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 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:

Course assessment
Total number of assessed students: 525

N	Ne	P	Pr	abs	neabs
0.0	0.0	58.29	0.0	41.71	0.0

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

Date of last modification: 04.10.2016

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 528

N	Ne	P	Pr	abs	neabs
0.0	0.0	91.86	1.52	6.63	0.0

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

Date of last modification: 04.10.2016

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ASTF/15	**Course name:** Astrophysics
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 credits: 10	
Recommended semester/trimester of the course: 1.	
Course level: III.	
Prerequisities:	
Conditions for course completion: Seminar essay. Oral exam with preparation; 3 questions within the curriculum presented during the course.	
Learning outcomes: Become acquainted with other aspects of the formation of spectra in stellar atmospheres.	
Brief outline of the course: Chemical analysis; measurement of stellar radii and temperatures; measurements of photospheric pressure; stellar rotation; velocity fields in stellar photospheres; microturbulence and macroturbulence; stellar granulation.	
Recommended literature: 1. Gray, D.F., The observation and analysis of stellar photospheres, Cambridge University Press, Cambridge, 1992; 2. Böhm-Vitense, E., Introduction to stellar astrophysics, Stellar atmospheres, Cambridge University Press, Cambridge, 1997; 3. Kipenhahn, R., Weigert, A., Stellar Structure and evolution, Springer-Verlag, Berlin, 1990;	
Course language: Slovak, English	
Course assessment Total number of assessed students: 4	
N	P
0.0	100.0
Provides: doc. RNDr. Rudolf Gális, PhD.	
Date of last modification: 21.02.2017	
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ASVE/15	**Course name:** High energy astrophysics

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 credits: 5

Recommended semester/trimester of the course: 3.

Course level: III.

Prerequisities:

Conditions for course completion:
Seminar essay.
Oral exam with preparation; 3 questions within the curriculum presented during the course.

Learning outcomes:
Become acquainted with the basics of high energy astrophysics.

Brief outline of the course:
Astrophysical mechanisms of the origin and properties of high energy photons in different types of cosmic objects: solar system bodies, active stellar coronae, supernova explosions and remnants, neutron stars, cataclysmic variable stars and X-ray binaries, active galactic nuclei, clusters of galaxies and gamma-ray bursts. Detection and analysis of X-rays and gamma rays.

Recommended literature:
1. Melia, F., High-Energy Astrophysics, Princeton University Press, Princeton, 2009;
2. Lewin, W.H.G., van der Klis, M., Compact Stellar X-ray Sources, Cambridge University Press, Cambridge, 2006;
3. Longair, M. S., High Energy Astrophysics, Cambridge University Press, Cambridge, 2011;
4. Seward, F. D., Charles, P. A., Exploring the X-ray Universe, Cambridge University Press, Cambridge, 2010;

Course language:
Slovak, English

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: doc. RNDr. Rudolf Gális, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 0	

abs	n
0.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 1

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 30	
abs	n
100.0	0.0
Provides:	
Date of last modification: 01.03.2017	
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 115	
abs	n
100.0	0.0
Provides:	
Date of last modification: 01.03.2017	
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	

Course assessment
Total number of assessed students: 7

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 227	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 12	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ FOTA/15	**Course name:** Photometry

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 credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:
oral exam and test

Learning outcomes:
inform students about advanced methods of astronomical photometry

Brief outline of the course:
Detection of objects, background determination. Aperture photometry, apertures optimization, profile fitting. PSF photometry. Image substraction method. Measurements calibration, removing systematic trends and errors. Transformation to international system.

Recommended literature:
1. Budding & Demircan: 2007, Introduction to Astronomical Photometry, Cambridge University Press
2. Howell : 2000, Handbook of CCD Astronomy, Cambridge University Press
3. Lena et al.: 1996, Observational Astrophysics, Springer-Verlag
4. Martinez a Klotz: 1998, A practical giude to CCD Astronomy, Cambridge University Press.
manuals to software packages, published papers and internet sources

Course language:
Slovak, English

Course assessment
Total number of assessed students: 4

N	P
0.0	100.0

Provides: doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/FTDV/15	**Course name:** Physics of the close binaries

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 credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
oral exam

Learning outcomes:
Obtaining knowledges about methods about close binaries research and their structure and evolution.

Brief outline of the course:
Kopal's classification of close binaries. Creation and evolution of close binaries. Physical processes in close binaries: mass transfer, outflow, tidal pulsations, accretion disks, mass flows. Methods of observations: photometry, spectroscopy, interferometry, polarimetry, Doppler thomography. Determination of orbital parameters and absolute parameters of bodies.

Recommended literature:
1. Hilditch, R.W.: 2001, An introduction to Close binary Stars, Cambridge University Press
2. Kallrath, J., Milone, E.F.: 1999, Eclipsing Binary Stars, Springer Verlag
3. Richards, M.T., Hubeny, I. (eds.):2012, "From Interacting Binaries to Exoplanets: Essential Modeling Tools", proceedings of IAU Symposium 282, Cambridge University Press

Course language:
Slovak, English

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: Mgr. Theodor Pribulla, CSc.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

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 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:

Course assessment
Total number of assessed students: 97

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 115

abs	n
100.0	0.0

Provides: doc. RNDr. Vladimír Zeleňák, PhD.

