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COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ IG/04	**Course name:** Acquirement of Internal Grant
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 10	
Recommended semester/trimester of the course: 6., 8.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 112	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved: prof. RNDr. Stanislav Vokál, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PVS/04	**Course name:** Author's patents, discoveries, software
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment

Total number of assessed students: 36

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ CM/04	**Course name:** Citation in monograph
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
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:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ CZC/04	**Course name:** Citation in scientific journal published abroad
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 10	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 42	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ CDC/04	**Course name:** Citation in scientific journal published in the country of residence
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
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:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SCI/04	**Course name:** Citation registered in Science Citation Index
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment

Total number of assessed students: 134

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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:** present	
Number of ECTS credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 87	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SDPR/04	**Course name:** Co-worker of project supported by national grant schemes
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 410

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ POCF/13	**Course name:** Computational Physics

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

Number of ECTS credits: 8

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
Examination

Learning outcomes:
To acquaint students with modern methods of computational physics and their application to different physical systems.

Brief outline of the course:
Brief outline of the course:
1. Modern Monte Carlo methods targeted for problematic complex systems with multimodal energy surfaces. Multicanonical methods. Parallel tempering (replica exchange) method. Calculation of density of states and free energy by using Wang-Landau method.
2. Molecular Dynamics. Hybrid Monte Carlo method and spin dynamics. Langevin equations. Cellular automata of lattice gas. Quantum Monte Carlo simulations of lattice systems based on Suzuki-Trotter relation. Ising model in transversal field. Anisotropic Heisenberg chain. Monte Carlo Renormalization Group (MCRG) methods. Mao and Swendsen method. Problems of dynamics.
3. Other models and applications. Fitting data with linear models. Pattern recognition. Recurrent neural networks and time series prediction. Hebbian learning. Principal component analysis. Stochastic signal processing. Simulations of neural networks. Socio-physical models motivated by spin models. Galam models. Voter model in hierarchical systems. Model of group decision making. The opinion dynamics. Sznajd model and its applications.

Recommended literature:
1. J.C. Principe, N.R. Euliano, Neural and adaptive systems, John Wiley & Sons. INC., New York, 2000.
2. K. Binder, D.W. Heermann, Monte Carlo simulation in statistical physics, Springer-Verlag, Berlin, 2002.
3. J.M. Haile, Molecular dynamics simulations, John Wiley & Sons. INC., New York, 1992.
4. N.G van Kampen, Stochastic processes in physics and chemistry, North-Holland, 1990.
5. B.K. Chakrabarti, A. Chakraborti, A. Chatterjee (Editors), Econophysics and sociophysics: Trends and perspectives, Wiley-VCH, 2006.

Course language:

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
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:** present	
Number of ECTS credits: 30	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 58	

N	P
0.0	100.0

Provides:
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ MDU/04	**Course name:** Detection Methods and Experiments on Large Colliders

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To extend the knowledge about the most recent results of nuclear and subnuclear physics.

Brief outline of the course:
Methods of determination of basic physical quantities: coordinates, momenta, energy, time of flight, charge, mass and their use in a given experiment.
Description of experiments and physical topics on large accelerators.

Recommended literature:
Dorin N. Poenaru and Walter Greiner: Experimental Techniques in Nuclear Physics, Walter de Gruyter, Berlin-New York, 1997
Kleinknecht k.:Detectors for particle radiation, Cambridge University press,1986

Course language:

Notes:

Course assessment
Total number of assessed students: 5

N	P
0.0	100.0

Provides: RNDr. Ivan Králik, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ DZS/14	**Course name:** Dissertation examination

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

Number of ECTS credits: 20

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:
Obtaining required number of credits as given by the study plan.

Learning outcomes:
Evaluation of competences of the student according to his/her scientific profile.

Brief outline of the course:
Presentation of the results in the thesis for disertation exam, responding to referee´s comments, answering questions of exam committee. Two questions are selected subsequently from one compulsory and one optional subject, respectively. The subjects are selected by guarantee of the program according to the study plan and scientific profile of the student. The third question addresses the current state of work on dissertation thesis.

Recommended literature:

Course language:
english

Notes:

Course assessment
Total number of assessed students: 95

N	P
0.0	100.0

Provides:

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Lectures on parallel data processing on analysis farms.

