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University: P. J. Šafá	rik University in Koš	ice
Faculty: Faculty of S	cience	
Course ID: ÚFV/ PVS/04	Course name: Author's patents, discoveries, software	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: dis	nd the method: rse-load (hours): y period: tance, present	
Number of ECTS cr	edits: 2	
Recommended seme	ster/trimester of the	course:
Course level: III.		
Prerequisities:		
Conditions for cours Patent filed, invention	e completion: n, software product c	reated.
Learning outcomes: The PhD student dem or with impact on an	onstrates the ability t interdisciplinary scal	o create an innovative product in a given scientific field, e or in technical practice.
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asses	ssed students: 44	
	abs	n
100.0 0.0		
Provides:		· · · ·
Date of last modifica	tion: 08.11.2022	
Approved: prof. RNI	Dr. Milan Žukovič, Pl	nD.

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ COK/22	Course name: Certified training course	
Course type, scope a Course type: Recommended cou Per week: Per stud Course method: dis	nd the method: rse-load (hours): ly period: stance, present	
Number of ECTS cr	edits: 4	
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours Completion of a certi	e completion: fied professional/training co	purse.
Learning outcomes: The PhD student acc work and familiarize He confronts his own peer discussion in the	uires up-to-date scientific k s himself with the methodo knowledge and skills with o e given scientific field.	nowledge, develops the capabilities of scientific logies of making scientific knowledge available. other course participants, develops the abilities of
Brief outline of the c	ourse:	
Recommended litera	nture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 0	
	abs	n
	0.0 0.0	
Provides:		
Date of last modifica	ntion: 08.11.2022	
Approved: prof. RNI	Dr. Milan Žukovič, PhD.	

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ CM/22	Course name: Citation in monograph	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present		
Number of ECTS cre	edits: 8	
Recommended semes	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for course Obtained citation regi	e completion: stered in SCI or Scopus.	
Learning outcomes: Obtaining a citation researched field, base problem in such a wa source demonstrates contribution to scienti	demonstrates broad and ed on the ability to formul y that generates new know the competence to commu- fic knowledge, at the highe	very well-founded scientific knowledge in the ate research questions, to reflect on a scientific ledge. At the same time, a citation in an indexed unicate new knowledge, which is a significant st expert level.
Brief outline of the co	ourse:	
Recommended litera	ture:	
Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
	abs	n
0.0 0.0		
Provides:		
Date of last modificat	tion: 08.11.2022	
Approved: prof. RND	Pr. Milan Žukovič, PhD.	

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ CZC/22	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: distance, present		
Number of ECTS cr	edits: 4	
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours Obtained citation in a	e completion: a foreign scientific journal.	
Learning outcomes: Obtaining a citation researched field, bas problem in such a wa source demonstrates contribution to scient	demonstrates broad and ed on the ability to formul ay that generates new know the competence to commu- ific knowledge, at the highe	very well-founded scientific knowledge in the ate research questions, to reflect on a scientific ledge. At the same time, a citation in an indexed unicate new knowledge, which is a significant st expert level.
Brief outline of the c	ourse:	
Recommended litera	nture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 0	
	abs	n
0.0 0.0		
Provides:		
Date of last modifica	tion: 08.11.2022	
Approved: prof. RNI	Dr. Milan Žukovič, PhD.	

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ CDC/22	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: distance, present			
Number of ECTS cr	edits: 2		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Records of citations i	e completion: n the central register of reco	ords of publication activity.	
Learning outcomes: A citation in a peer-reviewed scientific journal indicates the quality of a doctoral student's publication activity and the acceptance of his publishing activity in the domestic scientific community.			
Brief outline of the course: Study of literature with a focus on the chosen issue of publication output.			
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0 0.0		
Provides:			
Date of last modification: 12.10.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ SCI/22	Course name: Citation registered in Science Citation Index		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: dis	nd the method: rse-load (hours): ly period: tance, present		
Number of ECTS cr	edits: 8		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Records of citations i	e completion: n the central register of reco	ords of publication activity.	
Learning outcomes: A citation in a peer publication activity a	r-reviewed scientific journa nd the acceptance of his pub	al indicates the quality of a doctoral student's plishing activity in the scientific community.	
Brief outline of the c Study of literature wi	ourse: th a focus on the chosen iss	ue of publication output.	
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0 0.0		
Provides:			
Date of last modifica	tion: 12.10.2022		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ SIG/22	Course name: Co-worker (VVGS)	of project supported by internal grant schemes	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Conditions for course	a completion.		
Conditions for cours Co-worker of project	supported by internal grant	schemes (VVGS)	
The PhD student demonstrates the ability to participate in teamwork, to bring his own contribution to the solution of the project objective within the internal grant system at UPJŠ. By solving the internal VVGS grant, he acquires the ability to implement the project plan according to the established procedure, adhere to the project schedule, coordinate his own activities with colleagues, and participate in the creation of outputs. The PhD student gains valuable experience from the practical course of the grant project.			
Brief outline of the course:			
Recommended litera	ature:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 0			
	abs n		
	0.0 0.0		
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ SMPR/04	Course 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: distance, present		
Number of ECTS cr	edits: 15	
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours Membership in the re	se completion: esearch team of an internation	nal project.
Learning outcomes: Active involvement by solving a specific task within a team of international project solvers. The PhD student demonstrates the ability to work in a team, take responsibility for the assigned task, adhere to the time schedule and fulfill the project outputs. The PhD student gains personal experience from the implementation of an international project, participation in its key stages, creation of measurable outputs, grant funding of science		
Brief outline of the c	course:	
Recommended litera	ature:	
Course language:		
Notes:		
Course assessment Total number of assessed students: 108		
abs n		
100.0 0.0		
Provides:		
Date of last modification: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafá	arik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ POCF/13	Course name: Computational Physics		
Course type, scope a Course type: Lectu Recommended cou Per week: 4 Per stu Course method: dis	and the method: re rse-load (hours): ady period: 56 stance, present		
Number of ECTS cr	redits: 8		
Recommended seme	ester/trimester of the course: 2.		
Course level: III.			
Prerequisities:			
Conditions for cours To successfully com degree of understand organized in blocks, The course ends with of the project electro course takes into acc (2 credits), project w minimum limit for co	se completion: uplete the course, it is necessary for the student to demonstrate a sufficient ing of the principles of selected advanced computational methods. Lectures are with a selection of topics reflecting the needs of currently registered students. In a final oral exam, the completion of which is conditioned by the submission onically and with the attached computer program. The credit evaluation of the count the following student workload: direct teaching (2 credits), self-study work (2 credits), individual consultations (1 credit), and exam (1 credit). The completing the course is to obtain at least 50% of the total score.		
Learning outcomes: To acquaint students physical and non-phy Monte Carlo methods complex systems using	with modern methods of computational physics and their application to various ysical systems. Students have the opportunity to get acquainted with modern s and methods of molecular dynamics, developed for demanding simulations of ng parallel programming, as well as their various interdisciplinary applications.		
 Brief outline of the of 1. Modern Monte rugged energy surface Calculation of dense parallelized Wang-La 2. Molecular Dyname physics and their imperimeter and its application in of dynamics. 3. Other models a models. Voting mode formation. Sznajd's perimeter applications. 	course: Carlo methods for application to problematic complex systems with ces. Multicanonical methods. Parallel tempering method (replica exchange). ity of states and free energy using the Wang-Landau method. Massively andau replica exchange method for petaflop supercomputers. ics. Advanced concepts of computer simulation techniques used in statistical portance for understanding physical systems. Approach of molecular dynamics n problems of statistical physics. Cellular automata for lattice gas. Problems nd applications. Sociophysical models based on spin models. Galam's del in hierarchical systems. Group decision model. Dynamics of opinion model and its applications. Applications of statistical physics approaches in poral data. Time series predictions and digital image processing. Geostatistical		
Recommended literature:	ature:		

LANDAU, D.P., BINDER, K.: A Guide to Monte Carlo Simulations in Statistical Physics, Cambridge Univ. Press, 5-th edition, 2021.

BOTTCHER, L., HERRMANN, H.J., Computational Statistical Physics, Cambridge Univ. Press, 2021.

BINDER, K., HEERMANN, D.W., Monte Carlo simulation in statistical physics, Springer-Verlag, Berlin, 2002.

HAILE, J.M., Molecular dynamics simulations, John Wiley & Sons. INC., New York, 1992. KAMBERAJ, H., Molecular Dynamics Simulations in Statistical Physics: Theory and Applications, Springer Nature Switzerland AG, 2020.

VAN KAMPEN, N.G., Stochastic processes in physics and chemistry, North-Holland, 1990. CHAKRABARTI, B.K. et al. (Editors), Econophysics and sociophysics: Trends and perspectives, Wiley-VCH, 2006.

Р

100.0

GALAM, S., Sociophysics: A Physicist's Modeling of Psycho-political Phenomena, Springer, 2012.

