesis for disertation exam, responding to referee's comments, answering questions of exam committee. Two questions are selected subsequently from one compulsory and one optional subject, respectively. The subjects are selected by guarantee of the program according to the study plan and scientific profile of the student. The third question addresses the current state of work on dissertation thesis.				
Recommended literature:				
Course language: english				
Notes:				
Course assessment Total number of assessed students: 100				
	N P			
	0.0 100.0			
Provides:	Provides:			
Date of last modification: 03.05.2015				
Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafá	rik University in Košice				
Faculty: Faculty of S	cience				
Course ID: ÚFV/ DPSD/14	Course name: Distributed data processing				
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS cro	edits: 4				
Recommended seme	ster/trimester of the cours	e: 2.			
Course level: III.					
Prerequisities:					
Conditions for cours	e completion:				
Learning outcomes: Lectures on parallel d	Learning outcomes: Lectures on parallel data processing on analysis farms.				
Brief outline of the course: Basics of scripting languages under various operating systems Scripting in Unix/Linux Simple parametrization of jobs on analyses farms Basic principles of batch farm organizations Basic principles of interactive farm organizations Implementation and realization of job parallelization					
Recommended literature: https://www.gnu.org/software/bash/ http://www.adaptivecomputing.com/products/open-source/torque/ http://root.cern.ch/drupal/ http://xrootd.org/ https://eos.readthedocs.org/en/latest/					
Course language: English					
Notes:					
Course assessment Total number of assessed students: 5					
	N P				
	0.0 100.0				
Provides: doc. RNDr. Jozef Urbán, CSc., RNDr. Martin Val'a, PhD.					
Date of last modification: 03.05.2015					
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ VPBP/04	: ÚFV/ Course name: Elaboration of reviewer report		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of EC18 cr			
Recommended seme	ster/trimester of the cours	e:	
Course level: 111.	-		
Prerequisities:			
Conditions for course completion:			
Learning outcomes:			
Brief outline of the c	ourse:		_
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 19			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

× .				
University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of Science				
Course ID: ÚFV/ EFVE/04	Course name: Electronics for Nuclear Physics			
Course type, scope a	nd the method:			
Course type: Lectur	re			
Recommended cour	rse-load (hours):			
Per week: 2 Per stu	dy period: 28			
Course method: pre	esent			
Number of ECTS cr	edits: 5			
Recommended seme	ster/trimester of the cours	e: 2.		
Course level: III.				
Prerequisities:				
Conditions for cours	Conditions for course completion:			
Learning outcomes: To show the basics methods of data acquisition in the recent high energy physics experiments.				
Brief outline of the course: Signals from detectors, data flow. Electronics for high energy physics, basics. Front-end and calibration electronics. Selection of interactions - trigger.				
Recommended literature: Grupen Claus: Particle Detectors, Cambridge University Press, 1999				
Course language:				
Notes:				
Course assessment	2			
Total number of assessed students: 4				
	N P			
	0.0 100.0			
Provides: doc. RNDr. Jozef Urbán, CSc.				
Date of last modification: 03.05.2015				
Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: ÚFV/ VPKF2/13	Course name: Energetic particles and heliosphere				
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS cr	edits: 4				
Recommended seme	ster/trimester of the cours	e: 2.			
Course level: III.					
Prerequisities:					
Conditions for cours Literature search and Concluding work.	e completion: compilation on one particul	ar subject selected.			
Learning outcomes: To acquaint with the know edge of selected physical processes in the inner and outer heliosphere.					
 Brief outline of the course: Heliosphere. Origin of solar wind. Dynamical processes in heliosphere. Formation of heliospheric boundaries. Measurements of charged energetic particles and energetic neutral atoms. Turbulence in solar wind. Energetic particles in the inner heliosphere. Solar flares, emission of energetic particles, its transport and detection near the Earth. 					
Recommended literature: R. Schwenn, E. Marsch (editors), Physics of the Inner Heliosphere II, Particles, Waves and Turbulence, Springer Verlag, 1991 K. Scherer, H. Fichtner, E. Marsch, The Outer Heliosphere: Beyond the Planets, Copernicus Gesellschaft e.V., 2000					
Course language:					
Notes:					
Course assessment Total number of assessed students: 1					
	Ν	Р			
	0.0 100.0				
Provides: RNDr. Pavol Bobik, PhD.					
Date of last modification: 03.05.2015					
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.				