Brief outline of the course:
Basics of scripting languages under various operating systems
Scripting in Unix/Linux
Simple parametrization of jobs on analyses farms
Basic principles of batch farm organizations
Basic principles of interactive farm organizations
Implementation and realization of job parallelization

Recommended literature:
https://www.gnu.org/software/bash/
http://www.adaptivecomputing.com/products/open-source/torque/
http://root.cern.ch/drupal/
http://xrootd.org/
https://eos.readthedocs.org/en/latest/

Course language:
English

Notes:

Course assessment
Total number of assessed students: 5

N	P
0.0	100.0

Provides: doc. RNDr. Jozef Urbán, CSc., RNDr. Martin Vaľa, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VPBP/04	**Course name:** Elaboration of reviewer report
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 19

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/EFVE/04	**Course name:** Electronics for Nuclear Physics

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To show the basics methods of data acquisition in the recent high energy physics experiments.

Brief outline of the course:
Signals from detectors, data flow. Electronics for high energy physics, basics. Front-end and calibration electronics. Selection of interactions - trigger.

Recommended literature:
Grupen Claus: Particle Detectors, Cambridge University Press, 1999

Course language:

Notes:

Course assessment
Total number of assessed students: 4

N	P
0.0	100.0

Provides: Ing. Jozef Černák, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ VPKF2/13	**Course name:** Energetic particles and heliosphere

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
Literature search and compilation on one particular subject selected.
Concluding work.

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

Brief outline of the course:
Heliosphere. Origin of solar wind. Dynamical processes in heliosphere. Formation of heliospheric boundaries.
Measurements of charged energetic particles and energetic neutral atoms. Turbulence in solar wind. Energetic particles
in the inner heliosphere. Solar flares, emission of energetic particles, its transport and detection near the Earth.

Recommended literature:
R. Schwenn, E. Marsch (editors), Physics of the Inner Heliosphere II, Particles, Waves and Turbulence, Springer Verlag, 1991
K. Scherer, H. Fichtner, E. Marsch, The Outer Heliosphere: Beyond the Planets, Copernicus Gesellschaft e.V., 2000

Course language:

Notes:

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: prof. Ing. Karel Kudela, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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: 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.

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

Brief outline of the course:
Magnetosphere of Earth and planetary magnetospheres. Structure of geomagnetic field. Motion of charged particles
in geomagnetc field. Solar wind, magetopause and Earth's bow shock. Ionosphere. Aurorae and electric fields.
Processes in the geomagnetic tail and geomagnetic storms.

Recommended literature:
Roederer, J., Dynamics of Geomagnetically Trapped Radiation, Springer, 1970
M.G. Kivelson and C.T. Russell, Introduction to Space Physics, Cambridge University Press, 1995

Course language:

Notes:

Course assessment
Total number of assessed students: 1

N	P
0.0	100.0

Provides: prof. Ing. Karel Kudela, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ AJD1/07	**Course name:** English Language for PhD Students 1

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 584

N	Ne	P	Pr	abs	neabs
0.0	0.0	56.85	0.0	43.15	0.0

Provides: PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.

Date of last modification: 03.10.2019

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ AJD2/07	**Course name:** English Language for PhD Students 2

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 3

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 569

N	Ne	P	Pr	abs	neabs
0.0	0.0	92.44	1.41	6.15	0.0

Provides: PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD., Mgr. Barbara Mitríková

Date of last modification: 26.02.2020

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ESH/09	**Course name:** Extremal States of Matter

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
The main goal of lectures is introduction to matter extremal states topic.

Brief outline of the course:
Lectures are introduction to extremal state of matter. Deals with wide spectrum of of effects beginning with electromagnetic plasma, following with phase states of matter in very hot/dense conditions and finish with a high speculative forms of matters. These can be responsible for accelerated expansion in very early state of space (inflation) or for his actual acceleration (dark energy). Lestures are also short introduction to modern cosmology, with relations to nuclear and particle physics.

Recommended literature:
1. Andrew Liddle, An introduction to modern cosmology, Chichester, UK: Wiley (1998) 129 str.
2. Joseph Silk, The Big Bang
3. Jean Letessier, Johan Rafelski: Hadrons and quark-gluon plasma, Camb. Monogr.Part. Phys. Nucl. Phys. Cosmol. 18: 1-397, 2002.
4. K.Yaki, T. Hatsuda, Y.Miake, Quark-gluon plasma: From big bang to little bang. Camb. Monogr.Part. Phys. Nucl. Phys. Cosmol. 23: 1-446, 2005.