Course language:

Notes:

Course assessment

Total number of assessed students: 11

0.0	

Ν

Provides: prof. RNDr. Milan Žukovič, PhD.

Date of last modification: 16.11.2021

Approved: prof. RNDr. Milan Žukovič, PhD.

University: P. J. Šafán	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ ODZP/14	Course name: Defence of	Doctoral Thesis	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cro	edits: 30		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for course completion: The Dissertation thesis is the result of the student's own scientific research. It must not show elements of academic fraud and must meet the criteria of correct research practice defined in the Rector's Decision no. 21/2021, which lays down the rules for assessing plagiarism at Pavel Jozef Šafárik University in Košice and its constituents. Fulfillment of the criteria is verified mainly in the process of supervising and in the process of the thesis defense. Failure to do so is grounds for disciplinary action.			
Learning outcomes: The Dissertation thesis has elements of a scientific work and the student demonstrates extensive mastery of the theory and professional terminology of the field of study, acquisition of knowledge, skills and competences in accordance with the declared profile of the graduate of the field of study, as well as the ability to apply them in an original way in solving selected problems of the field of study. The student demonstrates the ability of independent scientific work in terms of content, formal and ethical aspects. Further details of the Dissertation thesis are determined by Directive no. 1/2011 on the essential prerequisites of final theses and by the Study Rules of Procedure at UPJŠ in Košice for doctoral studies. The doctoral student demonstrated the ability and readiness for independent scientific and creative activity in the field of study of philology in accordance with the expectations of the relevant qualification framework and the profile of the graduate			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 103			
	N P		
	0.97 99.03		

Provides:

Date of last modification: 08.11.2022

Approved: prof. RNDr. Milan Žukovič, PhD.

	COURSE INFORMATION LETTER		
University: P. J. Šaf	ărik University in Košice		
Faculty: Faculty of	Faculty: Faculty of Science		
Course ID: ÚFV/ MDU/04	Course name: Detection Methods and Experiments on Large Colliders		
Course type, scope Course type: Lectu Recommended cou Per week: 2 Per st Course method: di	and the method: are arse-load (hours): udy period: 28 astance, present		
Number of ECTS c	redits: 4		
Recommended sem	ester/trimester of the course: 2.		
Course level: III.			
Prerequisities:			
1. Presence at the le 2. Activity at semina Conditions for the fi Conditions for the s 1. Active presence a 2. Fulfillment of the Credit evaluation o practical activities –	nuous evaluation: ctures as specified by the rules of study and indicated by the lecturer. ars. inal evaluation:Research work on a selected topic. uccessful course completion: it lectures. conditions of continuous and final evaluation at more than 90% level. f the course: direct teaching, individual consultations, self-study (1 credit), research work (2 credits), evaluation (1 credit).		
Learning outcomes The student can der methods in the high Aqcuired knowledge	: nonstrate sufficient knowledge about the physics principles and measurement a energy and particle physics in large experiments with particle accelerators. e can be actively used during the physics analysis of the real experimental data.		
 Brief outline of the 1. Passage of radiati 2. Gaseous detector chamber, streamer c 3. Scintillation c photomultipliers. 4. Calorimeters: ca Heitler model of th electromagnetic calc 5. Hadron calorimeters 	course: on through matter. rs: principles of operation, ionization chamber, proportional chamber, spark hamber, MWPC, drift chamber, TPC. letectors: Geiger and Marsden experiments, scintillation detectors, lorimetry in the high energy physics, electromagnetic calorimeters, Rossi- e electromagnetic shower, electromagnetic showers, practical realization of primeters, energetic resolution of electromagnetic calorimeters. eters: hadron showers, electromagnetic and hadronic shower components,		

calorimeter response, compensation, energy resolution. 6. Cherenkov radiation detectors: Cherenkov radiation, differential Ch. detectors, RICH.

7. Transition radiation detectors.

8. Semiconductor detectors: conduction, semiconductors, P-N junction, microstrip detectors, pixel detectors, drift detectors.

9. Time of flight method.

 Muon detectors: multiple scattering, Branson plane. Photoemulsion detectors. Experiments at large accelerators. ALICE experiment at LHC at CERN. 		
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 S. Tavernier, Experimental Techniques in Nuclear and Particle Physics, Springer-Verlag Berlin Heidelberg, 2010		
Course language: slovak or english		
Notes:		
Course assessment Total number of assessed students: 9		
Ν	Р	
0.0	100.0	
Provides: RNDr. Ivan Králik, CSc.		
Date of last modification: 19.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ DPSD/14	Course name: Distributed	data processing	
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: distance, present			
Number of ECTS cr	edits: 4		
Recommended seme	ster/trimester of the cours	e: 2.	
Course level: III.			
Prerequisities:			
Conditions for course completion: Term project, evaluation. Credit evaluation of the course: direct teaching, individual consultations and self-study (1 credit), practical activities – term project (2 credits), evaluation (1 credit). Minimum limit for completion of the course is to obtain at least 51% of the total evaluation.			
Learning outcomes: Lectures on parallel of	Learning outcomes: Lectures on parallel data processing on analysis farms.		
Brief outline of the course: Introduction to batch systems and network storage. Generate multiple events using event generator and run multiple simulations on cluster. Analyze these data to produce physics results. Merge these results when analysis is done.			
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 asse	ssed students: 9		
N P			
	0.0	100.0	
Provides: RNDr. Martin Val'a, PhD.			
Date of last modification: 18.11.2021			

Approved: prof. RNDr. Milan Žukovič, PhD.

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ VPZP/22Course name: Elaboration of reviewer name: E	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: distance, present		
Number of ECTS credits: 3		
Recommended semester/trimester of the course:		
Course level: III.		
Frerequisities:		
Conditions for course completion: Elaboration of reviewer report		
Learning outcomes: The PhD student demonstrates broad and scientifically based knowledge in the field of study, as well as knowledge of a wide range of methods and approaches. Demonstrates the ability to critically assess a professional problem and its proposed solution, as well as to evaluate it and possibly recommend another solution. He applies knowledge and skills from the field of pedagogical sciences to his own field.		
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
abs	n	
0.0	0.0	
Provides:		
Date of last modification: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience	
Course ID: ÚFV/ VPKF2/13	Course name: Energetic particles and heliosphere	
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: distance, present		
Number of ECTS credits: 4		
Recommended semester/trimester of the course: 2.		
Course level: III.		

Prerequisities:

Conditions for course completion:

Literature search and compilation on one particular subject selected. Concluding work.

Credit evaluation of the course: direct teaching,

individual consultations and self-study (1 credit), practical activities – concluding work (2 credits), evaluation (1 credit).

Learning outcomes:

To acquaint with the know edge of selected physical processes in the inner and outer heliosphere.

Brief outline of the course:

1. Introduction. Radial structure of the Sun. 2. Sun atmosphere. Solar flares. Acceleration of particles in eruptions. Solar neutrons and gamma radiation. 3. Solar wind. Interplanetary magnetic field. Corotion interaction areas. 4. Plasma waves in the interplanetary environment. Threedimensional structure of the heliosphere. 5. Active processes in the Sun. Eruptions and outbursts of coronal matter. Shock waves. 6. Solar radio emissions. Thermal emission. Microwave domain. Radio emissions after eruptions and disturbances in the interplanetary environment. 7. Energy particles in the heliosphere. Populations and resources. Solar energy particles. 8. Transport of particles in the interplanetary field. Theoretical foundations. Spatial diffusion. Diffusion in the space of pitch angles. Diffusion in the space of momentum. 9. Interactions of waves and particles in the heliosphere. Transport equations. 10. Observations of particle propagation in the interplanetary environment. Comparison with experiment. 11. Acceleration of particles on shock waves - theoretical models. 12. Particles on shock waves in the interplanetary environment. 13. Galactic cosmic rays and modulation models.

Recommended literature:

R. Schwenn, E. Marsch (editors), Physics of the Inner Heliosphere II, Particles, Waves and Turbulence, Springer Verlag, 1991

Reames, D. V., Particle acceleration at the Sun and in the heliosphere, Space Science Reviews, vol. 90, pp. 413–491, 1999. doi:10.1023/A:1005105831781.

K. Scherer, H. Fichtner, E. Marsch, The Outer Heliosphere: Beyond the Planets, Copernicus Gesellschaft e.V., 2000

Lee, M.A., Mewaldt, R.A., and Giacalone, J., Shock Acceleration of Ions in the Heliosphere, 2012, Space Science Reviews, 173, 247. doi:10.1007/s11214-012-9932-y.

Marius S. Potgieter, Solar Modulation of Cosmic Rays, Living Reviews in Solar Physics volume 10, Article number: 3 (2013)

Course language:		
Notes:		
Course assessment		
Total number of assessed students: 3		
Ν	Р	
0.0	100.0	
Provides: RNDr. Pavol Bobik, PhD.		
Date of last modification: 18.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik 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: distance, present		
Number of ECTS credits: 4		
Recommended semester/trimester of the course: 1.		
Course level: III.		

