COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KFaDF/AFS/05	**Course name:** Antique Philosophy and Present Times

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: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 30

A	B	C	D	E	FX
83.33	6.67	6.67	0.0	3.33	0.0

Provides: doc. PhDr. Pavol Tholt, PhD., mim.prof., Doc. PhDr. Peter Nezník, CSc.

Date of last modification: 26.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ARE1a/99	**Course name:** Automatization of Physical Experiments

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: 3

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
2 tests during semester
Exam, according to the topics of the lectures.

Learning outcomes:
Design of automated setups for performing selected types of physical measurements. Discussion of properties of measuring and controlling subsystem.

Brief outline of the course:
Structure of systems of automated measurement and control. Characterization of instrumentation equiped with microcomputer. Sensors of physical quantities, principle of operation, technical realization of selected types of sensors. Elements for processing signal from sensors. Electronic regulators, software simulation of analog regulators. Standart communication protocols CAMAC, IEEE488, RS232. Universal microprocessors and microcomputers. Digital signal processing. Design of digital filters.

Recommended literature:
J. Uffenbeck, Microcomputers and microprocessors, Prentice Hall, 1985.
P. Horowitz, W. Hill, The Art of Electronics, Cambridge University Press 1989.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 38

A	B	C	D	E	FX
44.74	28.95	13.16	10.53	2.63	0.0

Provides: RNDr. Erik Čižmár, PhD., prof. Ing. Martin Orendáč, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ ARE1b/99	**Course name:** Automatization of Physical Experiments

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: II.

Prerequisities: ÚFV/ARE1a/99

Conditions for course completion:
Evaluation of results reached during solving given tasks.
Final evaluation of the obtained results.

Learning outcomes:
Obtaining practical skills in programing automated experimental setups. Extension of knowledge about properties of non-ideal digital to analog and analog to digital converters. Obtaining skills in practical programming of model experimental setups designed for investigation of thermodynamic properties of solids as well as in design of digital filters. A student will also become familiar with handling selected automatedl setups designed for experimental studying solids.

Brief outline of the course:
Temperature controller. Nonlinearity of digital - analog and analog -digital converters. Analog - digital converter with feedback. Study of heat flow in materials with low thermal conductivity. Digital filtering of signal. Controlling step motor. Adressing selected problems in automated experimental setups in the laboratories in Department of Condensed Matter Physics.

Recommended literature:
Supporting material is available.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 18

A	B	C	D	E	FX
61.11	22.22	16.67	0.0	0.0	0.0

Provides: prof. Ing. Martin Orendáč, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ KEM1/99	**Course name:** Ceramics Materials

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: 3

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Written test and oral examination.

Learning outcomes:
The main aim of this course is to gain confidence in the preparation and properties of a wide range of ceramics and their applications.

Brief outline of the course:
Introduction to Solid State Science. The Fabrication of Ceramics. Construction Ceramics. Mechanical Properties of Construction Ceramics. Ceramics Conductors. Dielectrics and Insulators. Piezoeletrics Ceramics. Pyroelectric Materials. Electro-optic Ceramics. Magnetic Ceramics. Aplications of Ceramics Materials in a Modern Idustry.

Recommended literature:
1. A. J. Moulson, J. M. Herbert, Electroceramics, Chapman and Hall, London 1990.
2. M. W. Barsoum,Fundamentals of Ceramics, Taylor & Francis, 2002.

Course language:

Notes:

Course assessment
Total number of assessed students: 12

A	B	C	D	E	FX
83.33	16.67	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Ján Füzer, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KPPaPZ/KK/07	**Course name:** Communication and Cooperation
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: 3.	
Course level: II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 281

abs	n	z
98.22	1.78	0.0

Provides: Mgr. Ondrej Kalina, PhD.
Date of last modification: 04.02.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MSSFKL/15	**Course name:** Condensed Matter Physics

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: II.

Prerequisities: ÚFV/MKL/03 and ÚFV/FNT1/03 and ÚFV/TKL1/99

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

Learning outcomes:
Evaluation of the competences of the students according to the profile.

Brief outline of the course:
The state exam consists of defending diploma thesis and exam which has two blocks. The student is obliged to pass the exam from the compulsory block and one of two optional blocks.
I. Block – compulsory
Theory of condensed mater
1. Basic approximations in solid state physics. The Born-Oppenheimer adiabatic approximation. The Hartreeho-Fock method.
2. The definition of ideal crystal. The direct and reciprocal lattice. The Wigner-Seitz elementary cell.
3. Electrons in a periodic potential field. The effective mass.
4. The finite crystal and Born-Kárnan boundary conditions. Brilluoin zones.
5. The approximation of nearly-fee electrons. The band structure of energy spectrum.
6. The tight binding method. Differences of the band structure in comparison with the approximation of nearly-fee electrons.
7. The harmonic approximation and lattice vibrations . Vibrations of the linear chain with one atom per unit cell.
8. Vibrations of the linear chain with two atoms per unit cell.
9. Quantum theory of harmonic vibrations. Phonons.
10. The second quantization.
11. The electron-phonon interaction.
II. Optional block
Magnetic properties of solids
1. Magnetic moment of atom.
2. Diamagnetism.
3. Paramagnetis.
4. Ferromagnetism.
5. Antiferromagnetism.

6. Ferrimagnetism.
7. Energy of ferromagnets.
8. Domain structure.
9. Magnetization processes.
Experimental methods
10. Measurement of intensity a induction of magnetic field.
11. Measurement of magnetostriction and anisotropy.
12. Physical principle of electron microscopy, construction of electron microscop.
13. X – ray and electron diffraction and their applications in solid state physics.
14. Analytical methods for determination of surface chemical composition (EDX, WDX).
III. Optional block
Low temperature physics
1. Superfluidity of 4He.
2. Superfluidity of 3He.
3. Properties of liquid solutions 3He - 4He.
4. Quantum crystals.
5. Introduction to superconductivity – Josephson effect and its applications.
6. BCS a GLAG theories of superconductivity.
7. Unconventional superconductivity.
8. Transport of charge and heat at low temperatures.
9. Methods of reaching very low temperatures.
10. Methods of measurements of low temperatures.
Experimental methods
11. Specific heat at low temperatures - measurement techniques and data acquisition.
12. Low level signal measurements.
13. Electron - paramagnetic resonance.

Recommended literature:

Course language:
english

Notes:

Course assessment
Total number of assessed students: 1

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides:

Date of last modification: 02.07.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ODP/14	**Course name:** Diploma Thesis and its Defence

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: II.

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

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides:

Date of last modification: 10.03.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ DDS/08	**Course name:** Domain and Domain Walls

Course type, scope and the method:
Course type: Lecture
Recommended course-load (hours):
Per week: 1 **Per study period:** 14
Course method: present

Number of credits: 2

Recommended semester/trimester of the course: 4.

Course level: II.

Prerequisities:

Conditions for course completion:
Exam

Learning outcomes:
The objective is to acquaint the students witrh the basis of the domain and domain wall formation, their structure, static and dynamic properties in magnetic materials.