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of Science				
Course ID: ÚFV/ VPKF1/13	Course name: Energetic particles and magnetospheres			
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS cr	edits: 4			
Recommended seme	ster/trimester of the cours	e: 1		
Course level: III.				
Prerequisities:				
Conditions for course completion: Literature search and compilation on one particular subject selected. Concluding work.				
Learning outcomes: To acquaint with the know edge of selected physical processes in magnetosphere, especially that of Earth.				
Brief outline of the course: Magnetosphere of Earth and planetary magnetospheres. Structure of geomagnetic field. Motion of charged particles in geomagnetc field. Solar wind, magetopause and Earth's bow shock. Ionosphere. Aurorae and electric fields. Processes in the geomagnetic tail and geomagnetic storms				
Recommended literature: Roederer, J., Dynamics of Geomagnetically Trapped Radiation, Springer, 1970 M.G. Kivelson and C.T. Russell, Introduction to Space Physics, Cambridge University Press, 1995				
Course language:				
Notes:				
Course assessment Total number of assessed students: 1				
	Ν	Р		
	0.0	100.0		
Provides: RNDr. Pav	Provides: RNDr. Pavol Bobik, PhD.			
Date of last modification: 03.05.2015				
Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafárik University in Košice Faculty: Faculty of Science Course ID: CJP/ AJD1/07 Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Faculty: Faculty of Science Course ID: CJP/ AJD1/07 Course name: English Language for PhD Students 1 Course type, scope and the method: Course type: Practice Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Course ID: CJP/ AJD1/07 Course name: English Language for PhD Students 1 Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS credits: 2				
Recommended semester/trimester of the course: 1.				
Course level: III.				
Prerequisities:				
Conditions for course completion: Written assignments - professional CV, short academic biography (200-350 words). distance mode of instruction using MS teams				
Learning outcomes:				
Brief outline of the course:				
Recommended literature:				
Course language:				
Notes:				
Course assessment Total number of assessed students: 649				
N Ne P Pr abs neabs				
0.0 0.0 51.31 0.0 48.69 0.0				
Provides: PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.				
Date of last modification: 11.02.2021				
Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of S	cience			
Course ID: CJP/ AJD2/07	Course name: English Language for PhD Students 2			
Course type, scope a Course type: Practic Recommended cour Per week: 2 Per stu Course method: pre	Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cr	edits: 3			
Recommended seme	ster/trimester of the course: 2.			
Course level: III.				
Prerequisities:				
Conditions for cours Distance mode of ins Test, oral exam in acc cjp/doktorandi-upjs/)	e completion: truction. Online consultations. ordance with the exam requirements (https://www.upjs.sk/filozoficka-fakulta/			
Learning outcomes: Development of stu (selected aspects of pragmatic competence and specific purposes	idents' language skills, improvement of students' linguistic competencies English pronunciation, vocabulary and syntax), development of students's e (selected aspects of functional grammar) with focus on English for academic s. B2/C1 level of lanugage competence (according to CEFR.)			
Brief outline of the c Specific aspecs of a (noun and verb colloc language, etc.), select etc.), selected function Academic communic	ourse: cademic and professional English with focus on vocabulary development cations, phrasal verbs, prepositional phrases, word-formation, formal/informal ted aspects of English grammar (prepositions, grammar tenses, passive voice, nal grammar (expressing opinion, cause/effect, arguments, examples, etc.). ation. Cross-language interference.			
Recommended litera Kolaříková, Z., Petru UPJŠ Košice, 2015 McCarthy, M., O'Del Štepánek, L., J. De H 2011 Blašková, K.: Handbo Dušková, L. a kol.: H Bratislava, 1982 Armer, T.: Cambridge Porter, D.: Check you Oxford Collocations Ims.upjs.sk	 hture: ňová, H., Timková, R.: Angličtina v akademickom prostredí (cvičebnica). II, F.: Academic Vocabulary in Use. CUP, 2008 aff a kol.: Academic English-Akademická angličtina. Grada Publishing, a.s., ook of English for Postgraduate Students. Vyd. SPRINT Bratislava, 2007 lovorová angličtina pre vedeckých a odborných pracovníkov. Veda. e English for Scientists. CUP, 2011 ar vocabulary for Academic English. Macmillan Publishers Limited, 2008 Dictionary for students of English. OUP, 2002 			
Course language:				

B2/C1 level according to CEFR					
Notes:					
Course assessm Total number of	ent f assessed studen	ts: 607			
Ν	Ne	Р	Pr	abs	neabs
0.33	0.0	92.59	1.32	5.77	0.0
Provides: PhDr.	. Helena Petruňo	vá, CSc., Mgr. Zu	uzana Kolaříkova	á, PhD.	·
Date of last mo	dification: 10.02	2.2021			
Approved: prof	RNDr. Stanisla	v Vokál, DrSc.			