Prerequisities:

Conditions for course completion:

Literature search and compilation on one particular subject selected. Concluding work.

Credit evaluation of the course: direct teaching,

individual consultations and self-study (1 credit), practical activities – concluding work (2 credits), evaluation (1 credit).

Learning outcomes:

To acquaint with the know edge of selected physical processes in magnetosphere, especially that of Earth.

Brief outline of the course:

1. Particle drifts and the first adiabatic invariant. Guiding center approach. Homogeneous magnetic field. 2. Drifts of zero, first and second order. The first adiabatic invariant. Particle drift at the geomagnetic equator. 3. Oscillating motion between mirror points. Particle capture. Equation of parallel motion with respect to a lineof force. Energy equation. 4. Drift envelopes. The second adiabatic invariant. 5. Drift of particles in a dipole magnetic field. 6. Monitoring of drift envelopes in a real model of a geomagnetic field. 7. Effects of external forces on particles near the equatorial plane. 8. Periodic drift movement. Drift envelopes in a time-dependent magnetic field. 9. Third adiabatic invariant. Influence of ring current on the path of particles near the equator. 10. Effect of sudden compressions and adiabatic expansions of the magnetosphere. 11. Distribution of trapped particles. Directional flow. 12. Distribution functions of particles in the magnetosphere. 13. Mapping of trapped particles in the inner magnetosphere. Coordinates B-L. 14. Disruption of adiabatic invariants. Diffusion mechanisms. 15. Coordinates and distribution functions used. 16. Diffusion equation. Radial diffusion. Angular diffusion in a symmetric field. Combined radial and angular diffusion.

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

J. P. Eastwood, H. Hietala, G. Toth, T. D. Phan & M. Fujimoto , What Controls the Structure and Dynamics of Earth's Magnetosphere?, Space Science Reviews volume 188, pages251–286, 2015

S. E. Milan, L. B. N. Clausen, J. C. Coxon, J. A. Carter, M.-T. Walach, K. Laundal, N. Østgaard, P. Tenfjord, J. Reistad, K. Snekvik, H. Korth & B. J. Anderson, Overview of Solar Wind– Magnetosphere–Ionosphere–Atmosphere Coupling and the Generation of Magnetospheric Currents, Space Science Reviews volume 206, pages547–573, 2017

Course language:		
Notes:		
Course assessment Total number of assessed students: 3		
Ν	Р	
0.0	100.0	
Provides: RNDr. Pavol Bobik, PhD.		
Date of last modification: 18.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafár	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ ESH/09	Course name: Extremal States of Matter		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: dis	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: distance, present		
Number of ECTS cro	edits: 4		
Recommended seme	ster/trimester of the course: 2.		
Course level: III.			
Prerequisities:			
Conditions for cours Literature search and The credit evaluation credit), practical activ	e completion: compilation on one particular subject selected. Concluding work. n of the course: direct teaching, individual consultations and self-study (1 vities – concluding work (2 credits), evaluation (1 credit).		
Learning outcomes: The main goal of lect	ures is introduction to matter extremal states topic.		
 Brief outline of the c 1. Inroduction to basi 2. Plasma 3. Quark-hadrons pha 4. Short introduction 5. Space expansion 6. Simple cosmologic 7. Big hot explosion 8. Phase transitions in 9. Elements nucleosy 10. Compact stars 11. Dark matter, dark 12. Inflation space 	ourse: c ase transition to modern cosmology cal models a early space nthesis and origin of light elements energy		
 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. Cosmol. 23: 1-446, 2005. 			
Course language:			
Notes:			

Course assessment		
Ν	Р	
0.0	100.0	
Provides: RNDr. Pavol Bobik, PhD., doc. RNDr. Marek Bombara, PhD.		
Date of last modification: 19.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ DKZU/22	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: distance, present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Active participation i	e completion: n a national conference with	n foreign participation.	
By actively participating in a scientific conference, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology in his scientific field. He demonstrates the ability to reflect on a specific scientific problem by using the latest approaches and applying them critically. Demonstrates competence to use existing theories and concepts in an innovative way, as well as generate new original scientific knowledge and communicate research results to a wider audience by adequate means and through Slovak or a foreign language.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 1			
	abs	n	
100.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ NEM/04	urse ID: ÚFV/ 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: distance, present			
Number of ECTS cr	edits: 15		
Recommended seme	ster/trimester of the cours	e: 8.	
Course level: III.			
Prerequisities:			
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: 91			
abs n			
100.0 0.0		0.0	
Provides:			
Date of last modification:			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ ZC/22	Course name: International Journal		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cr	edits: 8		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Publication accepted	e completion: in a foreign journal as an au	thor/co-author.	
By publishing in a foreign journal as an author/co-author, the PhD student demonstrates a high level of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0 0.0		
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ ZSP1/22	Course name: International Study Stay less than 30 Days		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cre	dits: 5		
Recommended semes	ter/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for course completion: Completion of a foreign study stay lasting less than 30 days.			
By completing a shorter study stay, the PhD student demonstrates the ability to reflect on research problems and work critically with sources at an expert level and in an interdisciplinary context, while being able to generate new knowledge. He is able to actively communicate at an expert level in more than one language. He acts as a responsible independent scientist, works independently and in a group with the aim of pushing the boundaries of knowledge and transferring them to other areas of research, to practice and to the wider public. He can competently argue and explain his ideas.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
0.0 0.0		0.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ ZSP2/22Course name: International S	Course name: International Study Stay more than 30 Days		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS credits: 10			
Recommended semester/trimester of the course:			
Course level: III.			
Prerequisities:			
Conditions for course completion: Completion of a foreign study stay lasting more that	in 30 days.		
By completing the study stay, the PhD student demonstrates the ability to reflect on research problems and work critically with sources at an expert level and in an interdisciplinary context, while being able to generate new knowledge. He is able to actively communicate at an expert level in more than one language. He acts as a responsible independent scientist, works independently and in a group with the aim of pushing the boundaries of knowledge and transferring them to other areas of research, to practice and to the wider public. He can competently argue and explain his ideas			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 1			
abs	n		
100.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ MKZ/22Course name: Internation	Course name: International abroad conference		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS credits: 10			
Recommended semester/trimester of the cours	se:		
Course level: III.			
Prerequisities:			
Conditions for course completion: Active participation in an international conference	ce abroad.		
By actively participating in an international scientific conference abroad, the phD student demonstrates a high level of ability to identify, evaluate, and apply correct scientific methods or research methodology in his scientific field. He demonstrates the ability to reflect on a specific scientific problem by using the latest approaches and applying them critically. Demonstrates competence to use existing theories and concepts in an innovative way, as well as generate new original scientific knowledge and communicate research results to a wider audience by adequate means and through a foreign language.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 1			
abs	n		
100.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
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: dis	nd the method: re rse-load (hours): dy period: 28 tance, present
Number of ECTS cr	edits: 5
Recommended seme	ster/trimester of the course: 2.
Course level: III.	
Prerequisities:	
Conditions for cours Knowledge of the sul Credit evaluation of t and individual consu	e completion: oject at a sufficient level, exam. he course takes into account the following student workload: direct teaching ltations (2 credits), self-study (2 credits), evaluation (1 credit).
Learning outcomes: The student learns ba	sic facts about development of the theory of weak interactions.
 Brief outline of the c 1. Basic properties of hypothetical particle 2. Revolutionary Ferri 3. Parity conservation decay. 4. A general form of 5. Experimetal determination of the second s	ourse: of the beta dacay and the first attempt to explain observed phenomena. A neutrino. mi theory of the beta decay. n in weak interaction. The experimental proof of parity violation in the beta the weak interaction Hamiltonian. nination of all free parameters of the weak interaction Hamiltonian.
Recommended litera 1. J. Hořejší: Introduc czech version: Elektr 2. P. Renton: Electrov 3. Francis Halzen, Al A.D.Martin: Kvarki i 4. Cheng T.P., Li L.F. 1984.	nture: etion to electroweak unification (World Scientific, Singapore 1994); oslabé sjednocení a stromová unitarita (Karolinum, Praha 1993). weak interactions (Cambridge Univ. Press, Cambridge 1990). an D. Martin: Quarks and Leptons, John Wiley&Sons in russian: F.Helzen, leptoni, Mir, Moskva, 1987. : Gauge theory of elementary particle Physics, Claredon Press, Oxford,
Course language:	
Notes:	