Brief outline of the course:
Domain structure. Experimental study of domain structure. Calculation of domain structure. Anisotropies. Domain wall types. Domain wall potential. Domain wall dynamics. Domain wall motion induced by electrical current.

Recommended literature:
1. B.D. Cullity, C.D. Graham, „Introduction to magnetic materials“, John Wiley & Sons, New Jersy (2009)
2. S. Chikazumi, Physics of Ferromagnetism, Oxford University Press, USA (2009)
3. S. Tumanski, Handbook of Magnetic Measurements, CRC Press (2011)
4. N. A. Spaldin, Magnetic Materials: Fundamentals and Device Applications, Cambridge University Press (2003)

Course language:
slovak or english

Notes:

Course assessment
Total number of assessed students: 5

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Rastislav Varga, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ EMT1/03	**Course name:** Experimental Methods in Solid State Physics I

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: 3

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
2 tests during semester,
Exam.

Learning outcomes:
Clarification of selected experimental techniques applied in the experimental study of solids. Discussion of physical phenomena associated with the techniques and design of model experimental setups.

Brief outline of the course:
Low level signal measurements. Study of dielectric properties. Dielectric polarization, susceptibility, permitivity. Capacitor partially filled with dielectric material. Capacitors for permitivity study in liquids and solids. Specific heat, thermal and electrical conductivity measurements. Introduction to vacuum technology. Studying Hall effect and magnetoresistance in semiconductors. Thermoelectric phenomena.

Recommended literature:
Supporting material is available.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 31

A	B	C	D	E	FX
45.16	32.26	16.13	3.23	3.23	0.0

Provides: prof. Ing. Martin Orendáč, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ EM1/03	**Course name:** Experimental Methods in Solid State Physics II

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: 3

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Test
Oral Exam

Learning outcomes:
The subjects provides a basic overview of the solid state methods and techniques studying the surface structures as well as the quasiparticle spectra.

Brief outline of the course:
Experimental methods oriented on structural studies of solid state surfaces, superconducting vortices, magnetic and electrical surface structures. Spectroscopies with high energy resolution for studies of electron and other quasiparticles in solids.

Recommended literature:
Hajko V a kol.: Physics in Experiment, Veda, Bratislava 1998.
Kittel Ch.: Introduction to Solid State Physics, 7th edition, John Wiley and sons, NY, 1996
M. Tinkham: Introduction to Superconductivity, McGraw-Hill, Nwe York, 1996

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 30

A	B	C	D	E	FX
83.33	10.0	6.67	0.0	0.0	0.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Mgr. Tomáš Samuely, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KFaDF/DF2p/03	**Course name:** History of Philosophy 2 (General Introduction)

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of credits: 4

Recommended semester/trimester of the course: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 729

A	B	C	D	E	FX
60.49	13.85	12.76	8.78	3.43	0.69

Provides: doc. PhDr. Pavol Tholt, PhD., mim.prof., Doc. PhDr. Peter Nezník, CSc., PhDr. Katarína Mayerová, PhD., Mgr. Róbert Stojka, PhD.

Date of last modification: 26.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DEJ1/99	**Course name:** History of 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 credits: 2

Recommended semester/trimester of the course: 2., 4.

Course level: I., II.

Prerequisities:

Conditions for course completion:
written test and thesis
exam

Learning outcomes:
Basic facts in the history of physics.

Brief outline of the course:
Evolution of knowledge before Galileo. Evolution of physics within the mechanical picture of the world. Evolution and limits of classical physics, phase of breakthrough in physics. Origin and evolution of the theory of relativity. Quantum physics and prospects of further evolution of physics and their application. Contemporary state of physical research and its application in technology, natural sciences and philosophy. Position of physics in our society.

Recommended literature:
1. R.Zajac, J.Chrapan: Dejiny fyziky, skriptá, MFF UK, Bratislava, 1982.
2. V.Malíšek: Co víte o dějinách fyziky, Horizont, Praha, 1986.
3. I.Kraus, Fyzika v kulturních dějinách Evropy, Starověk a středověk, Nakladatelství ČVUT, Praha, 2006.
4. A.I.Abramov: Istoria jadernoj fiziky, KomKniga, Moskva, 2006.
5. L.I.Ponomarev: Pod znakom kvanta, Fizmatlit, Moskva, 2006.
6. I.Kraus, Fyzika v kulturních dějinách Evropy, Od Leonarda ke Goethovi, Nakladatelství ČVUT, Praha, 2007.
7. I.Kraus, Fyzika od Thaléta k Newtonovi, Academia, Praha, 2007.
8. I.Štoll, Dějiny fyziky, Prometheus, Praha, 2009.
9. www-pages.
10.Brandt S., The harvest of a century, Discoveries of modern physics in 100 episodes, Oxford, 2009.

Course language:

Notes:

Course assessment
Total number of assessed students: 11

A	B	C	D	E	FX
63.64	18.18	18.18	0.0	0.0	0.0

Provides: prof. RNDr. Stanislav Vokál, DrSc.

Date of last modification: 11.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KFaDF/ KDF/05	**Course name:** Chapters from History of Philosophy of 19th and 20th Centuries (General Introduction)

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: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 10

A	B	C	D	E	FX
50.0	20.0	10.0	0.0	10.0	10.0

Provides: doc. PhDr. Pavol Tholt, PhD., mim.prof.

Date of last modification: 26.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB10/14	**Course name:** IB10 - Medzinárodný certifikát ECo-C
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB11/14	**Course name:** IB11 - Medzinárodný certifikát ECDL
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 14	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB12/14	**Course name:** IB12 - Používanie, administrácia a vývoj v systéme SAP
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 54	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB1/14	**Course name:** IB1 - Etika v biomedicínskych vedách pre zdravotnícku prax
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB2/14	**Course name:** IB2 - Právne minimum – súkromnoprávne aspekty
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB3/14	**Course name:** IB3 - Právne minimum – verejnoprávne aspekty
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB4/14	**Course name:** IB4 - Projektový manažment
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: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB5/14	**Course name:** IB5 - Manažérska ekonomika
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB6/14	**Course name:** IB6 - Riešenie konfliktných a krízových situácií v školskej praxi
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB7/14	**Course name:** IB7 - Štatistika pre prax
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB8/14	**Course name:** IB8 - Environmentálne aspekty záťaže životného prostredia
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 16	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: R UPJŠ/ IB9/14	**Course name:** IB9 - Medzinárodný certifikát TOEFL
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 17	
Recommended semester/trimester of the course:	
Course level: I., I.II., II.	
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	neabs
0.0	0.0	0.0

Provides:
Date of last modification: 11.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KFaDF/IH2/03	**Course name:** Idea Humanitas 2 (General Introduction)

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: 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 4

A	B	C	D	E	FX
75.0	25.0	0.0	0.0	0.0	0.0

Provides: Doc. PhDr. Peter Nezník, CSc.

Date of last modification: 26.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ FNT1/03	**Course name:** Low Temperature 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 credits: 6

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Two tests during the semester. Final examination consists of the results of two tests and oral exam. The oral exam may be waived of if the tests results are better then D.