Course language:

Notes:

Course assessment
Total number of assessed students: 3

N	P
0.0	100.0

Provides: RNDr. Ivan Králik, CSc., RNDr. Pavol Bobik, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DKZU/04	**Course name:** Home Conference with Foreign Participation
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 271

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ NEM/04	**Course name:** Implementation of new experimental methodology
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 72	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MK/04	**Course name:** International Conference
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 375	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ UFRJZ/09	**Course name:** Introduction to Physics of Relativistic Nuclear Collisions

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
full-time form: written test and thesis, exam,
distance form in 2019/20:
control exams are replaced by continuous assignments, thesis

Learning outcomes:
Acquisition of basic knowledges from the high-energy heavy ion physics.

Brief outline of the course:
Heavy ion collisions from intermediate to ultra-relativistic energies are covered in this lecture. After the introductory part, including kinematics, cross sections, geometry and centrality of nuclear collisions, the fragmentation processes, multiplicities, longitudinal and transverse momentum spectra of secondary particles are discussed. The next part covers a wide range of subjects from strangeness production and heavy flavors through creation of antinuclei and hypernuclei in nuclear collisions to hadron femtoscopy. Some selected phenomena connected with possible production of the dense and hot nuclear matter (quark-gluon plasma) are introduced. Finally, collective flows, charmonium suppression, di-lepton mass spectra, direct photons and production of particles with high transverse momenta are presented.

Recommended literature:
1. J. Bartke, Introduction to Relativistic Heavy Ion Physics, World Scientific Publishing Co. Pte. Ltd., Singapore, 2009.
2. R. Vogt, Ultrarelativistic Heavy-Ion Collisions, Elsevier, 2007.
3. J. Letessier, J. Rafelski: Hadrons and quark-gluon plasma, Camb. Monogr. Part. Phys. Nucl. Phys. Cosmol. 18: 1-397, 2002.

Course language:
slovak and english

Notes:

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ USM/04	**Course name:** Introduction to Standard Model

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
The aim of the course is to give to the students basic knowledges about unified theory of electro-weak interactions

Brief outline of the course:
1. From the metodological point of view the lectures are based on explanation of known processes of weak interaction where beta-decay belongs.
2. Genesis of modern electro-weak theory and standard model is given by inductive method starting from definition of V-A currents, choise of appropriate calibration symmetry, corresponding intermediate bosons and Yang_Mils quantum fields and Higgs mechanism.
3. As a result the modern formulation of Glashow- Weinberg-Salam standard model is proposed.

Recommended literature:
1. J. Hořejší: Introduction to electroweak unification (World Scientific, Singapore 1994);
czech version: Elektroslabé sjednocení a stromová unitarita (Karolinum, Praha 1993).
2. P. Renton: Electroweak interactions (Cambridge Univ. Press, Cambridge 1990).
3. Francis Halzen, Alan D. Martin: Quarks and Leptons, John Wiley&Sons; in russian: F.Helzen, A.D.Martin: Kvarki i leptoni, Mir, Moskva, 1987.
4. Cheng T.P., Li L.F.: Gauge theory of elementary particle Physics, Claredon Press, Oxford, 1984.

Course language:
slovak and english

Notes:

Course assessment
Total number of assessed students: 15

N	P
0.0	100.0

Provides: prof. RNDr. Michal Hnatič, DrSc., RNDr. Ivan Králik, CSc.

Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZKC/04	**Course name:** Journals Registered by Current Contets Database
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 382

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZNC/04	**Course name:** Journals not registered in the Current Contents Connect database and published abroad
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 45

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DNC/04	**Course name:** Journals not registered in the Current Contents Connect database and published in the country of residence
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 18

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DKC/04	**Course name:** Journals registered in the Current Contents Connect database and published in the country of residence
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 8	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
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:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 129	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ NZ/04	**Course name:** Non-reviewed collections of papers and monographs published abroad or in the country of residence
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 98	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DCK/14	**Course name:** Particle detection by calorimetric methods

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Special lectures oriented towards particle calorimetry.