Course assessment		
Total number of assessed students: 18		
N P		
0.0	100.0	
Provides: prof. RNDr. Michal Hnatič, DrSc., RNDr. Ivan Králik, CSc.		
Date of last modification: 18.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ DC/22	Course name: Local journal		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cro	edits: 6		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Publication accepted	Conditions for course completion: Publication accepted in a national journal as author/co-author.		
By publishing in a national journal as an author/co-author, the PhD student demonstrates a high level of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0 0.0		
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ MONB/22Course name: Monograph	Course name: Monograph		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS credits: 20			
Recommended semester/trimester of the course:			
Course level: III.			
Prerequisities:			
Conditions for course completion: Co-author of the monograph.			
By publishing a monograph, the PhD student demonstrates a high level of ability to identify, evaluate, and apply correct scientific methods or research methodology. It demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The doctoral student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
abs	n		
0.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			
University: P. J. Šafárik University in Košice			
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Faculty: Faculty of Science			
Course ID: ÚFV/ MONA/22	Course name: Monograph in a renowned publishing house		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cr	edits: 40		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Co-author of a monog	Conditions for course completion: Co-author of a monograph in a renowned publishing house.		
By publishing a monograph in a renowned publishing house, the PhD student demonstrates a high level of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The doctoral student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0	0.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice				
Faculty: Faculty of S	Faculty: Faculty of Science			
Course ID: ÚFV/ DK/04	Course name: National Conference			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present				
Number of ECTS cro	edits: 2			
Recommended seme	ster/trimester of the cours	e:		
Course level: III.				
Prerequisities:				
Conditions for cours Active participation i	e completion: n the home conference.			
By actively participating in the national scientific conference, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology in his scientific field. He demonstrates the ability to reflect on a specific scientific problem by using the latest approaches and applying them critically. Demonstrates competence in using existing theories and concepts in an innovative way, as well as generating new original scientific knowledge and communicating research results to a wider audience using adequate means and through the Slovak language.				
Brief outline of the c	Brief outline of the course:			
Recommended litera	iture:			
Course language:				
Notes:				
Course assessment Total number of assessed students: 160				
	abs	n		
100.0		0.0		
Provides:				
Date of last modification: 08.11.2022				
Approved: prof. RNDr. Milan Žukovič, PhD.				

University: P. J. Šafárik University in Košice	University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science				
Course ID: ÚFV/ NRZ/22Course name: Non-Review	Course name: Non-Reviewed International or National Proceedings			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present				
Number of ECTS credits: 2				
Recommended semester/trimester of the cours	e:			
Course level: III.				
Prerequisities:				
Conditions for course completion: A publication published in a non-reviewed foreig	gn or national journal as an author/co-author.			
By publishing in a non-reviewed foreign or national journal as an author/co-author, the PhD student demonstrates the ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The phD student demonstrates the ability to finalize his own thoughts in a written speech.				
Brief outline of the course:				
Recommended literature:				
Course language:				
Notes:				
Course assessment Total number of assessed students: 0				
abs	n			
0.0	0.0			
Provides:				
Date of last modification: 08.11.2022				
Approved: prof. RNDr. Milan Žukovič, PhD.				

University: P. J. 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 cou Per week: 2 Per stu Course method: dis	ind the method: re rse-load (hours): idy period: 28 stance, present
Number of ECTS cr	redits: 4
Recommended seme	ester/trimester of the course: 2.
Course level: III.	
Prerequisities:	
Conditions for cours Knowledge of the sul into account the follo evaluation (1 credit).	se completion: bject at a sufficient level, evaluation. The credit evaluation of the course takes owing student workload: direct teaching (1 credit), self-study (2 credits) and
Learning outcomes: Special lectures orier	nted towards particle calorimetry.
electrons, protons, ch Energy loss, range. Interactions at high e Calorimeters: Principles of Calorim Electromagnetic and Shower Profiles and Electromagnetic calo Hadronic calorimeter Free electron drift ve Types of Calorimeter Compensating and ne Total Absorption, Sa Scintillation, Ionizati Signal Detection. Shower shapes in had Fluctuations in hadro Position resolution ir Shower maximum de Signal read-out, p	narged particles, photons, muons. nergy. hetry. Hadronic Showers. Containment. primeters. rs. hocities in liquid ionization chamber. rs: on-compensating. mpling, homogeneous ion, Cherenkov. dron calorimeters. phic energy measurements. in the calorimeters. etectors. rocessing, calibration of readout electronics. Physics calibration of

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.html 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 lecture8/27257380 http://www.kip.uni-heidelberg.de/atlas/seminars/WS2009 JC/compensation1 **Course language:** English Notes: **Course assessment** Total number of assessed students: 0 Ν Р 0.0 0.0 Provides: RNDr. Pavol Stríženec, CSc. Date of last modification: 18.11.2021 Approved: prof. RNDr. Milan Žukovič, PhD.

University P I Šafárik University in Košice		
Examples Frankts of Spinner		
Faculty: Faculty of S	Science	
Course ID: UFV/ UFRJZ/22	Course name: Physics of Relativistic Nuclear Collisions	
Course type, scope a Course type: Lectu Recommended cou Per week: 2 Per sta Course method: di	and the method: re irse-load (hours): udy period: 28 stance, present	
Number of ECTS ci	redits: 5	
Recommended sem	ester/trimester of the course: 2.	
Course level: III.		
Prerequisities:		
Conditions for cour Elaboration of a term Detailed conditions within the repository Credit evaluation of and individual consu evaluation (1 credit) of the total score.	se completion: n project on a given topic. Passing the oral exam. are updated annually on the electronic notice board of the subject in AiS2 or 7 for digital support materials (LMS UPJŠ, MS Teams UPJŠ, etc.) the course takes into account the following student workload: direct teaching lltations (1 credit), self-study (1 credit), practical activities - project (2 credits), . The minimum threshold for completing the course is to obtain at least 51%	
Learning outcomes: Acquisition of basic energies.	knowledges from the heavy ion physics from intermediate to ultra-relativistic	
Brief outline of the 1. Introduction 2. Basic overview of 3. Introduction to rel 4. Relativistic Boltzn 5. Equation of state 6. Relativistic fluid of 7. Simple models 8. Measurable quant 9. Scaling in hydrod 10. Direct solution of 11. Search for quark 12. Relation to astro	course: The phenomenology of heavy ion collisions ativistic kinetic theory nann transport equation dynamics ities ynamic model if the kinetic equation -gluon plasma physics	
Recommended liter 1. J. Bartke, Introduce Ltd., Singapore, 200 2. R. Vogt, Ultrarela 3. J. Letessier, J. Rat Phys. Nucl. Phys. Co	ature: ction to Relativistic Heavy Ion Physics, World Scientific Publishing Co. Pte. 9. tivistic Heavy-Ion Collisions, Elsevier, 2007. felski: Hadrons and quark-gluon plasma, Camb. Monogr. Part. osmol. 18: 1-397, 2002.	

Course language: slovak and english		
Notes:		
Course assessment Total number of assessed students: 0		
Ν	Р	
0.0	0.0	
Provides: doc. RNDr. Adela Kravčáková, PhD.		
Date of last modification: 19.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ PK/04Course name: Plasma in Space			
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: distance, present			
Number of ECTS credits: 5			
Recommended semester/trimester of the course: 1.			
Course level: III.			
Prerequisities:			
Conditions for course completion: Literature search and compilation on one particular subject selected. Final examination. Credit evaluation of the course: direct teaching and individual consultations (1 credit), self-study (1 credits), practical activities – iterature search and compilation (2 credits), evaluation (1 credit).			
Learning outcomes: To acquaint with the specifics of plasma formations in space.			
Brief outline of the course: 1. Differences of matter in cosmic plasma formations from solids, liquids and gases. 2. Distribution function, description of particles in 6D phase space, relation of distribution function and measured flow characteristics. 3. Basic equations for the description of the flow of energetic particles in cosmic plasma. 4. Geomagnetic field. 5. Development of geomagnetic field in the past. IGRF models. 6. Geomagnetic disturbance. Geomagnetic activity indices. The main areas of the Earth's magnetosphere. 7. Particles trapped in magnetic field traps. Description using adiabatic invariants. Disorders of movement and dumping of particles into the upper atmosphere. 8. Atmospheric layers. Influence of cosmic rays on the atmosphere. Radiation doses at different heights and their changes. 9. Propagation of radio waves and the state of the Earth's ionosphere. 10. Plasma of the solar wind. Concentration, flow rate and temperature. The influence of the solar wind on the immediate vicinity of the Earth. 11. Basic data on solar flares. Models of acceleration in eruptions. Classification of eruptions. 12. Plasma and magnetic field in the solar system. Discharges of coronal substance. 13. What is space weather, how is it monitored and what are the prediction methods.			
 Recommended literature: 1. Rossi B., Olbert S.: Introduction to the Physics of Space, ruský preklad, Moskva, 1974. 2. George K. Parks, Physics of Space Plasmas, 2004, Westview Press 3. Paul M. Bellan, Fundamentals of Plasma Physics, Cambridge University Press, 2006 4. Current materials published in cosmic physics. 			
Course language:			
Notes:			