Learning outcomes:
The cours gives knowledge of methods and techniques used in low-temperature physics and information on basic physical properties of condensed matter at low temperatures.

Brief outline of the course:
Phase diagram of 4He. Thermal and transport propertie sof liquid helium-4. Superfluidity. Two-fluid model for superfluid He II. Hydrodynamics and thermodynamics for superfluid helium-4. Quantize vortices. Phase diagram of 3He. Order parameter. Properties of 3He-4He solutions. Quantum crystals. Superconductivity. Tunnel superconducting junctions. Application of superconductivity. Transport properties (electrical and thermal) of solids at low temperatures. Macroscopic quantum effects and mesoscopic systems. Specific heat of solids at low temperatures. Reaching low and very low temperatures. Thermometry. New problems of low-temperature physics.

Recommended literature:
A. Kent: Experimental low-temperature physics. Mac Millan Press Ltd., 1993.
D. S. Betts: An introduction to Milikelvin Technology. Cambridge University Press, 1989.
P. V. E. McClintok et al.: Low-Temperature Physics. Blackie, Galsgow and London 1992.
F. Pöbell: Matter an Methods at Low Temperatures. Springer - Verlag, Berlin, 1992

Course language:

Notes:

Course assessment
Total number of assessed students: 34

A	B	C	D	E	FX
94.12	2.94	2.94	0.0	0.0	0.0

Provides: RNDr. Erik Čižmár, PhD., Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

Date of last modification: 18.02.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ MKL/03	**Course name:** Magnetic Properties of Solids

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: 6

Recommended semester/trimester of the course: 2.

Course level: II., III.

Prerequisities:

Conditions for course completion:
Test.
Oral examination.

Learning outcomes:
To obtain a general view on basic magnetic phenomena, intrinsic magnetic properties of various magnetic materials, magnetization processes and domain structure.

Brief outline of the course:
Magnetic materials and magnetization. Magnetic quantities. Carriers of magnetic moment. Vector model of the atom. Magnetic field sources. Measurements of magnetic field. Diamagnetism. Paramagnetism. Ferromagnetism. Antiferromagnetism. Ferrimagnetism. Mgnetic behavior and structure of materials. Neutron diffraction. Magnetic anisotropy. Hall effect, magnetoresistance. Domain structure. Magnetostriction. Technical magnetization. Dynamic magnetization processes. Susceptibility. Thin films.

Recommended literature:
S. Chikazumi: Physics of Magnetism, Oxford University Press 2009
D. Jiles: Introduction to magnetism and magnetic materials, Chapman&Hall, London, New York, Tokyo, Melbourne, Madras, 1991

Course language:
english

Notes:

Course assessment
Total number of assessed students: 62

A	B	C	D	E	FX	N	P
51.61	14.52	6.45	0.0	0.0	0.0	0.0	27.42

Provides: prof. RNDr. Peter Kollár, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ MAG/08/08	**Course name:** Magnetochemistry

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of credits: 5

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Exam

Learning outcomes:
Introduction to the basic interactions in the electron subsystem of insulators, demonstration of the correlations between the structure and magnetic properties. Students will learn the basic standard methods used in the analysis of thermodynamic data (specific heat, susceptibility, magnetization) and EPR, since the study of magnetic properties yield an important information about the structure of material especially at low temperatures.

Brief outline of the course:
Electronic states in hydrogen atom, electronic configuration, term, multiplet. Paramagnetic and diamagnetic atoms. Atom in magnetic field: specific heat, susceptibility, magnetization and electron paramagnetic resonance (EPR). Atom in the crystal field. Freezing of angular momentum. Spin Hamiltonian. Termodynamics and EPR of paramagnetic atoms in the crystal field. Exchange and dipole interaction.Heisenberg Hamiltonian. Magnetic dimer. Long-range and short- range order. Low-dimensional magnets. Spatial anisotropy of exchange coupling. Exchange anisotropy. Heisenberg, Ising and XY model.

Recommended literature:
1.R.L. Carlin, A.J. Duyneveldt: Magnetic properties of transition metal compounds. New York, inc. Springer Verlag, 1977.
2. A.B.P.Lever, Inorganic electronic spectroscopy, Elsevier, Amsterdam, 1987.

Course language:
english

Notes:

Course assessment
Total number of assessed students: 10

A	B	C	D	E	FX
50.0	20.0	10.0	10.0	10.0	0.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., RNDr. Róbert Tarasenko, PhD.
Date of last modification: 18.02.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ MPN/14	**Course name:** Methods of preparation and characterization of nanostructures

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of credits: 3

Recommended semester/trimester of the course: 2.

Course level: II., III.

Prerequisities:

Conditions for course completion:
powerpoint review of selected topic

Learning outcomes:
The goal of this course is to make an overview of methods used for fabrication of nanostructures and nanodevices.

Brief outline of the course:
This course teaches student about methods for fabrication of microelectromechanical devices, microanalytical devices and nanoobjects using top-down methods. I will make an overview of forces acting upon nanoobjects, thermodynamics on nanoscale. Overview of thin film preparation methods will be also given. I will talk about conventional and unconventional nanopatterning methods. Also application of nanostructures in fundamental and applied science will be described. Part of this course is also laboratory practice.

Recommended literature:
1. B. Bhushan Ed., Handbook of nanotechnology, Springer Academic Publishers, 2nd edition, 2007.
2. J. A. Rogers, H. H. Lee, Unconventional nanopatterning techniques and applications, Wiley, 1990.
3. G. Hornyak, J. Dutta, H. F. Tibbals, A. K. Rao, Introduction to nanocience CRC Press, 2008.
4. G. A. Ozin, A. C. Arsenault, L. Cademartiri, Nanochemistry A Chemical Approach to Nanomaterials, RSC Publishing, 2005.

Course language:
Slovak, English

Notes:

Course assessment
Total number of assessed students: 12

A	B	C	D	E	FX	N	P
41.67	0.0	0.0	0.0	0.0	0.0	0.0	58.33

Provides: Mgr. Vladimír Komanický, PhD.
Date of last modification: 18.02.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ MSA1/03	**Course name:** Methods of Structural Analysis

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 2 **Per study period:** 42 / 28
Course method: present

Number of credits: 7

Recommended semester/trimester of the course: 2., 4.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Final written exams form both topics:EM and X-ray diffractometry - 25%
Experimental projects from both topics: ligt and electron microscopy and X-ray diffractometry - 75%

Learning outcomes:
The course is oriented on modern methods of structural analysis of metals. Main topics are: optic microscopy, electron microscopy (TEM, SEM),electron microprobe analysis and X-ray diffractometry.

