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COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ IG/04	Course name: Acquirement of Internal Grant
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 10	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 130	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ AKTP/12	Course name: Aplikácie kvantovej teórie poľa v súčasnej fyzike kondenzovaných látok
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: exam	
Learning outcomes: To acquaint the students with modern methods of quantum field theory and their application in the condensed matter physics.	
Brief outline of the course: Hypothesis of scaling (critical scaling) in thermodynamics; Ising model and thermodynamics of ferromagnetism; Scaling of Green functions; Landau theory; Fluctuation theory and critical behaviour; Foundations of quantum field theory; Physical quantum fields and their equations – Dirac equations, Klein-Gordon equation; Quantization of fields; Evolution operator; S-matrix; Green functions and generation functional; T- and N-products; Wick theorems; Feynman diagrammatic technique; Functional form of Green functions, generating functional and statistical sum; Phase transitions; Universal behaviour of statistical sum in the vicinity of phase transition point; Landau fluctuation theory for description of phase transitions; Anomalous scaling; Renormalization of Landau theory; Epsilon-expansion and calculation of renormalization constants; Renormalization group and differential equations for Green functions; Asymptotic scaling solutions in the region of large scales, determination of their stability; Calculation of anomalous and critical exponents.	
Recommended literature: 1. N.N. Bogolyubov, D.V. Shirkov: Quantum fields, Nauka, Moskva, 2005 (in russian) 2. A.N. Vasilev: Renormalization group in Critical Behavior Theory and Stochastic Dynamics Chapman & Hall/CRS, Boca Raton London New York Washington D.C., 2004.	
Course language: slovak, english	
Notes:	

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PVS/04	Course name: Author's patents, discoveries, software
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 38	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ CM/04	Course name: Citation in monograph
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 1	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ CZC/04	Course name: Citation in scientific journal published abroad
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 10	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 67	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ CDC/04	Course name: Citation in scientific journal published in the country of residence
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 4	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SCI/04	Course name: Citation registered in Science Citation Index
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 227	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SMPR/04	Course name: Co-worker of project supported by international grant schemes
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 98	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SDPR/04	Course name: Co-worker of project supported by national grant schemes
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 527	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ODZP/14	Course name: Defence of Doctoral Thesis
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 30	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 94	
N	P
0.0	100.0
Provides:	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DZS/14	Course name: Dissertation examination
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Obtaining required number of credits as given by the study plan.	
Learning outcomes: Evaluation of competences of the student according to his/her scientific profile.	
Brief outline of the course: Presentation of the results in the thesis for disertation exam, responding to referee's comments, answering questions of exam committee. Two questions are selected subsequently from one compulsory and one optional subject, respectively. The subjects are selected by guarantee of the program according to the study plan and scientific profile of the student. The third question addresses the current state of work on dissertation thesis.	
Recommended literature:	
Course language: english	
Notes:	
Course assessment Total number of assessed students: 117	
N	P
0.0	100.0
Provides:	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚFV/DDS/15		Course name: Domain and Domain Walls					
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present							
Number of ECTS credits: 3							
Recommended semester/trimester of the course:							
Course level: II., III.							
Prerequisites:							
Conditions for course completion: Oral examination							
Learning outcomes: The objective is to acquaint the students with 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 Jersey (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, english							
Notes:							
Course assessment Total number of assessed students: 7							
A	B	C	D	E	FX	N	P
71.43	0.0	28.57	0.0	0.0	0.0	0.0	0.0
Provides: prof. RNDr. Rastislav Varga, DrSc.							
Date of last modification: 23.07.2021							
Approved:							

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VPBP/04	Course name: Elaboration of reviewer report
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 20	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice					
Faculty: Faculty of Science					
Course ID: CJP/AJD1/07		Course name: English Language for PhD Students 1			
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present					
Number of ECTS credits: 2					
Recommended semester/trimester of the course: 1.					
Course level: III.					
Prerequisites:					
Conditions for course completion: Written assignments - professional CV, short academic biography (200-350 words). distance mode of instruction using MS teams					
Learning outcomes:					
Brief outline of the course:					
Recommended literature:					
Course language:					
Notes:					
Course assessment Total number of assessed students: 654					
N	Ne	P	Pr	abs	neabs
0.0	0.0	51.38	0.0	48.62	0.0
Provides: PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.					
Date of last modification: 11.02.2021					
Approved:					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: CJP/AJD2/07	Course name: English Language for PhD Students 2
Course type, scope and the method: Course type: Practice Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 2.	
Course level: III.	
Prerequisites:	
Conditions for course completion: Distance mode of instruction. Online consultations. Test, oral exam in accordance with the exam requirements (https://www.upjs.sk/filozoficka-fakulta/cjp/doktorandi-upjs/)	
Learning outcomes: Development of students' language skills, improvement of students' linguistic competencies (selected aspects of English pronunciation, vocabulary and syntax), development of students' pragmatic competence (selected aspects of functional grammar) with focus on English for academic and specific purposes. B2/C1 level of language competence (according to CEFR.)	