Date of last modification: 13.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ KTPA/15	**Course name:** Quantum field theory

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 credits: 8

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
Exam

Learning outcomes:
To acquaint with quantum field theory methods and their application in theory of elementary particles and astrophysics.

Brief outline of the course:
1. Quantum field, Lagrange formalism, interacting quantum fields, Wick theorems and Feynman diagrammatic technique, higher orders of perturbation theory.
2. Application of quantum field theory in the theory of elementary particles: standard model, unified theories of elementary particles.
3. Application of quantum field theory in statistical physics. Feynman diagrams.
4. Critical dynamics and description of scaling at phase transitions by means of quantum-field technique and renormalization group.
Selection of aforementioned topics will be made by supervisor according to the content and aims of PhD thesis

Recommended literature:
1. L.H. Ryder, Quantum Field Theory, Cambridge University Press, Cambridge, 1996.
2. A. Zee, Quantum Field Theory in Nutshell, Princeton University Press, Princeton, 2010.
3. P. Ramond, Field Theory: A Modern Primer, Westview Press, 1990.
4. Zinn-Justin J., Quantum Field Theory and Critical Phenomena, Claredon Press, Oxford, 2004.
5. W. Greiner, J. Reinhardt, Field Quantization, Springer, Berlin, 1996.
6. W. Greiner, J. Reinhardt, Quantum Electrodynamics, Springer, Berlin, 2009.
7. W. Greiner, S. Schramm, E. Stein, Quantum Chromodynamics, Springer, Berlin, 2007.
8. A.N. Vasiliev, The Field Theoretic Renormalization Group in Critical Behavior Theory and Stochastic Dynamics, Chapman & Hall/CRC Press Company Boca Raton, London, 2004.

Course language:
Slovak, English

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0
Provides: prof. RNDr. Michal Hnatič, DrSc.	
Date of last modification: 21.02.2017	
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 316

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ NMAS/15	**Course name:** Numerical methods of astrophysics

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 credits: 8

Recommended semester/trimester of the course: 3.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Acquaint students about advanced numerical methods for solving of problems in astrophysics.

Brief outline of the course:
Monte-Carlo simulations in astrophysics, error determination of parameters. Simulation of mass transfer and accretion disks. N-body system dynamics.

Recommended literature:
1. Press et. al.: 2002, Numerical Recipes in C.: Cambridge University Press
2. Robert & Cassela: 2005, Monte Carlo Statistical Methods, Springer
manuals for packages NumPy, SciPy, PyKE, published papers

Course language:
Slovak, English

Course assessment
Total number of assessed students: 2

N	P
0.0	100.0

Provides: doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 88	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/PLSD/15	**Course name:** Planetary systems

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 credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
exam

Learning outcomes:
Obtaining knowledges about methods of exoplanet searching and their physical properties.

Brief outline of the course:
Methods of exoplanets detection: transits, radial velocities, microlensing, direct imaging. Dynamic of exoplanets. Creation and evolution of exoplanets, evolution of protoplanetary discs. Atmosphere of exoplanets.

Recommended literature:
1. Haswell: 2010, Transiting exoplanets, Cambridge University Press
2. Perryman: 2011, The exoplanet handbook, Cambridge University Press
3. Seager (eds.): 2010, Exoplanets, The University of Arizona Press, Tuscon

Course language:
Slovak, English

Course assessment
Total number of assessed students: 2

N	P
0.0	100.0

Provides: Mgr. Martin Vaňko, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 68	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 204

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 204

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ PTMH/15	**Course name:** Populations of the interplanetary bodies

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 credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:
Exam

Learning outcomes:
Obtaining detailed knowledges about populations of interplanetary matter.

Brief outline of the course:
Meteoroids flows, near-earth asteroids, new comets under Oort, Troians. Ice objects of Edgeworth-Kuiper belt: orbits physical properties, dynamical and physical evolution

Recommended literature:
1. Bottke, Cellino, Paolicchi, Binzel,: 2002, Asteroids III, University of Arizona Press
2. Hawkes, Mann, Brown: 2005, Modern Meteor Science, Springer
3. Fernández, Lazzaro, Prialnik, Schulz: 2010, Icy Bodies of the Solar System, Cambridge University Press
4. Swamy: 2010, Physics of comets, World Scientific

Course language:
Slovak, English

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: doc. RNDr. Ján Svoreň, DrSc.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 34	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 144

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SASTa/15	**Course name:** Seminar in astrophysics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 3 **Per study period:** 42
Course method: present

Number of credits: 3

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Acquaint students with actual problems of astronomy and astrophysics and presentation of own results.

Brief outline of the course:
Scientific seminar about problems of astronomy and astrophysics, problems of dissertation thesis.

Recommended literature:
Current papers in astronomical and astrophysical journals.