Brief outline of the course:
Optic microscopy. Electron microscopy: Electron beam instruments, Electron optics, Electron lences and deflection systems, Transmission electron microscopy - principle and construction. Electron – specimen interactions. Electron diffraction. Kikuchy lines. Scanning electron microscopy – principle and cnstrucion. Scanning transmission electron microscopy. High Voltage electron microscopy. Electron microprobe analysis: WDX spectrometer, EDX spectrometer, Auger electron spectrometer. Self-emision microscopy. Convergent beam diffraction.
X-ray diffractometry: Scattering of x-rays, Neutrons and neutron scattering, CW - diffractometer, Ewald´s sphere, Diffraction on powder samples, The main characteristics of powder diffraction pattern, Structure factor, Ocupation factor, Atomic displacement factor, Peak intensity, shape and symmetry, Sherrer equation. Peak profile, Rietweld method. Qualitative phase analysis, parameters of elementary cell, Profile analysis of diffraction peak and interpretation of profile analysis.

Recommended literature:
1.S. Amelincks, D.van Dyck, J. van Landyut, Electron Microscopy – Principles and Fundamentals of Electon Microscopy, VCH, 1997.
2.M.H. Loretto, Electrom beam analysis of materials. Springer, 2002.
3.Fundamentals of Powder Diffraction and Structural Characterization of Materials, Vitalij K. Pecharsky & Peter Y. Zavalij , Kluwer Academic Publishers, 2003.
4.Structure Determination from Powder Diffraction Data, Edited by W.I.F. David, K. Shankland, L.B. McCusker, C. Bärlocher, Oxford University Press, 2006

Course language:

English

Notes:

Course assessment
Total number of assessed students: 32

A	B	C	D	E	FX
53.13	31.25	12.5	3.13	0.0	0.0

Provides: prof. RNDr. Pavol Sovák, CSc., Ing. Karel Saksl, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ NANO/09	**Course name:** Nanomaterials and Nanotechnologies

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 1 **Per study period:** 28 / 14
Course method: present

Number of credits: 4

Recommended semester/trimester of the course: 2.

Course level: II., 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: 6

A	B	C	D	E	FX	N	P
66.67	0.0	0.0	0.0	0.0	0.0	0.0	33.33

Provides: doc. RNDr. Adriana Zeleňáková, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ NJ//13	**Course name:** Naval Yachting
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 36 **Per study period:** 504 **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 2

abs	n
100.0	0.0

Provides: doc. Mgr. Rastislav Feč, PhD.
Date of last modification: 15.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ NKM1/99	**Course name:** Non-Conventionals Metallic Materials

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: 3

Recommended semester/trimester of the course: 1.

Course level: II., III.

Prerequisities:

Conditions for course completion:
Full-course elaboration of chosen topic and oral presentation with oral discussion.

Learning outcomes:
The course gives information about basics of materials science, standard and advanced materials, and relations between structure states and mechanical and physical properties of metalic alloys.

Brief outline of the course:
Real metalic structures, hyperstructures, Fe - based alloys, advanced high-strenght alloys. Metallic biomaterials. Corrosive processes and materials for corrosion environment. Ti, Al, Co, Ni - based progressive materials. Materials dedicated to automotive, aircraft, armament and nuclear industry. Superplasticity, shape memory effect and its alloys. Materials for cryogenic applications. Technology and materials of powder metallurgy. Thin layers and interphase boundary.

Recommended literature:
1.D.R.Askeland and P.P. Phulé, The Science and Engineering of Materials, Thomson 2003.
2.Structure and Properties of Engineering Alloys, McGraw-Hill Editons, 1993.
Š. Nižník: Základy Fyziky tuhých látok, Učebné texty, Košice, 2002

Course language:
Slovak language

Notes:
None.

Course assessment
Total number of assessed students: 9

A	B	C	D	E	FX	N	P
22.22	11.11	0.0	11.11	0.0	0.0	0.0	55.56

Provides: prof. RNDr. Pavol Sovák, CSc., Ing. Vladimír Girman, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ NOT1a/03	**Course name:** Nontraditional Optimization Techniques I

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 credits: 5

Recommended semester/trimester of the course: 1.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Monitoring progress in solving applied projects.
examination (50%), quality of the project (50%)
examination

Learning outcomes:
To familiarize students with biologically and physically inspired optimization, simulation and prediction techniques. To expand students' creativity and programming skills by applying heuristic techniques in solving applied problems.

Brief outline of the course:
Fundamentals of optimization theory. Basic optimization problems. Basic types of objective functions. Classification of optimization techniques. Gradient-based optimization techniques. Evolutionary algorithms. Genetic algorithms. Genetic algorithms as Markov processes. Statistical Mechanics Approximations of Genetic Algorithms. Monte Carlo simulation and simulated annealing. Swarm optimization. Cellular Automata and their applications in simulations of complex systems. Fractals. Agent-based models. Evolutionary games. Evolution of cooperation. Fundamentals of Neural Networks. Application of singular value decomposition to solve least squares problems.

Recommended literature:
Hartmann, A. K., Rieger, H., Optimization Algorithms in Physics, Wiley, 2002
Reeves, C. R., Rowe, J. E., Genetic Algorithms: Principles and perspectives, Kluwer, 2003
Mitchell, M., Complexity. A Guided Tour, Oxford University Press, 2009
Solé, R. V., Phase Transitions, Princeton University Press, 2011
Ilachinski, A., Cellular Automata. A Discrete universe, World Scientific, 2002
Haykin, S., Neural Networks. A Comprehensive Foundation, Prentice-Hall, 1999

Course language:

Notes:

Course assessment
Total number of assessed students: 55

A	B	C	D	E	FX
69.09	16.36	7.27	1.82	5.45	0.0

Provides: RNDr. Branislav Brutovský, CSc.

Date of last modification: 10.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: Dek. PF UPJŠ/PPZ/13	**Course name:** Personality Development and Key Competences for Success on a Labour Market

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: Per study period: 14s
Course method: present

Number of credits: 2

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 39

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: RNDr. Peter Stefányi, PhD.

Date of last modification: 17.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ FPK1/07	**Course name:** Phase Transitions and Critical Phenomena

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

Number of credits: 4

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Examination

Learning outcomes:
To acquaint students with based problems of the phase transitions and critical phenomena.

Brief outline of the course:
Thermodynamics of phase transitions. Classification of phase transitions. Critical phenomena, universality. Microscopic models of the magnetic phase transitions. Ising model in one and two dimensions. Mean field theory of the Ising model. Landau theory of phase transitions.

Recommended literature:
1. Stanley H.G.: Introduction to Phase Transitions and Critical Phenomena, Clarendon Press Oxford, Oxford, 1971.
2. Reichl L.E.: A Modern Course in Statistical Physics, University of Texas Press, Austin, 1980.
3. Plischke M., Bergersen B.: Equilibrium Statistical Physics, World Scientific, Singapore, 1994.
4. Kadanoff L.P.: Statistical Physics, Statistics, Dynamics and Renormalization, World Scientific, Singapore, 2000.

Course language:
1. Slovak,
2. English

Notes:

Course assessment
Total number of assessed students: 87

A	B	C	D	E	FX
65.52	9.2	9.2	11.49	4.6	0.0

Provides: prof. RNDr. Andrej Bobák, DrSc.

Date of last modification: 31.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ FZM/09	**Course name:** Physical Principles of Imagine Techniques

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 0 **Per study period:** 28 / 0
Course method: present

Number of credits: 3

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Two (written) tests during the semester.
The summary of two tests during the semester and oral examination (about themes lectured in the frame of the semester).