Brief outline of the course:
PASSAGE OF PARTICLES THROUGH MATTER
Electronic energy loss by heavy particles, Moments and cross sections, Maximum energy transfer in a single collision
Stopping power at intermediate energies, Mean excitation energy, Density effect, Energy loss at low energies
Energetic knock-on electrons (δ rays) , Restricted energy loss rates for relativistic ionizing particles
Fluctuations in energy loss, Energy loss in mixtures and compounds, Ionization yields
Multiple scattering through small angles,
Photon and electron interactions in matter
Collision energy losses by e±, Radiation length, Bremsstrahlung energy loss by e±
Critical energy, Energy loss by photons, Bremsstrahlung and pair production at very high energies
Photonuclear and electronuclear interactions at still higher energies ,
Muon energy loss at high energy
Cherenkov and transition radiation
Optical Cherenkov radiation
Coherent radio Cherenkov radiation
CALORIMETERS
Principles of Calorimetry
Electromagnetic and Hadronic Showers
Shower Profiles and Containment
Electromagnetic calorimeters
Hadronic calorimeters
Free electron drift velocities in liquid ionization chamber
Types of Calorimeters:
Compensating and non-compensating
Total Absorption, Sampling, homogeneous

Scintillation, Ionization, Cherenkov
Signal Detection
Shower shapes in hadron calorimeters
Fluctuations in hadronic energy measurements
Position resolution in the calorimeters
Shower maximum detectors
Signal read-out, processing, calibration of readout electronics. Physics calibration of electromagnetic and hadron calorimeters, jet reconstruction, determination of missing energy and that of the jet energy scale.(Getting from calorimetry to physics results)
Energy and position resolution in calorimetry.

Recommended literature:
http://indico.cern.ch/getFile.py/access?contribId=24&resId=0&materialId=slides&confId=44587
http://pdg.lbl.gov/2013/reviews/contents_sports.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

N	P
0.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Dušan Bruncko, CSc., RNDr. Pavol Stríženec, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/PK/04	**Course 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: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:
Recherche work.
Final examination.

Learning outcomes:
To acquaint with the specifics of plasma formations in space.

Brief outline of the course:
Matter in space, distribution function, continuity equation in the phase space. Magnetosphere of Earth.
Radiation belts. Ionosphere and upper atmosphere. Solar wind plasma. Outer regions of Sun, solar flares.

Recommended literature:
Rossi B., Olbert S.: Introduction to the Physics of Space, ruský preklad, Moskva, 1974.
Aktuálne materiály publikované v kozmickej fyzike.

Course language:

Notes:

Course assessment
Total number of assessed students: 2

N	P
0.0	100.0

Provides: prof. Ing. Karel Kudela, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VYS/04	**Course name:** Presentation in Seminar
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 315	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ KCHD/04	**Course name:** Quantum Chromodynamics

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To acquaint with basic information about the theory of strong interactions - quantum chromodynamics

Brief outline of the course:
1. Lectures are oriented on explanation of the strong interaction on the base of first principles, their description and analysis of both elastic and deep-inelastic scattering of hadrons and leptons.
2. Determination of the color is introduced, which is basic quantum number for strongly interacting particles and fundamental physical principle on which quantum chromodynamics (QCD) is constructed.
3. Basic features of this theory are explaned and it is demonstrated its application for calculation cross sections of typical interacting processes in presence of mesons and baryons.

Recommended literature:
Cheng T.P., Li L.F.: Gauge theory of elementary particle Physics, Claredon, Press, Oxford, 1984.
Yndurain F.J.: Quantum chromodynamics. An introduction to the theory of Quarks and gluons, Springer-Verlag, Berlín, 1983;
Francis Halzen, Alan D. Martin: Quarks and Leptons, John Wiley&Sons, 1984

Course language:
slovak and english

Notes:

Course assessment
Total number of assessed students: 19

N	P
0.0	100.0

Provides: prof. RNDr. Michal Hnatič, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ RZ/04	**Course name:** Reviewed Proceedings
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 183

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ VDM/11	**Course name:** Selected Detection Methods of Nuclear Radiaton

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To extend the scope of basic contemporary detection methods and systems.

Brief outline of the course:
General Charateristics of Detectors, Detectors: ionization, scintillation, semiconductor, Pulse Signals in Nuclear Electronics, Signal Transmission, Electronics for Pulse Signal Processing, Pulse Height Selection and Coincidence. Laboratory practice from selected detection methods.