Course assessment		
N	Р	
0.0	100.0	
Provides: RNDr. Pavol Bobik, PhD.		
Date of last modification: 19.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ POP/22	Course name: Popularisation of science	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present		
Number of ECTS cr	edits: 5	
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for course completion: Active involvement in the popularization of science.		
Learning outcomes: Demonstrated ability to present science to the lay public, use interactive methods of scientific communication, identify the target group and adapt the communication language to the level of professional knowledge. A PhD student is able to arouse interest and motivate specific target groups in the field of his scientific work, but also in the wider context of science		
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: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ VYS/22Course name: Presentation	Course name: Presentation in Seminar		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS credits: 5			
Recommended semester/trimester of the cours	e:		
Course level: III.			
Prerequisities:			
Conditions for course completion: Presentation at the seminar			
Learning outcomes: By actively participating in the seminar, the PhD student demonstrates the ability to identify, evaluate, and apply correct scientific methods or research methodology in his field of study. He demonstrates the ability to reflect on a specific scientific problem by using the latest approaches and applying them critically. Demonstrates competence in using existing theories and concepts in an innovative way, as well as generating new original scientific knowledge and communicating research results by adequate means and through Slovak or a foreign language.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
abs	n		
0.0	0.0		
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. I. Šafá	University D. I. Čeféril: University in Kečice		
Faculty: Faculty of S	cience		
Course ID: UFV/ ZRIG/22	Course name: Principal investigator of an internal grant (VVGS)		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cr	edits: 10		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Principal investigator	e completion: of an internal grant (VVGS	5)	
The PhD student demonstrates the ability to process a successful application for his own research problem within the internal grant system at UPJŠ. Acquires skills with the design of research stages, their time schedule, measurable outputs and adequate distribution of funds. The very solution of the internal VVGS grant acquires the ability to implement the project intention according to the established procedure, to be responsible for achieving the set outputs. As a responsible researcher, the PhD student acquires competencies in project management, its administration, and presentation of results.			
Brief outline of the c	Brief outline of the course:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0	0.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Q1SA/22	Course name: Q1 journal as co-author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cro	edits: 30		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Publication accepted	e completion: in a journal of category Q1	as co-author.	
Learning outcomes: By publishing in a journal of category Q1 as a co-author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas			
Brief outline of the c	ourse:		
Recommended litera	ture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0	0.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Q11A/22	rse ID: ÚFV/ Course name: Q1 journal as first or corresponding author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cr	edits: 40		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Publication accepted	e completion: in a journal of category Q1	as first or corresponding author	
By publishing in a journal of category Q1 as the first or corresponding author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
abs n			
	0.0 0.0		
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Q2SA/22Course name: Q2 journal	Course name: Q2 journal as co-author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS credits: 20			
Recommended semester/trimester of the cours	e:		
Course level: III.			
Prerequisities:			
Conditions for course completion: Publication accepted in a journal of category Q2	as co-author.		
Learning outcomes: By publishing in a journal of category Q2 as a co-author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 2			
abs n			
100.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Q21A/22	Course name: Q2 journal as first or corresponding author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cr	edits: 30		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for course Publication accepted	e completion: in a journal of category Q2	as first or corresponding author.	
By publishing in a journal of category Q2 as the first or corresponding author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Q3SA/22	Course name: Q3 journal as co-author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cre	edits: 15		
Recommended semes	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for course Publication accepted i	e completion: in a journal of category Q3	as co-author.	
Learning outcomes: By publishing in a journal of category Q3 as a co-author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the course:			
Recommended literat	ture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
0.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ Q31A/22	Course name: Q3 journal as first or corresponding author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cr	edits: 25		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for course Publication accepted	e completion: in a journal of category Q3	as first or corresponding author	
By publishing in a journal of category Q3 as the first or corresponding author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ Q4SA/22	V/ Course name: Q4 journal as co-author		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cro	edits: 10		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Publication accepted	e completion: in a journal of category Q4	as co-author.	
Learning outcomes: By publishing in a journal of category Q4 as a co-author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
abs n			
	0.0 0.0		
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNI	Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafár	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ Q41A/22	Durse ID: ÚFV/ Course name: Q4 journal as first or corresponding author 41A/22		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: dis	nd the method: rse-load (hours): y period: tance, present		
Number of ECTS cro	edits: 20		
Recommended seme	ster/trimester of the cour	se:	
Course level: III.			
Prerequisities:			
Conditions for cours Publication accepted	e completion: in a journal of category Q4	as first or corresponding author.	
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	ture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 0		
	abs n		
	0.0 0.0		
Provides:			
Date of last modifica	tion: 08.11.2022		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafán	ik University in Košice
Faculty: Faculty of So	cience
Course ID: ÚFV/ KCHD/04	Course name: Quantum Chromodynamics
Course type, scope at Course type: Lectur Recommended cour Per week: 2 Per stue Course method: dis	nd the method: e 'se-load (hours): dy period: 28 tance, present
Number of ECTS cro	edits: 5
Recommended semes	ster/trimester of the course: 1.
Course level: III.	
Prerequisities:	
Conditions for cours Knowledge of the su into account the follo evaluation (1 credit).	e completion: bject at a sufficient level, exam. The credit evaluation of the course takes wing student workload: direct teaching (2 credits), self-study (2 credits) and
Lectures are oriented description and analy Determination of the particles and fundan constructed. Basic fe calculation cross sect	on explanation of the strong interaction on the base of first principles, their sis of both elastic and deep-inelastic scattering of hadrons and leptons. color is introduced, which is basic quantum number for strongly interacting nental physical principle on which quantum chromodynamics (QCD) is atures of this theory are explaned and it is demonstrated its application for ions of typical interacting processes in presence of mesons and baryons.
 Brief outline of the constraint of the	Durse: blor as the basic quantum number of hadrons and the basic principle for ental theory for strongly interacting particles. ry calibration group SUc (3). as SUc multiplets (3). ons, formfactors (basic knowledge). ring of electrons on a proton. Neutrino scattering on a nucleon. Summation odel. lectural function. Bjorken scaling. ynamics as a theory of strong interactions and its Lagrangian. momentum representation. for QCD and asymptotic freedom. uarks and gluons. tandard model.
Recommended litera Cheng T.P., Li L.F.: O Yndurain F.J.: Quantu Springer-Verlag, Berl	ture: auge theory of elementary particle Physics, Claredon, Press, Oxford, 1984. im chromodynamics. An introduction to the theory of Quarks and gluons, ín, 1983;

Francis Halzen, Alan D. Martin: Quarks and Le	ptons, John Wiley&Sons, 1984	
Course language: slovak and english		
Notes:		
Course assessment Total number of assessed students: 19		
N P		
0.0 100.0		
Provides: prof. RNDr. Michal Hnatič, DrSc.	· ·	
Date of last modification: 18.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University P I Šafá	rik University in Košice		
Enculty: Eaculty of Science			
Course ID: ÚEV/	Course name: Radiobiological Modeling of the Effect of Ionizing		
RMU/22	Radiation		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: dis	Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: distance, present		
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the course: 1.		
Course level: III.			
Prerequisities:			
Conditions for cours To analyze irradiation Credit evaluation of t and individual consu credits), evaluation (1	e completion: a plan with the use of radiobiological models NTCP and TCP, exam. he course: direct teaching ltations (1credit), self-study (1 credit), practical activities – to analyze IP (2 l credit).		
Learning outcomes: To provide basic know	wledge of radiobiological models and their use in radiation planning.		
Brief outline of the c 1. Radiobiological p quadratic model, biol 2. Early and late rac redistribution into LC 3. Planning of radioth 4. Historical develope 5. LOGEUD model, 1 6. Modelling of tumo probability 7. Use of software Bi 8. Parameters of radio 9. Linear-quadratic-li 10. Radiobiological control 11. Radiobiological b 12. Optimization of in	ourse: rinciples of radiotherapy : cell and cell cycle, cell survival curves, linear ogical effective dose, normalised total dose liation morbidity, inclusion of repopulation, reparation, reoxygenation and model erapy, Dose volume histogram, DVH reduction techniques, Tolerance doses ment of radiobiological models, Lyman-Kucther-Burman model Relative seriality model, Critical element model, Critical volume model or response : Tumor control probability model, Uncomplicated tumor control ogray for radiobiological modelling obiological models , fitting of parameters near model for stereotactic radiotherapy modelling of reirradiation, Impact of radiotherapy prolongation on tumor pasics of proton therapy rradiation plans with the use of radiobiological modelling		
Recommended litera 1. DALE, R., JONES institute of radiology, 2. MATULA, P., KOI oncology. [†] LAP LAN	ture: ,B. 2007. Radiobiological models in radiation oncology. London: British 2007. 292 s. ISBN13-978-0-905749-60-0 NCIK, J. 2018. Key to radiobiological modelling effects in radiation IBERT Academic Publishing 2018. 104s. ISBN13-978-6137342244		