Learning outcomes:
The object is to present main informations about physical principles of the operations in modern imagine techniques, used in informatic systems and mainly in medicine diagnostique, wich needs top software and hardware extension for its full utilization.

Brief outline of the course:
A) The analysis of the selected physical phenomenon, methods and utilities used by processing of imaging of the data (CCD components of camera, semiconductor display, plasma and LCD monitors, etc.)
B) The analysation of the display-medicine-techniques precedures (USG, NMR, CT, radiotheraphy, lasers, ect.)

Recommended literature:
Gershenfeld N.: The Physics of Information Technology. Cambridge University Press, Cambridge, 2000.
Bushberg J.T. et al.: The Essential Physics of Imaging. Lip. Wiliams, Philadelphia, 2002.

Course language:

Notes:

Course assessment
Total number of assessed students: 6

A	B	C	D	E	FX
83.33	16.67	0.0	0.0	0.0	0.0

Provides: RNDr. Marcela Kajňaková, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ LEK1/02	**Course name:** Physical Principles of Medical Diagnostics and Therapy

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: 2

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 27

A	B	C	D	E	FX
85.19	11.11	3.7	0.0	0.0	0.0

Provides: doc. RNDr. Karol Flachbart, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/FMJ/06	**Course name:** Physics of Magnetic Phenomena

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: 3

Recommended semester/trimester of the course: 1.

Course level: I., II., III.

Prerequisities:

Conditions for course completion:
Exam

Learning outcomes:
The aim of the subject is to give overview to the physical mechanism of the magnetization process.

Brief outline of the course:
Basic units for magnetic material characterization. Magnetic materials. Magnetic anisotropies. Magnetic parameters. Domain structure. Magnetization processes. Dynamics of magnetization processes.

Recommended literature:
1; B.D. Cullity and C.D. Graham, Introduction to magnetic materials, Willey-IEEE Press, 2007
2; S. Chikazumi, Physics of Ferromagnetism, Claredon Press, 1997
3; C.W. Chen, Magnetism and metallurgy of soft magnetic materials, Dover Publ.,1986

Course language:
slovak or english

Notes:

Course assessment
Total number of assessed students: 44

A	B	C	D	E	FX	N	P
65.91	4.55	2.27	2.27	0.0	0.0	0.0	25.0

Provides: doc. RNDr. Rastislav Varga, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ FMT/07	**Course name:** Physics of Materials

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

Number of credits: 4

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
70% written test
30% exam

Learning outcomes:
The course gives basic information about Physics of Metals. Main topics are: diffusion in metals, classification of surfaces, models of grain boundary, segregation kinetics, dislocations, plastic deformation.

Brief outline of the course:
Imperfections in crystal lattice. Diffusion in metals: 1st and 2nd Fick's laws, diffusion coefficient, solution of Ficks' laws for different marginal conditions, Kirkendall effect, diffusion-controlled growth of precipitates, up-hill diffusion, diffusion in dilute and alloy systems. Experimental methods of diffusion coefficient determination.
Classification of surfaces, models of grain boundary. Grain boundary segregation in solids: equilibrium segregation (McLean's and Guttmann's models), site competition effect, non-equilibrium segregation, segregation kinetics.
Dislocations: classification, properties, movement and dislocation reactions. Dilocation structure in bcc, fcc and hcp lattice. Elastic deformation. Elastic stretching. Plastic deformation. Mechanism of strain hardening. Mechanical properties and behaviour. Creep, Stress, Rupture and Stress Corrosion.

Recommended literature:
1.Heumann: Diffusion in Metallen, Springer-Verlag, Berlin 1992 (in German).
2. W. Cahn and P. Haasen: Physical Metallurgy, Elsevier Science Publishers, Amsterdam 1996.Shewmon: Diffusion in solids, TMS, Warrendale 1989.
3. D.R. Askeland, P. Phulé, The Science and Engineering of Materials, Thomson, 2003.

Course language:
english

Notes:

Course assessment
Total number of assessed students: 8

A	B	C	D	E	FX
37.5	25.0	37.5	0.0	0.0	0.0

Provides: prof. RNDr. Pavol Sovák, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ POL1/99	**Course name:** Physics of Polymers

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: 3

Recommended semester/trimester of the course: 1., 3.

Course level: II.

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

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides: Mgr. Ján Murín

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/PP1/99	**Course name:** Physics of Semiconductor Elements

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: 3

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Exam, its contents is given by topics of lectures.

Learning outcomes:
Acquiring knowledge about principle of operation of semiconductor elements and their applications in experimental research and technology.

Brief outline of the course:
Basic properties of semiconductors. Termistors. Hall device, magnetoresistor, cryosar, Gunn device, varistor, tensoelektric elements. Semiconductor devices with one PN junction. Bipolar junction transistor. Junction field-effect transistors. MOS field-effect transistors. Contact metall-semiconductor. Silicon chip technology and fabrication techniques. Optoelektronic devices. Charge coupled devices

Recommended literature:
D.J. Roulston, An introduction to the physics of semiconductor devices, Oxford University Press, 1999

Course language:
english

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX
94.12	5.88	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Peter Kollár, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/FPO/11	**Course name:** Physics of Surfaces

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: 4

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
report from selected scientific problematics
Exam.

Learning outcomes:
The goal of this course is to introduce student to theory and physical properties of surfaces, processes and phenomena on surfaces and methods used for their study.

Brief outline of the course:
In the introduction i will make general overview of terminology in physics of surfaces, electronic structure of solids with application to surfaces. I will make detailed overview of experimental methods used for surface characterization. Student will learn about theory of adsorption and diffusion on surfaces, with thermodynamics and kinetics of processes on surfaces and growth of layers. I will show examples of physical and chemical processes on surfaces in real applications. Student will gain basic knowledge about theory of interfaces and about processes stimulated by laser and electrons and about manipulation on surfaces on nanoscale.

Recommended literature:
1. K. W. Kolasinski, Surface Science Foundations of Catalysis and Nanoscience, John Wiley and Sons, Ltd. 2008.
2. Ch. Kittel, Introduction to Solid State Physics, 7th edition, John Wiley and Sons, 1995.
3. A. Zangwill Physics at Surfaces, Cambridge university press, 1988

Course language:

Notes:

Course assessment
Total number of assessed students: 3

A	B	C	D	E	FX
66.67	33.33	0.0	0.0	0.0	0.0

Provides: Mgr. Vladimír Komanický, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPPaPZ/PPZMg/12	**Course name:** Psychology and Health Psychology (Mgr. study)

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 1 / 2 **Per study period:** 14 / 28
Course method: present

Number of credits: 4

Recommended semester/trimester of the course: 2.

Course level: I., II.