University: P. J. Šafárik University in Košice				
Faculty: Faculty of Science				
Course ID: ÚFV/ Course name: Extremal Star ESH/09	Course name: Extremal States of Matter			
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS credits: 4				
Recommended semester/trimester of the course:	: 2.			
Course level: III.				
Prerequisities:				
Conditions for course completion:				
Learning outcomes: The main goal of lectures is introduction to matter	extremal states topic.			
Lectures are introduction to extremal state of matter. Deals with wide spectrum of of effects beginning with electromagnetic plasma, following with phase states of matter in very hot/dense conditions and finish with a high speculative forms of matters. These can be responsible for accelerated expansion in very early state of space (inflation) or for his actual acceleration (dark energy). Lestures are also short introduction to modern cosmology, with relations to nuclear and particle physics.				
 Recommended literature: 1. Andrew Liddle, An introduction to modern cosmology, Chichester, UK: Wiley (1998) 129 str. 2. Joseph Silk, The Big Bang 3. Jean Letessier, Johan Rafelski: Hadrons and quark-gluon plasma, Camb. Monogr.Part. Phys. Nucl. Phys. Cosmol. 18: 1-397, 2002. 4. K.Yaki, T. Hatsuda, Y.Miake, Quark-gluon plasma: From big bang to little bang. Camb. Monogr.Part. Phys. Nucl. Phys. Nucl. Phys. Cosmol. 23: 1-446, 2005. 				
Course language:				
Notes:				
Course assessment Total number of assessed students: 3				
N P				
0.0	100.0			
Provides: RNDr. Ivan Králik, CSc., RNDr. Pavol F	Bobik, PhD.			
Date of last modification: 03.05.2015				
Approved: prof. RNDr. Stanislav Vokál, DrSc.				

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ DKZU/04	FV/ Course name: Home Conference with Foreign Participation		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 4		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 293			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ NEM/04	Course name: Implementation of new experimental methodology		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 15		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	Conditions for course completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 74			
	abs n		
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ MK/04	Durse ID: ÚFV/ Course name: International Conference K/04		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of EC18 cr	ealts: 0		
Course level: III	ster/trimester of the cours	e:	
Duonoguigitioge			
Conditions for source			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 393			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

×		
University: P. J. Safá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ UFRJZ/09	Course name: Introduction to Physics of Relativistic Nuclear Collisions	
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): idy period: 28 esent	
Number of ECTS cr	edits: 5	
Recommended seme	ster/trimester of the course: 2.	
Course level: III.		
Prerequisities:		
full-time form: written test and thesis, exam, distance form in 2019/20: control exams are replaced by continuous assignments, thesis		
Acquisition of basic	knowledges from the high-energy heavy ion physics.	
Brief outline of the course: Heavy ion collisions from intermediate to ultra-relativistic energies are covered in this lecture After the introductory part, including kinematics, cross sections, geometry and centrality of nuclear collisions, the fragmentation processes, multiplicities, longitudinal and transverse momentum spectra of secondary particles are discussed. The next part covers a wide range of subjects from strangeness production and heavy flavors through creation of antinuclei and hypernuclei in nuclear collisions to hadron femtoscopy. Some selected phenomena connected with possible production of the dense and hot nuclear matter (quark-gluon plasma) are introduced. Finally, collective flows charmonium suppression, di-lepton mass spectra, direct photons and production of particles with high transverse momenta are presented.		
 Recommended literature: 1. J. Bartke, Introduction to Relativistic Heavy Ion Physics, World Scientific Publishing Co. Pte. Ltd., Singapore, 2009. 2. R. Vogt, Ultrarelativistic Heavy-Ion Collisions, Elsevier, 2007. 3. J. Letessier, J. Rafelski: Hadrons and quark-gluon plasma, Camb. Monogr. Part. Phys. Nucl. Phys. Cosmol. 18: 1-397, 2002. 		
Course language:		

slovak and english

Notes:

Course assessment		
Total number of assessed students: 10		
N P		
0.0 100.0		
Provides: prof. RNDr. Stanislav Vokál, DrSc., doc. RNDr. Adela Kravčáková, PhD.		
Date of last modification: 31.03.2020		
Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafárik University in Košice				
Faculty: Faculty of Science				
Course ID: ÚFV/ USM/04	Course name: Introduction to Standard Model			
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cr	edits: 5			
Recommended seme	ster/trimester of the o	course: 2.		
Course level: III.				
Prerequisities:				
Conditions for cours	e completion:			
Learning outcomes: The aim of the course is to give to the students basic knowledges about unified theory of electro- weak interactions				
 From the metodological point of view the lectures are based on explanation of known processes of weak interaction where beta-decay belongs. Genesis of modern electro-weak theory and standard model is given by inductive method starting from definition of V-A currents, choise of appropriate calibration symmetry, corresponding intermediate bosons and Yang_Mils quantum fields and Higgs mechanism. As a result the modern formulation of Glashow- Weinberg-Salam standard model is proposed. 				
 Recommended literature: 1. J. Hořejší: Introduction to electroweak unification (World Scientific, Singapore 1994); czech version: Elektroslabé sjednocení a stromová unitarita (Karolinum, Praha 1993). 2. P. Renton: Electroweak interactions (Cambridge Univ. Press, Cambridge 1990). 3. Francis Halzen, Alan D. Martin: Quarks and Leptons, John Wiley&Sons in russian: F.Helzen, A.D.Martin: Kvarki i leptoni, Mir, Moskva, 1987. 4. Cheng T.P., Li L.F.: Gauge theory of elementary particle Physics, Claredon Press, Oxford, 1984. 				
Course language: slovak and english				
Notes:				
Course assessment				
Total number of asses	ssed students: 15	p		
Provides: prof. RNDr. Michal Hnatič, DrSc., RNDr. Ivan Králik, CSc.				