Brief outline of the course: Specific aspects of academic and professional English with focus on vocabulary development (noun and verb collocations, phrasal verbs, prepositional phrases, word-formation, formal/informal language, etc.), selected aspects of English grammar (prepositions, grammar tenses, passive voice, etc.), selected functional grammar (expressing opinion, cause/effect, arguments, examples, etc.). Academic communication. Cross-language interference.	
Recommended literature: Kolaříková, Z., Petruňová, H., Timková, R.: Angličtina v akademickom prostredí (cvičebnica). UPJŠ Košice, 2015 McCarthy, M., O'Dell, F.: Academic Vocabulary in Use. CUP, 2008 Štěpánek, L., J. De Haaf a kol.: Academic English-Akademická angličtina. Grada Publishing, a.s., 2011 Blašková, K.: Handbook of English for Postgraduate Students. Vyd. SPRINT Bratislava, 2007 Dušková, L. a kol.: Hovorová angličtina pre vedeckých a odborných pracovníkov. Veda. Bratislava, 1982 Armer, T.: Cambridge English for Scientists. CUP, 2011 Porter, D.: Check your vocabulary for Academic English. Macmillan Publishers Limited, 2008 Oxford Collocations Dictionary for students of English. OUP, 2002 lms.upjs.sk	
Course language:	

B2/C1 level according to CEFR					
Notes:					
Course assessment					
Total number of assessed students: 649					
N	Ne	P	Pr	abs	neabs
0.31	0.0	93.07	1.23	5.39	0.0
Provides: PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.					
Date of last modification: 10.02.2021					
Approved:					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ EMFNT/12	Course name: Experimentálne metódy fyziky nízkych teplôt
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Successful passing test and final exam.	
Learning outcomes: Introduction to fundamental principles and methods of cooling to low and ultra low temperatures and technical realization of low temperature facilities. Fundamentals of the vacuum physics and techniques. Introduction to low and ultra low temperature measurements and specifics of the low temperature physical measurements. Applications of low temperature physics and techniques in ordinary life.	
Brief outline of the course: Physical principles of cooling below ambient temperature. Liquefaction of gases and manipulation with cryogenic liquids. Fundamentals of vacuum techniques and leak detection of vacuum systems. Physical principles and methods of cooling to low and ultra low temperatures. Measurements of low and ultra low temperatures, temperature scale definition. Physical properties of condensed matters at low temperatures. Construction of low temperature refrigerators and apparatuses. Low temperature electronics and measurements of physical quantities at low and ultra low temperatures. Applications of low and ultra low temperature physics and techniques.	
Recommended literature: F. Pobell: Matter and Methods at Low Temperatures, Springer Verlag Berlin 1995. Ch. Enss and S. Hunklinger: Low Temperature Physics, Springer Verlag Berlin 2005. L. Skrbek a kolektív: Fyzika nízkych teplot, matfyz press, Praha 2011 G.K. White and P.J. Meeson: Experimental Techniques in Low Temperature Physics, Clarendon Press, Oxford 2002. Š. Jánoš: Fyzika nízkych teplôt, Alfa, Bratislava 1982. J. Jelínek a Z. Málek: Kryogénní technika, SNTL Praha 1982.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 11	
N	P
0.0	100.0
Provides: RNDr. Peter Skyba, DrSc.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ FVT/12	Course name: Fyzika vysokých tlakov
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Successful passing final exam	
Learning outcomes: Introduction to the high pressure physics and technique including experimental practice. Students will learn about importance of thermodynamic parameter – pressure in the study of superconducting, magnetic, strongly correlated or structure properties of materials.	
Brief outline of the course: Pressure as parameter in solid state physics and general mechanism of pressure effect on physical properties in condensed matter. Experimental techniques for high pressure generation: piston cylinder and Bridgman cells, diamond anvil and Al ₂ O ₃ cells. Pressure induced structural phase transitions. The measurement of magnetic, transport and thermal properties of solid state at high pressures and very low temperatures. Spectroscopy under pressure: Raman, UV VIS, Moesbauer, NMR and neutron diffraction. Typical examples of high pressure physics study: pressure induced quantum phase transitions in electronic systems (metal-insulator transition, anti-/ferromagnet-superconductor transition, Non-Fermi-liquid behavior). Influence of pressure on electronic structure, strongly correlated systems and superconductivity. Tuning of magnetic properties of molecular magnets by pressure.	