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

A	B	C	D	E	FX
19.91	25.79	25.34	12.67	15.84	0.45

Provides: PhDr. Anna Janovská, PhD., PhDr. Karolína Barinková, PhD., Mgr. Lucia Hricová

Date of last modification: 04.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ KTP1a/03	**Course name:** Quantum Field Theory I

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 1 **Per study period:** 42 / 14
Course method: present

Number of credits: 6

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
homeworks; their presentation and common analysis of problem under consideration, exam

Learning outcomes:
To offer basic knowledges about modern trends and theoretical methods in description of microword and phenomena in physical systems with infinite degrees of freedom.

Brief outline of the course:
Conception of relativistic quantum field. Particles as quantum fluctuations of this field. Lagrange formalism. Symmetries and related conservation laws for currents. Euler-Lagrange equations. Basic fields - scalar, spinor, electromagnetic and vector. Equations for free classical fields - Klein-Gordon and Dirac equations, Maxwell equations. Lagrangeans and Hamiltonians for these fields. Quantization of free fileds. Basic commutating and anticommutating relatios for free quantum fields.

Recommended literature:
Bogoljubov N.N., Širkov D.V.: Vvedenie v teoriu kvantovannych polej, Moskva, 1957 (prvé vydanie); Moskva, Nauka 1984 (4. Vydanie).
Bjorken J.D., Drell S.D.: Relativistic quantum fields (dva diely), McGraw-Hill, New York, 1966.
Feynmann R.P.: Photon-Hadron Interactions, Benjamin,New York, 1972; ruský preklad: Vzaimodejstvije fotonov s adronami, Mir, Moskva, 1975.

Course language:
slovak and english

Notes:

Course assessment
Total number of assessed students: 43

A	B	C	D	E	FX
60.47	20.93	6.98	4.65	6.98	0.0

Provides: prof. RNDr. Michal Hnatič, DrSc., RNDr. Tomáš Lučivjanský, PhD.

Date of last modification: 11.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ KTP1b/03	**Course name:** Quantum Field Theory II

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 1 **Per study period:** 42 / 14
Course method: present

Number of credits: 6

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities: ÚFV/KTP1a/03

Conditions for course completion:
homeworks, their presentation and common analysis of the problem under consideration; exam

Learning outcomes:
To offer basic knowledges about modern trends and theoretical methods in description of microword and phenomena in physical systems with infinite degrees of freedom.

Brief outline of the course:
Interacting fields. The principle of symmetry and the form of interactions of quantum fields. Lagrange operator in QED. S – matrix. Wick theorems and Feynman diagrams. Perturbative calculation of S - matrix. S - matrix and cross section of the processes. Compton scattering of the proton on electron cross section calculation in QCD frame. Radiation corrections and the divergences of the Feynman graphs. Running coupling constant.

Recommended literature:
Bogoljubov N.N., Širkov D.V.: Vvedenie v teoriu kvantovannych polej, Moskva, 1957 (prvé vydanie); Moskva, Nauka 1984 (4. Vydanie)
Itzykon C., Zuber J.B.: Quantum field theory,McGraw-Hill, New York, 1986; ruský preklad: Icikon K., Zjuber Z.B.: Kvantovaja teoria polja,
Mir, Moskva, 1984.
Ryder L.H.: Quantum field theory, Cambridge University Press, 1985; ruský
preklad: Rajder L.: Kvantovaja teoria polja, Mir, Moskva, 1987.

Course language:
slovak and english

Notes:

Course assessment
Total number of assessed students: 40

A	B	C	D	E	FX
57.5	27.5	7.5	2.5	5.0	0.0

Provides: prof. RNDr. Michal Hnatič, DrSc., RNDr. Tomáš Lučivjanský, PhD.

Date of last modification: 11.02.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ ÚTVŠ/CM/13	**Course name:** Seaside Aerobic Exercise
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 36 **Per study period:** 504 **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 7

abs	n
57.14	42.86

Provides: Mgr. Alena Buková, PhD., Mgr. Agata Horbacz, PhD.
Date of last modification: 15.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SPFKLa/14	**Course name:** Semestral work I

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: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
Succesful meeting the goals formulated by the supervisor at the beginning of the semester in required extent.

Learning outcomes:
Students become familiar and obtain skills in scientific work related to experimental study of solids by involving them in solving scientific problems in research teams.

Brief outline of the course:
Solving of selected problems associated with experimental study in solid state physics.

Recommended literature:
Selected scientific journals and books.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 6

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides:

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/SPFKLb/14	**Course name:** Semestral work II

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: 2.

Course level: II.

Prerequisities: ÚFV/SPFKLa/14

Conditions for course completion:
Succesful meeting the goals formulated by the supervisor at the beginning of the semester in required extent.

Learning outcomes:
Students become familiar and obtain skills in scientific work related to experimental study of solids by involving them in solving scientific problems in research teams.

Brief outline of the course:
Solving of selected problems associated with experimental study in solid state physics.

Recommended literature:
Selected scientific journals and books.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 4

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: prof. Ing. Martin Orendáč, CSc., doc. RNDr. Alžbeta Orendáčová, DrSc., RNDr. Erik Čižmár, PhD., Mgr. Tomáš Samuely, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SPFKLc/14	**Course name:** Semestral work III

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: 3.

Course level: II.

Prerequisities: ÚFV/SPFKLb/14

Conditions for course completion:
Succesful meeting the goals formulated by the supervisor at the beginning of the semester in required extent.

Learning outcomes:
Students become familiar and obtain skills in scientific work related to experimental study of solids by involving them in solving scientific problems in research teams.

Brief outline of the course:
Solving of selected problems associated with experimental study in solid state physics.

Recommended literature:
Selected scientific journals and books.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides:

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ OSA1/99	**Course name:** Seminar in Solid State Physics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 1 **Per study period:** 14
Course method: present

Number of credits: 1

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
Active participation at the seminars.

Learning outcomes:
Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions.

Brief outline of the course:
Contents is determined by the lectures and varies every year.

Recommended literature:
Scientific journals.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 27

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ OSB1/99	**Course name:** Seminar in Solid State Physics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 1 **Per study period:** 14
Course method: present

Number of credits: 1

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Active participation at seminars.

Learning outcomes:
Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions.

Brief outline of the course:
Contents is determined by the lectures and varies every year.

Recommended literature:
Scientific journals.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 20

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ OSC1/99	**Course name:** Seminar in Solid State Physics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 1 **Per study period:** 14
Course method: present

Number of credits: 1

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Active participation in seminars.

Learning outcomes:
To obtain informations about scientific results of various research group from Košice and from their cooperating foreign institutions.

Brief outline of the course:
Content is determined by the lectures and varies every year.

Recommended literature:
Scientific journals.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 22

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/OSD1/99	**Course name:** Seminar in Solid State Physics

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 1 **Per study period:** 14
Course method: present

Number of credits: 1

Recommended semester/trimester of the course: 4.

Course level: II.

Prerequisities:

Conditions for course completion:
Active participation in seminars.

Learning outcomes:
To obtain informations about scientific results of various research group from Košiceand from their cooperating foreign institutions.

Brief outline of the course:
Content is determined by the lectures and varies every year.

Recommended literature:
Scientific journals.