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: L'IEV/			
ZKC/04	Course name: Journals Re	Course name: Journals Registered by Current Contets Database	
Course type, scope a	nd the method:		
Course type:			
Recommended cou	rse-load (hours):		
Per week: Per stud	ly period:		
Course method: pre	esent		
Number of ECTS cr	edits: 20		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	ature:		
Course language:			
Notes:			
Course assessment			
Total number of assessed students: 455			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ ZNC/04	Course name: Journals not registered in the Current Contents Connect database and published abroad		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 49			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ DNC/04	Course name: Journals not registered in the Current Contents Connect database and published in the country of residence		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECIS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e:	
Course level: 111.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 21			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ DKC/04	Course name: Journals registered in the Current Contents Connect database and published in the country of residence		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 15		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.	Course level: III.		
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 8			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ DK/04	ourse ID: ÚFV/ Course name: National Conference K/04		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of EC18 cr			
Course levels III	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 137			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ NZ/04	Course name: Non-reviewed collections of papers and monographs published abroad or in the country of residence		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.	Course level: III.		
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 104			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University P I Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚFV/ DCK/14	Course name: Particle detection by calorimetric methods
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: e rse-load (hours): dy period: 28 esent
Number of ECTS cr	edits: 4
Recommended seme	ster/trimester of the course: 2.
Course level: III.	
Prerequisities:	
Conditions for cours	e completion:
Learning outcomes: Special lectures orien	ted towards particle calorimetry.
PASSAGE OF PART Electronic energy los in a single collision Stopping power at in low energies Energetic knock-on e Fluctuations in energy Multiple scattering th Photon and electron i Collision energy loss Critical energy, Energ Photonuclear and elec Muon energy loss at Cherenkov and transi Optical Cherenkov ra Coherent radio Chere CALORIMETERS Principles of Calorim Electromagnetic and Shower Profiles and Electromagnetic calo Hadronic calorimeter Free electron drift ve Types of Calorimeter Compensating and no Total Absorption, San	ICLES THROUGH MATTER s by heavy particles, Moments and cross sections, Maximum energy transfer termediate energies, Mean excitation energy, Density effect, Energy loss at lectrons (δ rays), Restricted energy loss rates for relativistic ionizing particles y loss, Energy loss in mixtures and compounds, Ionization yields rough small angles, nteractions in matter es by e±, Radiation length, Bremsstrahlung energy loss by e± gy loss by photons, Bremsstrahlung and pair production at very high energies ctronuclear interactions at still higher energies , high energy tion radiation diation nkov radiation etry Hadronic Showers Containment rimeters s locities in liquid ionization chamber s: m-compensating npling, homogeneous

Scintillation Ionization Cherenkov		
Signal Detection		
Shower shapes in hadron calorimeters		
Fluctuations in hadronic energy measurements		
Position resolution in the calorimeters		
Shower maximum detectors		
Signal read-out, processing, calibration of readout electronics. Physics calibration of electromagnetic and hadron calorimeters, jet reconstruction, determination of missing energy and that of the jet energy scale.(Getting from calorimetry to physics results) Energy and position resolution in calorimetry.		
Recommended literature:		
http://indico.cern.ch/getFile.py/access?contribId=	24&resId=0&materialId=slides&confId=44587	
http://pdg.lbl.gov/2013/reviews/contents_sports.h	tml	
http://indico.cern.ch/getFile.py/access?contribId=24&resId=0&materialId=slides&confId=44587		
http://www.slidefinder.net/c/		
calorimetry_energy_measurements_prof_robin/252b_lecture8/2/25/380 http://www.kip.upi_heidelberg.de/atlas/seminars/W/S2009_IC/compensation1		
English		
Notes:		
Course assessment		
Total number of assessed students: 0		
N P		
0.0 0.0		
Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Dušan Bruncko, CSc., RNDr. Pavol		
Stríženec, CSc.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ PK/04	Course name: Plasma in S	pace	
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e: 1.	
Course level: III.			
Prerequisities:			
Conditions for cours Recherche work. Final examination.	Conditions for course completion: Recherche work. Final examination.		
Learning outcomes: To acquaint with the	specifics of plasma formation	ons in space.	
Brief outline of the c Matter in space, distr Earth. Radiation belts. Ionos flares.	ourse: ribution function, continuity sphere and upper atmospher	equation in the phase space. Magnetosphere of e. Solar wind plasma. Outer regions of Sun, solar	
Recommended litera Rossi B., Olbert S.: I Aktuálne materiály p	iture: ntroduction to the Physics o ublikované v kozmickej fyz	f Space, ruský preklad, Moskva, 1974. ike.	
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 2		
N P			
0.0 100.0			
Provides: RNDr. Pavol Bobik, PhD.			
Date of last modification: 03.05.2015			
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ VYS/04	Course ID: ÚFV/ Course name: Presentation in Seminar		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	Conditions for course completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 345			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ KCHD/04	Course name: Quantum C	hromodynamics
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present		
Number of ECTS cr	edits: 5	
Recommended seme	ster/trimester of the cours	e: 1.
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes: To acquaint with basic information about the theory of strong interactions - quantum chromodynamics		
 Brief outline of the course: 1. Lectures are oriented on explanation of the strong interaction on the base of first principles, their description and analysis of both elastic and deep-inelastic scattering of hadrons and leptons. 2. Determination of the color is introduced, which is basic quantum number for strongly interacting particles and fundamental physical principle on which quantum chromodynamics (QCD) is constructed. 3. Basic features of this theory are explaned and it is demonstrated its application for calculation cross sections of typical interacting processes in presence of mesons and baryons. 		
Recommended literature: Cheng T.P., Li L.F.: Gauge theory of elementary particle Physics, Claredon, Press, Oxford, 1984. Yndurain F.J.: Quantum chromodynamics. An introduction to the theory of Quarks and gluons, Springer-Verlag, Berlín, 1983; Francis Halzen Alan D. Martin: Quarks and Leptons. John Wiley&Sons. 1984		
Course language: slovak and english		
Notes:		
Course assessment Total number of asses	ssed students: 19	
N P		
	0.0 100.0	
Provides: prof. RNDr. Michal Hnatič, DrSc.		
Date of last modification: 03.05.2015		