Recommended literature: 1. M. I. Eremets: High pressure experimental methods, Oxford University Press, Oxford, (2002) 2. J. Loveday: High pressure physics, CRC Press, Taylor&Francis Group (2012) 3. S. Sachdev: Quantum Phase Transitions, Cambridge University Press, Cambridge (2000) 4. T. Vojta: Quantum phase transitions in electronic systems, Ann. Phys. 9, 403-440 (2000) 5. G. R. Stewart: Non-Fermi-Liquid behavior in d- and f- electron metals, Rev. Mod. Phys. 73, 797-855 (2001) 6. W. Buckel and R. Kleiner: Superconductivity, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim (2004)	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 11	
N	P
0.0	100.0
Provides: doc. RNDr. Slavomír Gabáni, PhD., RNDr. Marián Mihálik, CSc., RNDr. Mária Zentková, CSc.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/DKZU/04	Course name: Home Conference with Foreign Participation
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 303	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ NEM/04	Course name: Implementation of new experimental methodology
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 79	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MK/04	Course name: International Conference
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 426	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VKFKL/04	Course name: Intruduction to Condensed Matter
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 4 Per study period: 56 Course method: present	
Number of ECTS credits: 9	
Recommended semester/trimester of the course: 1.	
Course level: III.	
Prerequisites:	
Conditions for course completion: Oral examination	
Learning outcomes: Introduction to basic princples of solid state physics as well as recently studied phenomena	
Brief outline of the course: Crystal structure. Crystal bonds. Phonons. Fermi gas of free electrons. Energy bands. Fermi surfaces and metals. Superconductivity. Non conventional superconductivity. Diamagnetism and paramagnetism. Ferro- and antiferromagnetism. Strongly correlated electron systems.	
Recommended literature: Ch. Kittel: Introduction to Solid State Physics, 7th edition, John Wiley and sons, New York 1996. H.Ibach, H.Luth: Solid-State Physics, Springer, Berlin 1996. M Tinkham: Introduction to Superconductivity, 2-nd edition, Mc Graw- Hill, New York 1996	
Course language: slovak, english	
Notes:	
Course assessment Total number of assessed students: 80	
N	P
0.0	100.0
Provides: prof. RNDr. Peter Samuely, DrSc., prof. Ing. Martin Orendáč, DrSc., Mgr. Tomáš Samuely, PhD.	
Date of last modification: 28.03.2020	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZKC/04	Course name: Journals Registered by Current Contents Database
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 496	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZNC/04	Course name: Journals not registered in the Current Contents Connect database and published abroad
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 54	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DNC/04	Course name: Journals not registered in the Current Contents Connect database and published in the country of residence
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 23	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/DKC/04	Course name: Journals registered in the Current Contents Connect database and published in the country of residence
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 8	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MKS I/04	Course name: Macroscopic quantum systems
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 1.	
Course level: III.	
Prerequisites:	
Conditions for course completion: Test.	
Learning outcomes:	
Brief outline of the course: 1.-2. Selected chapters about superfluidity in 4He, 3He and in their solutions. 3. Solid helium, properties of quantum crystals. 4. Quantum cavitation and evaporation in liquid helium. 5.-6. Spin dynamics and magnetic resonance in superfluid 3He. Magnetic superfluidity and persistent processing domain in 3He-B. Bose-Einstein condensation of magnons in superfluid 3He. 7. Superfluid helium as cosmologic laboratory. 8. Nuclear magnetism. Nanokelvin temperatures. 9. Spin liquid in spin chains and frustrated spin systems. 10.-11. Dimerized spin systems and their energy spectrum. Spin ladder, alternating chain. Luttinger liquid and Bose-Einstein condensation of magnetic excitations. 12. Solitons in spin chains and dimerized spin systems.	
Recommended literature: W. Buckel: Superconductivity. VCH, Weinheim, 1991. K. H. Bennemann, J. B. Ketterson: The Physics of liquid and solid Helium. A Wiley Interscience Publication. D. R. Tilley, J. Tilley: Superfluidity and Superconductivity. Adam Hilger Ltd., Bristol. E. R. Dobbs: Helium Three. Oxford Science publications, 2000.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 22	
N	P
0.0	100.0
Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., doc. RNDr. Karol Flachbart, DrSc.	
Date of last modification: 30.08.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MVV1/07	Course name: Magnetic 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 ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: test and oral examination.	
Learning outcomes: To obtain a general view on the magnetic properties an application of soft and hard magnetic materials.	
Brief outline of the course: Magnetic properties of iron, cobalt and nickel and alloys. Magnetic properties of Fe-Si steels (oriented and non-oriented). Structure and magnetic properties of amorphous and nanocrystalline alloys. Magnetic properties of permanent magnets. The principle of magnetic recording and magnetic recording media. Preparation, structure and magnetic properties of thin films and multilayers.	