Recommended literature:
1. W.R.Leo, Techniques for Nuclear and Particle Physics Experiments, Springer Verlag, 1994
2.J.R.Cooper, K.Randle, R.S. Sokhi: Radioactive Releases in the Environment, Impact and Assessment, J.Wiley &Sons, Ltd., 2003
3.R.L. Murray, Nuclear Energy, An Introduction to the Concepts, Systems and Aplications of Nuclear Processes, 6th Edition, Elsevier, 2009

Course language:

Notes:

Course assessment
Total number of assessed students: 5

N	P
0.0	100.0

Provides: prof. RNDr. Gabriela Martinská, CSc., doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VKJSF/04	**Course name:** Selected Topics from Nuclear and Subnuclear Physics

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

Number of ECTS credits: 10

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

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

Brief outline of the course:
1. - Subnuclear physics. Lecture show a review of the newest experimental results in elementary particle physics with focus on estimation of neutrino mass, CP symmetry violation in B-mesons decays, testing of Standard model at TeV energies, Higgs boson discovery, quark-gluon plasma properties and supersymmetric particles searches as a candidate for dark matter.
2. - Cosmic physics. Introduction to micro-world physics, relativistic kinematics, basic classification of elementary particles and experiments leading to their discoveries, physical principles of particle acceleration, classification of particle accelerators and their applications.
3. - Applied nuclear physics
General topics:Rutherford Scattering, Nuclear Phenomenology, Nuclear Models, Nuclear Radiation, Applications of Nuclear Physics, Energy deposition in Media, Particle Detection, Accelerators, Properties of Elementary Particles, Symmetries, Discrete Transformations, Neutral Kaons, oscillations and CP Violation, Standard Model
Special topics: Nuclear Reactions, Biological Effects of Radiation, Industrial and Analytical Applications, Nuclear Medicine

Recommended literature:
1. Griffiths D.: Introduction to Elementary Particle, WILEY-VCH, 4th Reprint, 2010
2. Bettini A.: Introduction to Elementary Particle Physics, Cambridge Univ. Press, Reprinted 2010
3. Perkins D.H.: Introduction to High Energy Physics, Cambridge University Press, 2000
4. Slugeň V. a iní: Jadrovo-energetické zariadenia, STU Bratislava, 2003
5. Fernow R.: Introduction to Experimental Particle Physics, Cambridge University Press, 1986
6. Das A., Ferbel T.: Introduction to Nuclear and Particle Physics, (2nd Edition), World Scientific Publishing Co. Pte. Ltd., Singapore, 2003
7. Lilley J.S.: Nuclear Physics - Principles and Application, J. Wiley & Sons, Ltd., Chichester, 2001

8. Ashok Das, Thomas Ferbel, Introduction to Nuclear and Particle Physics, (2nd Edition), 2003, World Scientific Publishing Co. Pte. Ltd., Singapore, ISBN 981-238-744-7.
9. John.S. Lilley, Nuclear Physics - Principles and Aplications, 2001, John Wiley& Sons, Ltd., Chichester, ISBN-0 471 97935 X, ISBN-0 471 97936 8.

Course language:

Notes:

Course assessment
Total number of assessed students: 22

N	P
0.0	100.0

Provides: prof. RNDr. Gabriela Martinská, CSc., doc. RNDr. Jozef Urbán, CSc., prof. RNDr. Stanislav Vokál, DrSc., doc. RNDr. Marek Bombara, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VKTF/04	**Course name:** Selected Topics from Theoretical Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 2.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes: The aim is a short renewal of master course and application of quantum field theory in physics of elementary particles 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 literature: 1. Bogoljubov N.N., Shirkov D.V.: Vvedenie v teoriju kvantovannich polej, Nauka (1957, 1973, 1984) 2. L.Rajder: Kvantovaja teorija pola, Moskva, Mir (1987) 3. Amit D.J., Field theory , the Renormalization Group, and Critical Phenomena,, McGraw-Hill (1978) 4. Zinn-Justin J.: Quantum Field Theory and Critical Phenomena, Claredon Press, Oxford (1989, 1993) 5. Vasiliev A.N. : Kvantovopolevaja renormgruppa v teorii kritičeskogo povedenia i stochastičeskoj dinamike, Izd. Peterburgskogo instituta jadernoj fiziky, Sankt Peterburg (1998)	
Course language: 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: 03.05.2015	
Approved: prof. RNDr. Stanislav Vokál, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SSOL/04	**Course name:** Self-motivated Study on Scientific Literature
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 170

N	P
0.0	100.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 1.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 18	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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 and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 2.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 17	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