Approved: prof. RNDr. Stanislav Vokál, DrSc.

University: P. J. Šafárik University	in Košice	
Faculty: Faculty of Science		
Course ID: ÚFV/ RMU/12Course nam Radiation	e: Radiobiological Modeling of the Effect of Ionizing	
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present		
Number of ECTS credits: 4		
Recommended semester/trimester	r of the course: 1.	
Course level: III.		
Prerequisities:		
Conditions for course completion	:	
To review biophysical and statistical ionizing radiation based on the type biological object (tumor, healthy tipe predictive determination of compli- tumor control probability (TCP). Brief outline of the course: Classification of tissue damage b	al models for evaluation of biological equivalent dose (BED) of be of dosing and timig of the therapy as well as on the type of ssue. To describe the linear-quadratic model, Lyman model for cations (NTCP) and the Poisson model for the determination of	
radiobiology. Stochastic a determ effects of ionozing radiation. Radia ratio. Tumor reaparation, repolulati and the biological equivalent dose (DVH). Lymanov-Kutcher-Burma of the QUANTEC project for the ap for the determination of tumor cont predictive modeling. Optimalization fractionation.	inistic effects of ionozing radiation. Immediate and retarded ation damage of the malignant and normal tissue – therapeutic on, redistribution, and reoxygenization. Linear-quadratic model Volume factor in the radiotherapy – dose-volume histograms n model of complication propabilityNTCP. Recommandations opreciation of the retarded effects prediction. The Poisson model rol probability - TCP. BioGray – an SW tool for the TCP/NTCP on of the radiation treatment applying 3D CT/MR , DVH and	
Recommended literature: 1. Dale R.G,Jones B. : Radiobiolog 2. Steel G.G.et al.: Basic Clinical R 3. Matula P. Prínos rádiobiologické Trnava 2008 4. Šlampa P., Petera J.: Radiační or	ical Modelling in Radiation Oncology, London 2007 adiobiology,London 2002 ho modelovania v radiačnej onkológii , Habilitačná práca. TU, kológie Galen Karolinum Praha 2007	
Course language:		
Notes:		

Course assessment		
Total number of assessed students: 1		
N	Р	
0.0 100.0		
Provides: doc. RNDr. Pavel Matula, CSc.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ RZ/04	Course ID: ÚFV/ Course name: Reviewed Proceedings		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECIS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e:	
Course level: 111.			
Prerequisities:			
Conditions for cours	Conditions for course completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	Recommended literature:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 219			
abs n			
100.0 0.0			
Provides:			
Date of last modifica	tion:		
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ VDM/11	JFV/ Course name: Selected Detection Methods of Nuclear Radiaton		
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 2 Per study period: 28 / 28 Course method: present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e: 2.	
Course level: III.			
Prerequisities:			
Conditions for cours	se completion:		
Learning outcomes: To extend the scope of	of basic contemporary detec	tion methods and systems.	
Brief outline of the c General Charateristi Signals in Nuclear El Height Selection and	course: cs of Detectors, Detectors: ectronics, Signal Transmissi Coincidence. Laboratory pr	ionization, scintillation, semiconductor, Pulse on, Electronics for Pulse Signal Processing, Pulse factice from selected detection methods.	
Recommended litera 1. W.R.Leo, Techniq 2.J.R.Cooper, K.Ran Assessment, J.Wiley 3.R.L. Murray, Nucle Nuclear Processes, 6	ature: ues for Nuclear and Particle dle, R.S. Sokhi: Radioactive &Sons, Ltd., 2003 ear Energy, An Introduction th Edition, Elsevier, 2009	Physics Experiments, Springer Verlag, 1994 Releases in the Environment, Impact and to the Concepts, Systems and Aplications of	
Course language:			
Notes:			
Course assessment Total number of asse	ssed students: 5		
	Ν	Р	
0.0 100.0			
Provides: prof. RND Vrláková, PhD.	r. Gabriela Martinská, CSc.,	doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka	
Date of last modification: 03.05.2015			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Ša	afárik University in Košice
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Faculty: Faculty of Science