3. FELTL, D., CVEK, J. 2008. Klinická rádiobiológie. Praha: Tobiáš, 2008. 105 s. ISBN 9788073111038

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Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
N P		
0.0 0.0		
Provides: RNDr. Barbora Hostová, PhD.		
Date of last modification: 18.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ RZ/22	Course name: Reviewed International or National Proceedings		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours A publication publish	e completion: ed in a peer-reviewed foreig	gn or national proceedings as an author/co-author.	
By publishing in a peer-reviewed foreign or national journal as an author/co-author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to critically evaluate and respond to reviewers' suggestions, to finalize his own ideas.			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
0.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ VPZ/22Course name: Scientific w	FV/ Course name: Scientific work after sending to the editorial office		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance present			
Number of ECTS credits: 5			
Recommended semester/trimester of the cours	e:		
Course level: III.			
Prerequisities:			
Conditions for course completion: Scientific work after being sent to the editorial of	ffice as an author/co-author.		
By sending a manuscript to the editors of a scientific journal as an author/co-author, the PhD student demonstrates a high degree of ability to identify, evaluate, and apply correct scientific methods or research methodology. He demonstrates the ability to reflect on a scientific problem by using the latest approaches and applying them critically. He demonstrates the competence to use existing theories and concepts in an innovative way, as well as to generate new original scientific knowledge, which he can publish according to the highest qualitative and ethical standards of the field. The PhD student demonstrates the ability to formulate his own ideas in a structured form.			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 1			
abs	n		
100.0 0.0			
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ VDM/11	rse ID: ÚFV/ Course name: Selected Detection Methods of Nuclear Radiaton		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 2 Per Course method: dis	nd the method: re / Practice rse-load (hours): study period: 28 / 28 tance, present		
Number of ECTS cr	edits: 5		
Recommended seme	ster/trimester of the course: 2.		
Course level: III.			
Prerequisities:			
Conditions for cours Written work and its p Credit evaluation of t (1), practical activitie completion of the cou	e completion: presentation, preparation and measurement of selected laboratory tasks, exam. he subject: direct teaching and consultations (1), self-study rs- lab. tasks (2), evaluation (1), total 5 credits. Minimum limit for urse is to obtain at least 51% of the total evaluation.		
Learning outcomes: To extend the theoreti detection systems. G nuclear physics.	cal and experimental knowledge about current detection methods and selected aining knowledge in the preparation of laboratory tasks and experiments in		
Brief outline of the c General Charateristic Detectors: ionization, Pulse Signals in Nucl Electronics for Pulse Pulse Height Selection Laboratory practice f	ourse: s of Detectors. , scintillation, semiconductor. ear Electronics. Signal Transmission. Signal Processing. on and Coincidence. rom selected detection methods.		
Recommended litera 1. W.R.Leo, Techniqu 2.J.R.Cooper, K.Rand Assessment, J.Wiley 3.R.L. Murray, Nucle Nuclear Processes, 6t 4. S.N.Ahmed, Physi Course language:	ture: ies for Nuclear and Particle Physics Experiments, Springer Verlag, 1994 ile, R.S. Sokhi: Radioactive Releases in the Environment, Impact and &Sons, Ltd., 2003 ear Energy, An Introduction to the Concepts, Systems and Aplications of the Edition, Elsevier, 2009 cs & Engineering of Radiation Detection, Elsevier, 2015		
Slovak and English			

Notes:

Course assessment		
Total number of assessed students: 9		
N P		
0.0 100.0		
Provides: doc. RNDr. Janka Vrláková, PhD.		
Date of last modification: 22.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafár	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚFV/ VKJSF/04	Course name: Selected Topics from Nuclear and Subnuclear Physics
Course type, scope a Course type: Lectur Recommended cour Per week: 4 Per stu Course method: dis	nd the method: e rse-load (hours): dy period: 56 tance, present
Number of ECTS cro	edits: 10
Recommended seme	ster/trimester of the course: 1.
Course level: III.	
Prerequisities:	
Conditions for cours preparation of a pape Credit distribution: lectures + consulting: preparation the paper writing the paper draft	e completion: r draft using several selected key publications 37 hours - 2 credits draft + study: 95 hours - 5 credits ft: 56 hours - 3 credit
Gain knowledge on the discovery of the kvar at BNL and at CERN	he heavy ion experimental programme at CERN SPS accelerator leading to the k-gluon plasma. Gain knowledge on heavy-ion programme at RHIC collider LHC.
 Brief outline of the c I. block (16. week): 1. Ultrarelativistic he 2. SPS accelarator, he 3. NA44 experiment. 4. NA45 experiment. 5. NA49 experiment. 6. NA50 experiment. 7. WA97 and NA57 e 8. WA98 experiment. 9. Ingredients of the C 10. Claim of discover II. block (712. week 1. Experiment STAR 2. Discovery of Ridge 3. Indication of Mach 4. Elliptical flow at R 5. Jet quenching. 6. QGP signatures at 7. Possible signatures 	ourse: avy ion collisions. Introduction. Discovery of QGP. :avy ion beams and the key experiments at CERN. experiments. CERN QGP. y. :): at RHIC. e structure. i cone. HIC. CERN LHC. is in small systems at ALICE experiment.
	Page: 65
	1 ugo. 03

Applied, medical physics:

General part: Rutherford scattering, nuclear phenomenology, nuclear models, nuclear radiation, use of nuclear physics, energy losses in matter, particle detection, accelerators, elementary particle properties, symmetry, discrete transformations, neutral kaons, oscillations and CP violation, Standard model.

Special part: 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:

slovak and english

Notes:

Course assessment

Total number of assessed students: 26

Ν	Р
0.0	100.0

Provides: doc. RNDr. Marek Bombara, PhD., doc. RNDr. Janka Vrláková, PhD., RNDr. Ivan Králik, CSc.

Date of last modification: 22.11.2021

Approved: prof. RNDr. Milan Žukovič, PhD.

University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience	
Course ID: ÚFV/ VKTF/04	Course name: Selected Topics from Theoretical 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: 4	
Recommended seme	ster/trimester of the course: 2.	
Course level: III.		
Prerequisities:		
Conditions for cours Knowledge of the sub the following student (1 credit) and evaluat	e completion: oject at a sufficient level. The credit evaluation of the course takes into account workload: direct teaching and individual consultations (2 credits), self-study ion (1 credit).	
Learning outcomes: The aim is a short ren elementary particles a	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 course: 1. Lectures cover wide sphere of problems of high energy physics and statistical physics. Specific applications are carried out for basic theories of elementary particles – Quantum electrodynamics (QED), Quantum Chromodymanics (QCD), standard model (SM) and for some models of unified theory of elementary particles. 2. Application of quantum field theory to the classical physics is concentrated on explanation of connection between the quantum field and statistical fluctuations of classical fields, generating functional of Green functions of quantum fields and statistical sum, on the Feynman graphs and perturbative technique in statistical physics 		
Recommended litera 1. Bogoljubov N.N., 1984) 2. L.Rajder: Kvantov 3. Amit D.J., Field th (1978) 4. Zinn-Justin J.: Qua 1993) 5. Vasiliev A.N. : Kv stochastičeskoj dinan Course language:	hture: 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 untum Field Theory and Critical Phenomena, Claredon Press, Oxford (1989, antovopolevaja renormgruppa v teorii kritičeskogo povedenia i nike, Izd. Peterburgskogo instituta jadernoj fiziky, Sankt Peterburg (1998)	
slovak and english		
Notes:		