Course language:
Slovak, English

Course assessment
Total number of assessed students: 4

N	P
0.0	100.0

Provides: doc. RNDr. Rudolf Gális, PhD., doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SASTb/15	**Course name:** Seminar in Astrophysics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 3 **Per study period:** 42
Course method: present

Number of credits: 3

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Acquaint students with actual problems of astronomy and astrophysics and presentation of own results.

Brief outline of the course:
Scientific seminar about problems of astronomy and astrophysics, problems of dissertation thesis.

Recommended literature:
Current papers in astronomical and astrophysical journals.

Course language:
Slovak, English

Course assessment
Total number of assessed students: 4

N	P
0.0	100.0

Provides: doc. RNDr. Rudolf Gális, PhD., doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SASTc/15	**Course name:** Seminar in astrophysics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 3 **Per study period:** 42
Course method: present

Number of credits: 3

Recommended semester/trimester of the course: 3.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Acquaint students with actual problems of astronomy and astrophysics and presentation of own results.

Brief outline of the course:
Scientific seminar about problems of astronomy and astrophysics, problems of dissertation thesis.

Recommended literature:
Current papers in astronomical and astrophysical journals.

Course language:
Slovak, English

Course assessment
Total number of assessed students: 2

N	P
0.0	100.0

Provides: doc. RNDr. Rudolf Gális, PhD., doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SASTd/15	**Course name:** Seminar in astrophysics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 3 **Per study period:** 42
Course method: present

Number of credits: 3

Recommended semester/trimester of the course: 4.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Acquaint students with actual problems of astronomy and astrophysics and presentation of own results.

Brief outline of the course:
Scientific seminar about problems of astronomy and astrophysics, problems of dissertation thesis.

Recommended literature:
Current papers in astronomical and astrophysical journals.

Course language:
Slovak, English

Course assessment
Total number of assessed students: 2

N	P
0.0	100.0

Provides: doc. RNDr. Rudolf Gális, PhD., doc. Mgr. Štefan Parimucha, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 103	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 353	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SLAA/15	**Course name:** Solar activity

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 credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:
exam

Learning outcomes:
Knowledges about physical properties of plasma in solar interior and atmosphere, about physics of active regions on the Sun and understanding of solar activity cycle.

Brief outline of the course:
Solar interior - solar activity cycles, Tachocline, solar atmosphere - energy transfer and radiation, magnetic field of the Sun and active regions, solar spots, eruptions, coronal mass ejections, Solar dynamics, Helioseismology

Recommended literature:
1. Aschwanden Markus, Physics of the Solar Corona: An Introduction with Problems and Solutions, Springer, 2006
2. Priest, E.R.: Solar Magnetohydrodynamics, Reidel, 1982.
3. Stix M.: The Sun, An Introduction, Springer, 2nd edition, 2002.
4. Sturrock, Holzer, Mihalas, Ulrich, Physics of the Sun I. II. III. Geophysics and Astrophysics Monorgaphs, Riedel Publ. Dodrecht 1968
5. Zirin, H., Astrophysics of the Sun, Cambridge Univ. Press, Cambridge, 1988

Course language:
Slovak, English

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: RNDr. Aleš Kučera, CSc.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 79	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SPKD/15	**Course name:** Spectroscopy

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 credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:
Seminar essay. Oral exam with preparation; 3 questions within the curriculum presented during the course.

Learning outcomes:
Become acquainted with the basics of acquisition, processing and analysis of stellar spectra.

Brief outline of the course:
Spectroscopic tools a detectors. The measurement and behaviour of stellar continua and spectral lines.

Recommended literature:
1. Gray, D.F., The observation and analysis of stellar photospheres, Cambridge University Press, Cambridge, 1992;
2. Böhm-Vitense, E., Introduction to stellar astrophysics, Stellar atmospheres, Cambridge University Press, Cambridge, 1997;
3. Kipenhahn, R., Weigert, A., Stellar Structure and evolution, Springer-Verlag, Berlin, 1990;

Course language:
Slovak, English

Course assessment
Total number of assessed students: 4

N	P
0.0	100.0

Provides: doc. RNDr. Rudolf Gális, PhD.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 157

N	P
0.0	100.0

Provides:

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ USMA/15	**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 credits: 5

Recommended semester/trimester of the course: 3.

Course level: III.

Prerequisities:

Conditions for course completion:
exam

Learning outcomes:
The aim of the course is to give to the students, oriented to the astrophysics, basic knowldges 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, English

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: prof. RNDr. Michal Hnatič, DrSc.

Date of last modification: 21.02.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 34

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 18

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 13

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:

Course assessment
Total number of assessed students: 282

abs	n
100.0	0.0

Provides:

Date of last modification: 01.03.2017

Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 333	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 40	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, 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 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:	
Course assessment Total number of assessed students: 216	

abs	n
100.0	0.0

Provides:
Date of last modification: 01.03.2017
Approved: Co-guaranteedoc. Mgr. Štefan Parimucha, PhD.Co-guaranteedoc. RNDr. Rudolf Gális, PhD.Guaranteeprof. RNDr. Michal Hnatič, DrSc.