Course ID: ÚFV/	Course name: Selected Topics from Nuclear and Subnuclear Physics
VKJSF/04	

Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present

Number of ECTS credits: 10

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Knowledge broadening of experimental nuclear and subnuclear physics taught during undergraduate study and renewing with newest informations and results from the field.

Brief outline of the course:

1. - Subnuclear physics. Lecture show a review of the newest experimental results in elementary particle physics with focus on estimation of neutrino mass, CP symmetry violation in B-mesons decays, testing of Standard model at TeV energies, Higgs boson discovery, quark-gluon plasma properties and supersymmetric particles searches as a candidate for dark matter.

2. - Cosmic physics. Introduction to micro-world physics, relativistic kinematics, basic classification of elementary particles and experiments leading to their discoveries, physical principles of particle acceleration, classification of particle accelerators and their applications. 3. - Applied nuclear physics

General topics:Rutherford Scattering, Nuclear Phenomenology, Nuclear Models, Nuclear Radiation, Applications of Nuclear Physics, Energy deposition in Media, Particle Detection, Accelerators, Properties of Elementary Particles, Symmetries, Discrete Transformations, Neutral Kaons, oscillations and CP Violation, Standard Model

Special topics: Nuclear Reactions, Biological Effects of Radiation, Industrial and Analytical Applications, Nuclear Medicine

Recommended literature:

1. Griffiths D.: Introduction to Elementary Particle, WILEY-VCH, 4th Reprint, 2010

2. Bettini A.: Introduction to Elementary Particle Physics, Cambridge Univ. Press, Reprinted 2010

3. Perkins D.H.: Introduction to High Energy Physics, Cambridge University Press, 2000

4. Slugeň V. a iní: Jadrovo-energetické zariadenia, STU Bratislava, 2003

5. Fernow R.: Introduction to Experimental Particle Physics, Cambridge University Press, 1986

6. Das A., Ferbel T.: Introduction to Nuclear and Particle Physics, (2nd Edition), World Scientific Publishing Co. Pte. Ltd., Singapore, 2003

7. Lilley J.S.: Nuclear Physics - Principles and Application, J. Wiley & Sons, Ltd., Chichester, 2001

8. Ashok Das, Thomas Ferbel, Introduction to Nuclear and Particle Physics, (2nd Edition), 2003, World Scientific Publishing Co. Pte. Ltd., Singapore, ISBN 981-238-744-7.

9. John.S. Lilley, Nuclear Physics - Principles and Aplications, 2001, John Wiley& Sons, Ltd., Chichester, ISBN-0 471 97935 X, ISBN-0 471 97936 8.

Course language:

Notes:

Course assessment

Total number of assessed students: 22

Ν	Р	
0.0	100.0	
Provides: prof. RNDr. Gabriela Martinská, CSc., doc. RNDr. Jozef Urbán, CSc., prof. RNDr. Stanislav Vokál, DrSc., doc. RNDr. Marek Bombara, PhD.		
Date of last modification: 03.05.2015		

Approved: prof. RNDr. Stanislav Vokál, DrSc.

University: P. J. Šafá	rik University in Košice			
Faculty: Faculty of S	Faculty: Faculty of Science			
Course ID: ÚFV/ VKTF/04	Course ID: ÚFV/ Course name: Selected Topics from Theoretical Physics /KTF/04			
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent			
Number of ECTS cr	edits: 4			
Recommended seme	ster/trimester of the course: 2.			
Course level: III.				
Prerequisities:				
Conditions for cours	e completion:			
Learning outcomes: The aim is a short representation of the second sec	newal of master course and application of quantum field theory in physics of and in macroscopic systems with infinite number of degrees of freedom.			
Brief outline of the c 1. Lectures cover wid applications are carri (QED), Quantum Ch theory of elementary 2. Application of qua connection between functional of Green to perturbative technique	ourse: le sphere of problems of high energy physics and statistical physics. Specific ed out for basic theories of elementary particles – Quantum electrodynamics romodymanics (QCD), standard model (SM) and for some models of unified particles. antum field theory to the classical physics is concentrated on explanation of the quantum field and statistical fluctuations of classical fields, generating functions of quantum fields and statistical sum, on the Feynman graphs and e in statistical physics			
Recommended litera 1. Bogoljubov N.N., 1984) 2. L.Rajder: Kvantov 3. Amit D.J., Field th (1978)	Ature: Shirkov D.V.: Vvedenie v teoriju kvantovannich polej, Nauka (1957, 1973, aja teorija pola, Moskva, Mir (1987) eory , the Renormalization Group, and Critical Phenomena,, McGraw-Hill			
 Zinn-Justin J.: Qua 1993) Vasiliev A.N. : Kv stochastičeskoj dinan 	antovopolevaja renormgruppa v teorii kritičeskogo povedenia i nike, Izd. Peterburgskogo instituta jadernoj fiziky, Sankt Peterburg (1998)			
Course language: slovak and english				
Notes:				