Course assessment		
Total number of assessed students: 1		
N P		
0.0 100.0		
Provides: prof. RNDr. Michal Hnatič, DrSc.		
Date of last modification: 18.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ Course name: Self-motivated Study on Scientific Literature SSOL/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	se completion:		
Learning outcomes:			
Brief outline of the c	course:		
Recommended litera	ature:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 192			
N P			
0.0 100.0			
Provides:			
Date of last modification:			
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF1a/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: distance, present			
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 1.	
Course level: III.			
Prerequisities:			
Conditions for course completion: Active participation in seminars, presentation at a seminar. The credit evaluation of the course takes into account the following student workload: practical activity - preparation of the contribution and its presentation (3credits).			
Learning outcomes: To bring the topical problems, methodics and tools of high energy physics to the students.			
Brief outline of the course: Department seminar - selected topical problems of the nuclear and subnuclear physics.			
Recommended litera	Recommended literature:		
Course language: Slovak and English			
Notes:			
Course assessment Total number of assessed students: 22			
	abs	n	
100.0 0.0			
Provides: doc. RNDr. Janka Vrláková, PhD.			
Date of last modification: 22.11.2021			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
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: dis	nd the method: re rse-load (hours): dy period: 28 stance, present		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 2.	
Course level: III.			
Prerequisities:			
Conditions for course completion: Active participation in seminars, presentation at a seminar. The credit evaluation of the course takes into account the following student workload: practical activity - preparation of the contribution and its presentation in English (3credits).			
Learning outcomes: To bring the topical problems, methodics and tools of high energy physics to the students.			
Brief outline of the course: Department seminar - selected topical problems of the nuclear and subnuclear physics.			
Recommended literature:			
Course language: Slovak and English			
Notes:			
Course assessment Total number of assessed students: 22			
	abs	n	
100.0 0.0			
Provides: doc. RNDr. Janka Vrláková, PhD.			
Date of last modification: 22.11.2021			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ SJSF2a/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: distance, present			
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 3.	
Course level: III.			
Prerequisities:			
Conditions for course completion: Active participation in seminars, presentation at a seminar. The credit evaluation of the course takes into account the following student workload: practical activity - preparation of the contribution and its presentation (3credits).			
Learning outcomes: To bring the topical problems, methodics and tools of high energy physics to the students.			
Brief outline of the course: Department seminar - selected topical problems of the nuclear and subnuclear physics.			
Recommended literature:			
Course language: Slovak and English			
Notes:			
Course assessment Total number of assessed students: 19			
	abs	n	
100.0 0.0			
Provides: doc. RNDr. Janka Vrláková, PhD.			
Date of last modification: 22.11.2021			
Approved: prof. RNDr. Milan Žukovič, PhD.			
University: P. J. Šafá	rik University in Košice		
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Faculty: Faculty of S	cience		
Course ID: ÚFV/ SJSF2b/04	Course ID: ÚFV/ Course name: Seminar from Nuclear and Subnuclear Physics SJSF2b/04		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: dis	nd the method: re rse-load (hours): dy period: 28 stance, present		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 4.	
Course level: III.			
Prerequisities:			
Conditions for cours Active participation i into account the follo its presentation in En	are completion: n seminars, presentation at a wing student workload: prace glish (3credits).	seminar. The credit evaluation of the course takes etical activity - preparation of the contribution and	
Learning outcomes: To bring the topical p	problems, methodics and too	ls 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 litera	iture:		
Course language: Slovak and English			
Notes:			
Course assessment Total number of asse	ssed students: 19		
	abs	n	
100.0 0.0			
Provides: doc. RNDr	. Janka Vrláková, PhD.		
Date of last modifica	tion: 22.11.2021		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ SJSF3a/04	Course ID: ÚFV/ Course name: Seminar from Nuclear and Subnuclear Physics SJSF3a/04		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: dis	nd the method: re rse-load (hours): dy period: 28 stance, present		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 5.	
Course level: III.			
Prerequisities:			
Conditions for cours Active participation i into account the follo its presentation (3cre	Se completion: n seminars, presentation at a wing student workload: prace dits).	seminar. The credit evaluation of the course takes etical activity - preparation of the contribution and	
Learning outcomes: To bring the topical p	problems, 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: Slovak and English			
Notes:			
Course assessment Total number of asse	ssed students: 15		
abs n			
	100.0 0.0		
Provides: doc. RNDr	. Janka Vrláková, PhD.		
Date of last modifica	tion: 22.11.2021		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		
L	· · · · · · · · · · · · · · · · · · ·		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ SJSF3b/04	Course ID: ÚFV/ Course name: Seminar from Nuclear and Subnuclear Physics SJSF3b/04		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: dis	nd the method: re rse-load (hours): dy period: 28 stance, present		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 6.	
Course level: III.			
Prerequisities:			
Conditions for cours Active participation i into account the follo its presentation in En	e completion: n seminars, presentation at a wing student workload: prac glish (3credits).	seminar. The credit evaluation of the course takes etical activity - preparation of the contribution and	
Learning outcomes: To bring the topical p	problems, methodics and too	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 litera	iture:		
Course language: Slovak and English			
Notes:			
Course assessment Total number of asse	ssed students: 14		
abs n			
100.0 0.0			
Provides: doc. RNDr	. Janka Vrláková, PhD.		
Date of last modifica	tion: 22.11.2021		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ SJSF4a/04	Course ID: ÚFV/ Course name: Seminar from Nuclear and Subnuclear Physics SJSF4a/04		
Course type, scope a Course type: Lectur Recommended cour Per week: 2 Per stu Course method: dis	nd the method: re rse-load (hours): dy period: 28 tance, present		
Number of ECTS cro	edits: 3		
Recommended seme	ster/trimester of the cours	e: 7.	
Course level: III.			
Prerequisities:			
Conditions for cours Active participation in into account the follow its presentation (3cree	e completion: n seminars, presentation at a wing student workload: prac dits).	seminar. The credit evaluation of the course takes etical activity - preparation of the contribution and	
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: Slovak and English			
Notes:			
Course assessment Total number of asses	ssed students: 12		
abs n			
	100.0 0.0		
Provides: doc. RNDr.	. Janka Vrláková, PhD.		
Date of last modifica	tion: 22.11.2021		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ SJSF4b/04	Course ID: ÚFV/ Course name: Seminar from Nuclear and Subnuclear Physics		
Course type, scope a Course type: Lectur Recommended cou Per week: 2 Per stu Course method: dis	and the method: re rse-load (hours): ady period: 28 stance, present		
Number of ECTS cr	edits: 3		
Recommended seme	ster/trimester of the cours	e: 8.	
Course level: III.			
Prerequisities:			
Conditions for cours Active participation i into account the follo its presentation in En	se completion: n seminars, presentation at a wing student workload: prac glish (3credits).	seminar. The credit evaluation of the course takes etical activity - preparation of the contribution and	
Learning outcomes: To bring the topical p	problems, methodics and too	ls of high energy physics to the students.	
Brief outline of the c Department seminar	course: - selected topical problems	of the nuclear and subnuclear physics.	
Recommended litera	ature:		
Course language: Slovak and English			
Notes:			
Course assessment Total number of asse	ssed students: 12		
abs n			
	100.0 0.0		
Provides: doc. RNDr	. Janka Vrláková, PhD.		
Date of last modifica	ntion: 22.11.2021		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		
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University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ MSF/04Course name: Simulation of Experiments and Processes in Subatomic Physics			
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: distance, present			
Number of ECTS credits: 5			
Recommended semester/trimester of the course: 1.			
Course level: III.			
Prerequisities:			
Conditions for course completion: Term project, its presentation, evaluation. The credit evaluation of the course takes into account the following student workload: direct teaching (1 credit), self-study (1 credit), practical activities - project, tasks (2 credits) and evaluation (1 credit). The minimum limit for completing the course is to obtain at least 51% of the total score.			
Learning outcomes: To introduce the students into the simulation of experiments and to the available programming tools.			
Brief outline of the course: The role of simulation in physics. Probability theory and mathematical statistics. Frequently used distributions in physics. The Monte Carlo methods. Random number generators and their realisations. Programming tools used in high energy physics experiments simulation (e.g. GEANT, PYTHIA).			
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:			
Notes:			
Course assessment Total number of assessed students: 17			
N P			
0.0 100.0			
Provides: RNDr. Martin Val'a, PhD.			
Date of last modification: 18.11.2021			

Approved: prof. RNDr. Milan Žukovič, PhD.

University: P. J. Safarik	University	/ In Kosice
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Faculty: Faculty of Science

Course ID: Dek. PF	Course name: Spring School for PhD Students
UPJŠ/JSD/14	

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

Course method: distance, present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Active participation in the Spring School of PhD students of UPJŠ.

Learning outcomes:

By actively participating in the Spring School of PhD Students of UPJŠ, the PhD student demonstrates a high level of ability to process the issues of his dissertation for a multidisciplinary audience with an emphasis on clarifying the motivation, scientific problem, processing methodology and own contribution to the solution of the selected topic. The PhD student demonstrates the ability to professionally discuss various research topics, present his own positions and accept a plurality of opinions. Demonstrates the ability to communicate research results to a wider professional audience with adequate means and through the Slovak language.

Brief outline of the course:

1. Interdisciplinary lectures from the fields of medicine, natural sciences, law, public affairs, humanities. Lecturers - top foreign or national experts from the mentioned fields.

2. Scientific lectures in sections created within related disciplines. Lecturers - top experts from UPJŠ from the mentioned fields.

3. Scientific contributions of PhD students in sections of related fields.

4. Panel discussions on the issue of PhD studies and current trends in the development of scientific disciplines at UPJŠ.

Recommended literature:

Proceedings of the Spring School of Doctoral Students.

Course language:

Notes:

Course assessment

Total number of assessed students: 170

abs	n
100.0	0.0

Provides: doc. RNDr. Marián Kireš, PhD.

Date of last modification: 08.11.2022

Approved: prof. RNDr. Milan Žukovič, PhD.