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 18

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SDP/14	**Course name:** Seminár k diplomovej práci
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 14	
Recommended semester/trimester of the course: 3.	
Course level: II.	
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: 06.08.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPPaPZ/SPVKE/07	**Course name:** Social-Psychological Training of Coping with Critical Life Situations

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: 2.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 101

abs	n	z
97.03	2.97	0.0

Provides:

Date of last modification: 04.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ SPE1/03	**Course name:** Solid State Spectroscopy

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 1 **Per study period:** 42 / 14
Course method: present

Number of credits: 5

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Exam interwiew.

Learning outcomes:
Explanation of the principles of Mössbauer spectroscopy, infrared spectroscopy and radiospectroscopy (electron paramagnetic resonance, nuclear magnetic resonance). The theoretical knowledge will be completed by the work in research laboratories.

Brief outline of the course:
Mössbauer spectroscopy: Mössbauer effect. Hyperfine coupling. Electric monopole and quadrupole, and magnetic dipole interactions. Mössbauer spectroscopy, analysis of Mössbauer spectra – intensity and width of lines, isomer shift, quadrupole splitting and magnetic splitting. Infrared spectroscopy: Harmonic and anharmonic oscilator. Vibrational spectra. IR spectrometers, techniques, sample preparation. NMR/EPR spectroscopy: Electron spin. Crystal field. Electron spectra and transitions. EPR technique. Interactions of nuclei with magnetic and electric fields. Nuclear paramagnetism. Continual wave and pulse nuclear magnetic resonance techniques. Relaxation processes in nuclear spin system. One dimensional 1H and 13C NMR of liquid samples. Two-dimensional NMR spectra. Principles, measuring techniques. Solid-state NMR. NMR of feromagnetics.

Recommended literature:
1. Dickson P.E., Berry F.J.: Mössbauer spectroscopy. Cambridge University Press, London 1986.
2. Slichter C. P.: Principles of Magnetic Resonance, Springer-Verlag, London, 1990.

Course language:
english

Notes:

Course assessment
Total number of assessed students: 27

A	B	C	D	E	FX
59.26	18.52	14.81	3.7	3.7	0.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., doc. RNDr. Ján Imrich, CSc., RNDr. Natália Tomašovičová, CSc.
Date of last modification: 18.02.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/SPR1/00	**Course name:** Special Practical Exercises I

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: II., III.

Prerequisities:

Conditions for course completion:
Participation in exercises, reports from all exercies.

Learning outcomes:
The objectives of the laboratory are:
a. To gain some physical inside into some of the concepts presented in the lectures.
b. To gain some practice in data collection, analysis and interpretation of resumance.
c. To gain experience and report writing presentation and results.

Brief outline of the course:
Measurement of basic magnetic properties at ac and dc magnetisation, domain structure observation.
Measurement of magnetic properties using a SQUID magnetometer. Measurement of the dynamics of domain walls and measurement of magnetostriction.

Recommended literature:
Tumanski S, Handbook of magnetic measurements, CRC press, 2011.
Fiorillo F, Characterization and Measurement of Magnetic Materials, Elsevier, 2004.
Dufek M., Hrabák J., Trnaka Z.: Magnetická měření, SNTL, 1964, Praha
Brož J. a kol.: Základy fysikálnich měření, SPN, 1974, Praha.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX	N	P
82.35	0.0	0.0	0.0	0.0	0.0	0.0	17.65

Provides: doc. RNDr. Rastislav Varga, DrSc., doc. RNDr. Adriana Zeleňáková, PhD., doc. RNDr. Ján Füzer, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/SPR2/09	**Course name:** Special Practicum II

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: 4

Recommended semester/trimester of the course: 2.

Course level: II., III.

Prerequisities:

Conditions for course completion:
Theoretical background of the practices, the activities and knowledges by the experiments. The analysis of the experimental data and quality of the experiment elaborates.
Summary of the work on practices (theoretical background of the practices, the activities and knowledges by the experiments. The analysis of the experimental data and quality of the experiment elaborates).

Learning outcomes:
To obtain fundamental theoretical and experimental skills in area of selected physical research of condensed matter, primarily at low temperatures.

Brief outline of the course:
Vacuum technology, Calibration of the thermometers, Heat capacity, Electron-spin resonance, Magnetic susceptibility and magnetisation, Electrical resistivity: measurement, analysis of the data, characterisation of the system.

Recommended literature:
J. H. Moore and N. D. Spencer: Encyclopedia o Chemical Physics and Physical Chemistry Vol. I., II. and III., IoP Publishing Ltd. 2001, ISBN 0750303131.

Course language:

Notes:

Course assessment
Total number of assessed students: 19

A	B	C	D	E	FX	N	P
57.89	5.26	15.79	0.0	0.0	0.0	0.0	21.05

Provides: RNDr. Erik Čižmár, PhD., prof. Ing. Martin Orendáč, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVa/11	**Course name:** Sports Activities I.

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: I., I.II., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 7160

abs	n	neabs
88.42	7.82	3.76

Provides: PaedDr. Imrich Staško, doc. PhDr. Ivan Šulc, CSc., doc. Mgr. Rastislav Feč, PhD., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, Mgr. Peter Bakalár, PhD., doc. PaedDr. Ivan Uher, PhD., PaedDr. Milena Švedová, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, Mgr. Dávid Kaško

Date of last modification: 15.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVb/11	**Course name:** Sports Activities II.

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: 2.

Course level: I., I.II., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 6364

abs	n	neabs
84.95	11.06	3.99

Provides: PaedDr. Imrich Staško, doc. Mgr. Rastislav Feč, PhD., doc. PhDr. Ivan Šulc, CSc., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, doc. PaedDr. Ivan Uher, PhD., Mgr. Peter Bakalár, PhD., PaedDr. Milena Švedová, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, Mgr. Dávid Kaško

Date of last modification: 15.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVc/11	**Course name:** Sports Activities III.

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: 3.

Course level: I., I.II., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 4191

abs	n	neabs
89.91	4.72	5.37

Provides: PaedDr. Imrich Staško, doc. Mgr. Rastislav Feč, PhD., doc. PhDr. Ivan Šulc, CSc., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, doc. PaedDr. Ivan Uher, PhD., PaedDr. Milena Švedová, PhD., Mgr. Peter Bakalár, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, Mgr. Dávid Kaško

Date of last modification: 15.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ TVd/11	**Course name:** Sports Activities IV.

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: 4.

Course level: I., I.II., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 3363

abs	n	neabs
86.14	6.78	7.08

Provides: PaedDr. Imrich Staško, doc. Mgr. Rastislav Feč, PhD., doc. PhDr. Ivan Šulc, CSc., Mgr. Ivan Matúš, PhD., Mgr. Zuzana Küchelová, PaedDr. Milena Švedová, PhD., Mgr. Peter Bakalár, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, Mgr. Dávid Kaško

Date of last modification: 15.01.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/SVKK/99	**Course name:** Student Scientific Conference

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: 2., 4.

Course level: II.

Prerequisities:

Conditions for course completion:
Research activities of a student during semester
Presentation of the achieved results at the Scientific Student Conference at the faculty level.