Course assessment		
Total number of assessed students: 1		
Ν	Р	
0.0 100.0		
Provides: prof. RNDr. Michal Hnatič, DrSc.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SSOL/04	se ID: ÚFV/ Course name: Self-motivated Study on Scientific Literature		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent		
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 180			
N P			
0.0 100.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

r			
University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF1a/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the course	: 1.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics and too	s of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems c	f the nuclear and subnuclear physics.	
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 20		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Jozef Urbán, CSc., doc. RN	Dr. Janka Vrláková, PhD.	
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ SJSF1b/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 2.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics and too	ls of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems of	of the nuclear and subnuclear physics.	
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 18		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Jozef Urbán, CSc., doc. RN	NDr. Janka Vrláková, PhD.	
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ SJSF2a/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the course	e: 3.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics and too	ls of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems c	of the nuclear and subnuclear physics.	
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 17		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Jozef Urbán, CSc., doc. RN	IDr. Janka Vrláková, PhD.	
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košic	e	
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF2b/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent		
Number of ECTS cro	edits: 3		
Recommended seme	ster/trimester of the c	course: 4.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics an	d tools of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical probl	ems of the nuclear and subnuclear physics.	
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 16		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.		
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, Dr	Sc.	

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF3a/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cro	edits: 3		
Recommended seme	ster/trimester of the cours	e: 5.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics and too	ls of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems of	of the nuclear and subnuclear physics.	
Recommended litera	iture:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 14			
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Jozef Urbán, CSc., doc. RN	NDr. Janka Vrláková, PhD.	
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF3b/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent		
Number of ECTS cro	edits: 3		
Recommended seme	ster/trimester of the cour	se: 6.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	problems, methodics and to	ols of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems	of the nuclear and subnuclear physics.	
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 12		
	abs	n	
100.0 0.0			
Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.			
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF4a/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cro	edits: 3		
Recommended seme	ster/trimester of the cours	e: 7.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics and too	ls of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems of	of the nuclear and subnuclear physics.	
Recommended litera	Recommended literature:		
Course language:			
Notes:	Notes:		
Course assessment Total number of asses	ssed students: 10		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Jozef Urbán, CSc., doc. RN	NDr. Janka Vrláková, PhD.	
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Approved: prof. RNDr. Stanislav Vokál, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ SJSF4b/04	Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 28 esent		
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e: 8.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To bring the topical p	roblems, methodics and too	ls of high energy physics to the students.	
Brief outline of the c Department seminar	ourse: - selected topical problems of	of the nuclear and subnuclear physics.	
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 10		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Jozef Urbán, CSc., doc. RN	NDr. Janka Vrláková, PhD.	
Date of last modifica	tion: 03.05.2015		
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.		