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ VPSV/22	ourse ID: ÚFV/ PSV/22Course name: Supervision of Student's Scientific Activity		
Course type, scope a Course type: Recommended cou Per week: Per stud Course method: dis	nd the method: rse-load (hours): ly period: stance, present		
Number of ECTS cr	edits: 8		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Supervision of Stude	se completion: nt's Scientific Activity		
By guiding a stude scientifically based ki and approaches. Dem solution, as well as to skills from the field of	nt within the SOČ or ŠV nowledge in the field of study constrates the ability to critica evaluate it and possibly pro of pedagogical sciences to hi	OČ, the PhD student demonstrates broad and y, as well as knowledge of a wide range of methods ally assess a professional problem and its proposed pose another solution. He applies knowledge and s own field.	
Brief outline of the c	ourse:		
Recommended litera	ature:		
Course language:			
Notes:			
Course assessment Total number of asse	ssed students: 0		
abs n			
	0.0 0.0		
Provides:			
Date of last modifica	ntion: 08.11.2022		
Approved: prof. RNI	Dr. Milan Žukovič, PhD.		

University: P. J. Šafári	ik University in Košice		
Faculty: Faculty of Sc	ience		
Course ID: ÚFV/ VZP/22	Course ID: ÚFV/ /ZP/22Course name: Supervisor/consultant of fianl thesis		
Course type, scope an Course type: Recommended cours Per week: Per study Course method: dist	nd the method: se-load (hours): y period: ance, present		
Number of ECTS cre	dits: 8		
Recommended semes	ter/trimester of the course	e:	
Course level: III.			
Prerequisities:			
Conditions for course Supervisor of the final	e completion: l thesis.		
By supervising the fi knowledge in the field Demonstrates the abil well as to evaluate it a the field of pedagogica	inal thesis, the PhD stude of study, as well as knowled ity to critically assess a pro- nd possibly propose another al sciences to his own field.	nt demonstrates broad and scientifically based edge of a wide range of methods and approaches. ofessional problem and its proposed solution, as er solution. He applies knowledge and skills from	
Brief outline of the co	ourse:		
Recommended literat	ture:		
Course language:			
Notes:			
Course assessment Total number of assess	sed students: 0		
abs n			
	0.0	0.0	
Provides:			
Date of last modificat	ion: 08.11.2022		
Approved: prof. RND	r. Milan Žukovič, PhD.		

Faculty: Faculty of Science		
Course ID: ÚFV/ PC1/22Course name: Teaching activities 1h/s		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present		
Number of ECTS credits: 2		
Recommended semester/trimester of the course:		
Course level: III.		
Prerequisities:		
Conditions for course completion: Direct teaching activity 1 semester hour		
Through pedagogical activity, the PhD student demonstrates the ability to transfer and integrat knowledge from his own field of study into education. He is able to select and apply th right techniques and strategies of study group management, higher education and evaluation of learning outcomes. He is capable of designing and implementing part of the educational process in accordance with current trends in higher education and the requirements placed on the level of communication and digital competencies.		
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
abs n		
0.0		
Provides:		
Date of last modification: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ PPC2/22	Course name: Teaching activities 2h/s		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cr	edits: 4		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Direct teaching active	e completion: ity 2 semester hours		
Learning outcomes: Through pedagogical activity, the PhD student demonstrates the ability to transfer and integrate knowledge from his own field of study into education. He is able to select and apply the right techniques and strategies of study group management, higher education and evaluation of learning outcomes. He is capable of designing and implementing part of the educational process in accordance with current trends in higher education and the requirements placed on the level of communication and digital competencies.			
Brief outline of the c	ourse:		
Recommended litera	ature:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0	0.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Safárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ PPC3/22Course name: Teaching activities 3h/s		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present		
Number of ECTS credits: 6		
Recommended semester/trimester of the course:		
Course level: III.		
Prerequisities:		
Conditions for course completion: Direct teaching activity 3 semester hours		
Learning outcomes: Through pedagogical activity, the PhD student demonstrates the ability to transfer and integrate knowledge from his own field of study into education. He is able to select and apply the right techniques and strategies of study group management, higher education and evaluation of learning outcomes. He is capable of designing and implementing part of the educational process in accordance with current trends in higher education and the requirements placed on the level of communication and digital competencies.		
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
abs n		
0.0 0.0		
Provides:		
Date of last modification: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ PPC4/22	Course name: Teaching activities 4h/s		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cr	edits: 8		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours Direct teaching activ	se completion: ity 4 semester hours		
Learning outcomes: Through pedagogical activity, the PhD student demonstrates the ability to transfer and integrate knowledge from his own field of study into education. He is able to select and apply the right techniques and strategies of study group management, higher education and evaluation of learning outcomes. He is capable of designing and implementing part of the educational process in accordance with current trends in higher education and the requirements placed on the level of communication and digital competencies.			ntegrate ply the ntion of process level of
Brief outline of the c	ourse:		
Recommended litera	ature:		
Course language:			
Notes:	Notes:		
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0	0.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ KZP/22Course name: Thesis consu	Course name: Thesis consultant	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present		
Number of ECTS credits: 4		
Recommended semester/trimester of the course:	:	
Course level: III.		
Prerequisities:		
Conditions for course completion: Final thesis consultant.		
By consulting the final thesis, the PhD student knowledge in the field of study, as well as knowled Demonstrates the ability to critically assess a prot well as to evaluate it and possibly propose another the field of pedagogical sciences to his own field.	demonstrates broad and scientifically based lge of a wide range of methods and approaches. fessional problem and its proposed solution, as solution. He applies knowledge and skills from	
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
abs	n	
0.0	0.0	
Provides:		
Date of last modification: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafa	árik University in Košice	
Faculty: Faculty of Science		
Course ID: ÚFV/ PSU/04	Course name: Tools for Data Analysis and Processing	
Course type, scope Course type: Lectu Recommended cou Per week: 2 Per stu Course method: di	and the method: are arse-load (hours): and y period: 28 stance, present	
Number of ECTS c	redits: 4	
Recommended sem	ester/trimester of the course: 2.	
Course level: III.		
Prerequisities:		
Conditions for cour Student will make a The results will be p Credit distribution: lectures + consulting study + preparation	root macro for data analysis related to the student's research area. resented at a final seminar. g: 37 hours - 2 credits for the final seminar: 37 hours - 2 credits	
Learning outcomes Extending the know experimental and th for analysis and data	: ledge of the modern statistical data processing, archivation and visualisation of eoretical data, basic knowledge of the work with object oriented applications a visualisation - ROOT and GRID.	
Brief outline of the I. block (19. week) Selected topics from programming of bas II. block (10-12.wee Data analysis in p uncertainties.	course: in methods of experimental data analysis in physics, particle physics and from ic physical applications in GRID and ROOT environment. k): article physics, data fitting, error propagation, statistical and systematic	
Recommended liter An Object Oriented GridCafe, http://grid Wikipedia article on conducted on the We A Gentle Introductio http://www.buyya.co	ature: Data Analysis Framework, http://root.cern.ch. lcafe.web.cern.ch/gridcafe/ the World Community Grid: Contains additional links for each project being orld Community Grid. on to Grid Computing and Technologies (pdf). Retrieved on 2005-05-06, om/papers/GridIntro-CSI2005.pdf	
Course language:		
Notes:		

Course assessment		
Iotal number of assessed students: 11		
Ν	Р	
0.0	100.0	
Provides: doc. RNDr. Marek Bombara, PhD.		
Date of last modification: 21.11.2021		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ POVK/22Course name: Work in O	Course name: Work in Organizing Committee of Conference	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present		
Number of ECTS credits: 3		
Recommended semester/trimester of the cour	se:	
Course level: III.		
Prerequisities:		
Conditions for course completion: Work in the organizing committee of the conference		
By working in the organizing committee of the abilities and competences to organize a scientific to manage the implementation in terms of time are in writing using various technical means as needed level with various types of people, if necessary, condecisions.	the conference, the PhD student demonstrates the c or professional event independently or in a team, ad content, to communicate effectively verbally and ed, including in a foreign language at a professional prrectly recommend solutions or make independent	
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 0		
abs	n	
0.0	0.0	
Provides:		
Date of last modification: 08.11.2022		
Approved: prof. RNDr. Milan Žukovič, PhD.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ PDS/22	Course name: Writing Dissertation Work		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: distance, present			
Number of ECTS cr	edits: 20		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for course completion: Obtaining the required number of credits in the prescribed composition according to the UPJŠ study regulations, preparation and defense of the thesis, successfully completed dissertation examination			
Learning outcomes: The PhD student demonstrated the prerequisites for successful continuation of the study by fulfilling the conditions prescribed by the study regulations for the study and scientific part of the doctoral study related to the topic of the dissertation.			
Brief outline of the course:			
Recommended litera	nture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 2			
	Ν	Р	
	50.0	50.0	
Provides:			
Date of last modification: 08.11.2022			
Approved: prof. RNDr. Milan Žukovič, PhD.			