Learning outcomes:
Students will obtain experience with presentation of achieved scientific results.

Brief outline of the course:
As required by individual topics of research.

Recommended literature:
According to requirements of individual topics of student works

Course language:
slovak, english

Notes:

Course assessment
Total number of assessed students: 38

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides:

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ LKSp//13	**Course name:** Summer Course-Rafting of TISA River
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 36 **Per study period:** 504 **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 63

abs	n
41.27	58.73

Provides: Mgr. Peter Bakalár, PhD.
Date of last modification: 15.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ KP/12	**Course name:** Survival Course
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 36 **Per study period:** 504 **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 185

abs	n
41.62	58.38

Provides: Mgr. Marek Valanský
Date of last modification: 15.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZTE/03	**Course name:** Technology of Condensed Maters
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: 3	
Recommended semester/trimester of the course: 1.	
Course level: II.	
Prerequisities:	
Conditions for course completion: 50 % maintained output, written test 50% final output, wtitten test	
Learning outcomes: The course gives information about principles of solidification, precipitatin. Thermodynamics of phase transitions, Plastic deformation, strethenning and Racrystallisation and Hot working	
Brief outline of the course: Principles of solidification: solidification defects, casting processes for manufacturing components, ingot casting, directional solidification, single crystal growth and epitaxial growth, joining of metallic materials. Solid solutions and phase equilibrium: phase diagrams,solubility and solutions, solid-solution strengthening. Relationship between properties and phase diagram. Nonequiblirium solidificatin and segregation. Dispersion strengthening and eutectic phase diagram: intermetallic compounds, eutectic phase diagram, eutectic alloys. Dispersion strengthening by phase transformations and heat treatment: nucleation and growth in solid-state reactions, precipitation hardening, age hardening, eutectoid reaction – pearlite, bainite and martensitic reaction, Strain hardening snd annealing. Hot working, recrystallisation. Superplastic forming. Ferrous alloys.	
Recommended literature: 1. D.R.Askeland and P.P. Phulé, The Science and Engineering of Materials, Thomson 2003. 2. R.W. Cahn et al, Physical Metalurgy I, Elsevier, 1983, ISBN - 0-444-86786-4 3. R.W. Cahn et al, Physical Metalurgy I, Elsevier, 1983, ISBN - 0-444-86787-2	
Course language: English	
Notes:	

Course assessment
Total number of assessed students: 28

A	B	C	D	E	FX
64.29	32.14	3.57	0.0	0.0	0.0

Provides: prof. RNDr. Pavol Sovák, CSc.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KPPaPZ/UPR/03	**Course name:** The Art of Aiding by Verbal Exchange

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: 4.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 47

A	B	C	D	E	FX
87.23	4.26	2.13	2.13	0.0	4.26

Provides: Mgr. Ondrej Kalina, PhD.

Date of last modification: 04.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ TKL1/99	**Course name:** Theory of Condensed Matter

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 4 / 2 **Per study period:** 56 / 28
Course method: present

Number of credits: 8

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
Successful passing of the final oral exam.

Learning outcomes:
To manage basic methods of quasiparticle formalism of Solid State Physics (electrons, phonons, electron-electron, electron-phonon interactions, magnons)

Brief outline of the course:
Born-Openheimer and Hartree-Fock aproximatins. The structure of solids and its theoretical description. The ideal crystal, direct and recipcal lattice. Brawaiss elementary cell. Electron in a periodic potential field, Bloch's theorem. Born-Karmán boundary conditions, Brillouin zones. Nearly free electron theory. Tight binding approximation. Existence of energy bands. Effective mass tensor. Lattice waves. Dynamical matrix. Linear monoatomic and diatomic lattices. Acoustic and optical modes. Phonons in solids. Electron-phonon interactions. The Fröhlich Hamiltonian. The atractive interaction between electrons.

Recommended literature:
[1.] Ch. Kittel: Quantum Theory of Solids, John Wiley & Sons Inc, 1985.
[2.] N.W. Ashcroft, N.D. Mermin: Solid State Physics, Harcourt College Publishers, 1976.
[3.] P.L. Taylor: A Quantum Approach to the Solid State, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1970.
[4.] J.M. Ziman, Principles of the Theory of Solids, University Press, Cambridge, 1972.
[5.] A.O.E. Animalu, Intermediate Quantum Theory of Crystalline Solids, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1981.

Course language:

Notes:

Course assessment
Total number of assessed students: 63

A	B	C	D	E	FX
47.62	12.7	17.46	11.11	11.11	0.0

Provides: prof. RNDr. Michal Jaščur, CSc., RNDr. Lukáš Mižišin
Date of last modification: 31.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/VOM/09	**Course name:** The Universe at Microscopic Level

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: 3

Recommended semester/trimester of the course: 1., 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To provide the students with the recent knowledge of the structure of the Universe at the elementary particle level.

Brief outline of the course:
The lectures provide an insight into the microstructure of the Universe - starting with early cosmic phases like quark-gluon plasma, baryogenesis and first nuclei creation and continue with the structure of nowadays Universe: main sequence stars, white dwarfs, neutron stars, black holes, interstellar and inter galactic space, dark matter and dark energy and cosmic rays.

Recommended literature:
1. D. Griffiths: Introduction to Elementary Particles, Wiley-VCH, Weinheim, 2004
2. D. Perkins: Particle Astrophysics, Oxford University Press, Oxford, 2003
3. D. Prialnik: An Introduction to the Theory of Stellar Structure and Evolution, Cambridge University Press, Cambridge, 2000

Course language:

Notes:

Course assessment
Total number of assessed students: 13

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: RNDr. Marek Bombara, PhD.

Date of last modification: 11.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/FTV/06	**Course name:** Vacuum 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 credits: 4

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Final test exam

Learning outcomes:

Brief outline of the course:
Overview of basic topics in vacuum physics - volume transport properties of gas, gas flow, gas on solids. Principles of the measurement and creation of low pressure conditions. Basics of the vacuum equipment construction and the leak-tightness testing. The use of vacuum technology in advanced material preparation and cryogenics.

Recommended literature:
J.F. O'Hanlon, A User's Guide to Vacuum Technology, Wiley-Interscience; 2003;

Course language:

Notes:

Course assessment
Total number of assessed students: 7

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

Provides: RNDr. Erik Čižmár, PhD.

Date of last modification: 18.02.2014

Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ ZKLS//13	**Course name:** Winter Ski Training Course
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 36 **Per study period:** 504 **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 59

abs	n
25.42	74.58

Provides: PaedDr. Imrich Staško, doc. PhDr. Ivan Šulc, CSc.
Date of last modification: 15.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: D PrávF/ZP2/11	**Course name:** Základy práva pre prirodovedcov II
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 1 **Per study period:** 28 / 14 **Course method:** present	
Number of credits: 4	
Recommended semester/trimester of the course:	
Course level: II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 95

abs	n
97.89	2.11

Provides:
Date of last modification: 14.01.2014
Approved: Dr.h.c. prof. RNDr. Alexander Feher, DrSc.