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:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 3.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 16	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SJSF2b/04	**Course name:** Seminar from Nuclear and Subnuclear Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 4.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 15	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SJSF3a/04	**Course name:** Seminar from Nuclear and Subnuclear Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 5.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 13	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SJSF3b/04	**Course name:** Seminar from Nuclear and Subnuclear Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 6.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 11	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SJSF4a/04	**Course name:** Seminar from Nuclear and Subnuclear Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 7.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 9	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SJSF4b/04	**Course name:** Seminar from Nuclear and Subnuclear Physics
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course: 8.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
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:	
Notes:	
Course assessment Total number of assessed students: 8	

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Urbán, CSc., doc. RNDr. Janka Vrláková, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/MSF/04	**Course name:** Simulation of Experiments and Processes in Subatomic Physics

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

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. Basics of probability theory and mathematical statistics. Frequently used distributions in physics. Basics of 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: 14

N	P
0.0	100.0

Provides: doc. RNDr. Jozef Urbán, CSc.

Date of last modification: 30.03.2020

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: Dek. PF UPJŠ/JSD/14	**Course name:** Spring School for PhD Students
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week: Per study period:** 4d **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 135

abs	n
100.0	0.0

Provides: prof. RNDr. Vladimír Zeleňák, DrSc.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZSP/04	**Course name:** Study Stay Abroad
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment

Total number of assessed students: 241

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SLNZ/09	**Course name:** Study of Lepton-Nucleon Collisions

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To review the results of lepton-nucleon collision studies.

Brief outline of the course:
The lectures are concentrated on the analysis of relativistic leptons (electron, positron, and neutrinos) collisions with nucleons (protons and neutrons) and based on these results to study the internal structure of hadrons, mainly that of the proton. Determination of the proton (neutron, pion) structure functions and the extraction of parton structure functions in the proton.To study the photon structure function and analysis of diffractive processes in lepton-nucleon collisions.

Recommended literature:
1. Dušan Bruncko: Štúdium leptónovo-nukleónových zrážok (Study of lepton-nucleon collisions)
http://home.saske.sk/~bruncko/img/paper/skripta.pdf
http://home.saske.sk/~bruncko/img/paper/skripta.ps

Course language:

Notes:

Course assessment
Total number of assessed students: 1

N	P
0.0	100.0

Provides: doc. RNDr. Dušan Bruncko, CSc., RNDr. Ivan Králik, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VPSV/04	**Course name:** Supervision of Student's Scientific Activity
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course: 6., 8.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 15	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VBP/04	**Course name:** Supervisor/consultant of bacelor thesis
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course: 6., 8.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 37	

abs	n
100.0	0.0

Provides:	
Date of last modification:	
Approved: prof. RNDr. Stanislav Vokál, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PPC/04	**Course name:** Teaching activities
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 1	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 221

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PPC/04	**Course name:** Teaching activities
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 1	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 221

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ PSU/04	**Course name:** Tools for Data Analysis and Processing

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 2 **Per study period:** 28
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To extend the knowledge of statistical data processing and get some experience in the area of application of programming tools in elementary particle physics.

Brief outline of the course:
Selected topics from methods of experimental data analysis in physics, particle physics and from programming of basic physical applications in GRID environment.

Recommended literature:
http://ned.ipac.caltech.edu/level5/astrostatistics
Glenovan: Computing and Statistical Data Analysis, University of London Lectures for HEP Postraguate Students: http://www.hep.ph.rhbnc.uk/~cowan.
http://www.amara.com/current/wavelet.html, http://www.statsoft.com/textbook/stathome.html
V. Blobel: Unfolding in HEP Experiments, ZEUS seminar at HERA, 1997.
http://lib-www.lanl.gov/numerical/, http://www.astro.psu.edu/statcodes
R. Barlow http://www.hep.man.ac.uk/u/roger
An object oriented Data Analysis Framework http://root.cern.ch,
Java Analysis Studio http://jas.freehep.org/
Grid computing, http://eu-datagrid.web.cern.ch/eu-datagrid/.
J. Liberty, Naučte se C++ za 21 dní, Computer Press , Praha 2002

Course language:

Notes:

Course assessment
Total number of assessed students: 8

N	P
0.0	100.0

Provides: RNDr. Alexander Dirner, CSc., Ing. Jozef Černák, PhD., doc. RNDr. Pavel Matula, CSc., RNDr. Pavol Bobik, PhD., doc. RNDr. Marek Bombara, PhD.

Date of last modification: 30.03.2020
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ POVK/04	**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:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 83	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PDS/14	**Course name:** Writing Dissertation Work
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 0	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 68	

abs	n
100.0	0.0

Provides:
Date of last modification:
Approved: prof. RNDr. Stanislav Vokál, DrSc.