University: P. J. Šafárik University in Košice				
Faculty: Faculty of Science				
Course ID: ÚFV/ MSF/04	Course name: Simulation of Experiments and Processes in Subatomic Physics			
Course type, scope a Course type: Lectur Recommended cou Per week: 2 Per stu Course method: pro	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cr	edits: 5			
Recommended seme	ster/trimester of the cours	e: 1.		
Course level: III.				
Prerequisities:				
Conditions for cours	se completion:			
Learning outcomes: To introduce the stude	ents into the simulation of ex	periments and to the available programming tools.		
The role of simulat Frequently used dist generators and their simulation (e.g. GEA	ion in physics. Basics of ributions in physics. Basics realisations. Programming NT, PYTHIA).	probability theory and mathematical statistics. of the Monte Carlo methods. Random number tools used in high energy physics experiments		
Recommended literature: .Hudson: Lectures on Elementary statistics and probability, CERN 63-29, 1963 D. Hudson: Maximum likehood and Least square theory, CERN 64-18,1964 Manuály modelovacích programov A.G. Frodersen, O.Skjeggestad, H.Tofte: Probability and statistics in particle physics, Universitetsforlaget, Bergen-Oslo-Tromso, 1978				
Course language:	Course language:			
Notes:				
Course assessment Total number of assessed students: 14				
	N P			
0.0 100.0				
Provides: doc. RNDr	Provides: doc. RNDr. Jozef Urbán, CSc.			
Date of last modifica	ation: 30.03.2020			
Approved: prof. RNI	Dr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ ZSP/04	Durse ID: ÚFV/ Course name: Study Stay Abroad		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECIS cr			
Recommended seme	ster/trimester of the cours	e:	
Course level: 111.			
Prerequisities:			
Conditions for cours	Conditions for course completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	Recommended literature:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 258			
abs n			
	100.0	0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ SLNZ/09	Course name: Study of Lepton-Nucleon Collisions		
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e: 2.	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes: To review the results	Learning outcomes: To review the results of lepton-nucleon collision studies.		
Brief outline of the course: The lectures are concentrated on the analysis of relativistic leptons (electron, positron, and neutrinos) collisions with nucleons (protons and neutrons) and based on these results to study the internal structure of hadrons, mainly that of the proton. Determination of the proton (neutron, pion) structure functions and the extraction of parton structure functions in the proton. To study the photon structure function and analysis of diffractive processes in lepton-nucleon collisions.			
Recommended literature: 1. Dušan Bruncko: Štúdium leptónovo-nukleónových zrážok (Study of lepton-nucleon collisions) http://home.saske.sk/~bruncko/img/paper/skripta.pdf http://home.saske.sk/~bruncko/img/paper/skripta.ps			
Course language:			
Notes:			
Course assessment Total number of assessed students: 1			
	N	Р	
	0.0 100.0		
Provides: doc. RNDr. Dušan Bruncko, CSc., RNDr. Ivan Králik, CSc.			
Date of last modification: 03.05.2015			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ VPSV/04	Course name: Supervision of Student's Scientific Activity		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 6		
Recommended seme	ster/trimester of the cours	e: 6., 8.	
Course level: III.			
Prerequisities:			
Conditions for cours	Conditions for course completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	Brief outline of the course:		
Recommended litera	Recommended literature:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 16			
	abs	n	
	100.0	0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ VBP/04	JFV/ Course name: Supervisor/consultant of bacelor thesis		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 6		
Recommended seme	ster/trimester of the cours	e: 6., 8.	
Course level: III.			
Prerequisities:			
Conditions for cours	se completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	course:		
Recommended litera	Recommended literature:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 38			
	abs	n	
	100.0	0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ PPC/04	ourse ID: ÚFV/ Course name: Teaching activities PC/04		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of EC18 cr			
Recommended seme	ster/trimester of the cours	e:	
Course level: 111.	-		
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 238			
abs n			
	100.0	0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ PPC/04	ourse ID: ÚFV/ Course name: Teaching activities PC/04		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of EC18 cr			
Recommended seme	ster/trimester of the cours	e:	
Course level: 111.	-		
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 238			
abs n			
	100.0	0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafárik University in Košice				
Faculty: Faculty of S	Faculty: Faculty of Science			
Course ID: ÚFV/ PSU/04	Course name: Too	ols for Data Analysis and Processing		
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present				
Number of ECTS cro	edits: 4			
Recommended seme	ster/trimester of th	ie course: 2.		
Course level: III.				
Prerequisities:				
Conditions for cours	e completion:			
Learning outcomes: To extend the knowledge of statistical data processing and get some experience in the area of application of programming tools in elementary particle physics.				
Brief outline of the course: Selected topics from methods of experimental data analysis in physics, particle physics and from programming of basic physical applications in GRID environment.				
Recommended literature: http://ned.ipac.caltech.edu/level5/astrostatistics Glenovan: Computing and Statistical Data Analysis, University of London Lectures for HEP Postraguate Students: http://www.hep.ph.rhbnc.uk/~cowan. http://www.amara.com/current/wavelet.html, http://www.statsoft.com/textbook/stathome.html V. Blobel: Unfolding in HEP Experiments, ZEUS seminar at HERA, 1997. http://lib-www.lanl.gov/numerical/, http://www.astro.psu.edu/statcodes R. Barlow http://www.hep.man.ac.uk/u/roger An object oriented Data Analysis Framework http://root.cern.ch, Java Analysis Studio http://jas.freehep.org/ Grid computing, http://eu-datagrid.web.cern.ch/eu-datagrid/. J. Liberty Naučte se C++ za 21 dní Computer Press_Praha 2002				
Course language:				
Notes:				
Course assessment Total number of assessed students: 9				
	Ν	Р		
	0.0 100.0			
Provides: RNDr. Ale: PhD., doc. RNDr. Ma	xander Dirner, CSc. rek Bombara, PhD.	, doc. RNDr. Pavel Matula, CSc., RNDr. Pavol Bobik,		

Date of last modification: 30.03.2020

Approved: prof. RNDr. Stanislav Vokál, DrSc.

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ POVK/04	rse ID: ÚFV/ Course name: Work in Organizing Committee of Conference K/04		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	Brief outline of the course:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 94			
	abs	n	
	100.0	0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ PDS/18	ourse ID: ÚFV/ Course name: Writing Dissertation Work DS/18		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of ECTS cr	edits: 0		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 22			
N P			
0.0 100.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Stanislav Vokál, DrSc.			