Recommended literature: S. Chikazumi: Physics of Magnetism, J. Willey and Sons, Inc. New York, London, Sydney, 1997. D. Jiles: Introduction to magnetism and magnetic materials, Chapman&Hall, London, New York, Tokyo, Melbourne, Madras, 1991 R. C. O'Handley: Modern Magnetic Materials, Principles and Applications, J. Willey and Sons, Inc. New York, 1999	
Course language:	
Notes:	
Course assessment Total number of assessed students: 39	
N	P
0.0	100.0
Provides: doc. RNDr. Ján Füzér, PhD., RNDr. Ivan Škorvánek, CSc.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MGCH/04	Course name: Magnetotochemistry
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 1., 3.	
Course level: III.	
Prerequisites:	
Conditions for course completion: examination	
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. Thermodynamics 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. Dwyneveldt: 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: 37	
N	P
0.0	100.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., RNDr. Róbert Tarasenko, PhD.
Date of last modification: 15.06.2021
Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MKS II/12	Course name: Makroskopické kvantové systémy II
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 ECTS credits: 3	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Successful passing of the final exam	
Learning outcomes: Acquaint students with some special cases of macroscopic quantum systems. These will be mainly superconducting heavy fermion systems, the Bose – Einstein condensate in dilute gases, macroscopic quantum tunnelling, the quantum Hall effect and its applications, the superconducting quantum interference device (SQUID) and its applications.	
Brief outline of the course: the lectures 1. - 7. and 11., 12. are given by Assoc. prof. Dr. K. Flachbart, the lectures 8. - 10. are given by prof. Dr. M. Orendáč. 1. week: Brief review of the basics of superconductivity (formation of the Cooper pairs condensate and its properties). Tunnelling of electrons and Cooper pairs (Josephson effect). Relationship between superconducting current and phase difference at a weak / tunnel connection between two superconductors. Influence of the external magnetic field on phase change. 2. week: Influence of external magnetic field on the phase change between two superconductors. Current passing through two parallel superconducting tunnel junctions. Interference between two parallel superconducting currents. Basics of the DC SQUID operation. 3. week: Construction of a DC SQUID and creation of various gradiometers for measuring very small magnetic fields. Use of SQUID - magnetometers in research, in the search for magnetic anomalies and in medical diagnostics. 4. week: Strongly interacting Fermi gas and its renormalization to free electron model. Simple 2D model of electron correlations. Interaction between conductivity and localized electrons in metals, Kondo phenomenon. Change of electrical and magnetic properties, and change of heat capacity related to the Kondo effect. 5. week: Origin of the Abrikosov - Suhl resonance in the Kondo lattice, origin of heavy-fermion systems. Basic properties of heavy-fermion systems (electrical, magnetic, thermal). RKKY interaction in metallic magnetic systems. Interplay between Kondo and RKKY interactions. 6. week: superconductivity in 4f- and 5f- heavy-fermion systems (examples). Other examples of unconventional superconductivity (high temperature superconductors, superfluid 3He). Pairing and order parameter in various unconventional superconductors.	

7. week: Applications of superconductivity. Transmission of electricity. Possibilities of using superconductivity in transport (superfast trains). Use of superconductivity in medicine - diagnostic and imaging techniques. Use of superconductivity in research (accelerators, fusion reactors, condensed matter physics). Possibilities of using superconductivity in electronics. 8. week: Bose - Einstein condensation. Properties of bosons and fermions, examples of bosonic and fermionic systems. Principles of BE condensation. Examples of BE condensates (e.g. 4He, 3He). Diluted gases, the de Broglie wavelength. Formation of coherence in diluted gases. 9. week: Laser cooling of diluted gases. 1D and 3D cooling, influence of the Doppler effect. Magnetic capture of cooled gas. Further cooling of the condensate via evaporation. Examples of condensates, achieved results and parameters (temperature, density of condensate). Methods of BE condensate detection and properties of BE condensates 10. week: Macroscopic quantum tunnelling in single molecule magnets. Influence of hyperfine interactions and magnetic coupling among single molecule magnets on the probability of quantum tunnelling. Experimental possibilities of detection of quantum tunnelling. 11. week: Quantum Hall effect. Hall effect in metals and semiconductors. Quantization of electron energy in magnetic field, Landau levels and their degeneration. Quantization of Hall resistance in 2D electron gases. 12. week: Observation of the fractional quantum Hall effect. Explanation of the fractional quantum Hall effect using the so-called composite fermions. Influence of magnetic field on 3D systems – the de Haas - van Alphen effect.	
Recommended literature: W. Buckel, R. Kleiner: Superconductivity, Wiley-WCH, Weinheim (2004). L. Skrbek a kol.: Fyzika nízkých teplot, MATFYZPRESS, Praha 2010. Scientific articles. K.N.Shrivastava; Introduction to Quantum Hall Effect; Nova Science, Hauppauge, N.Y. 2002 S.Takagi; Macroscopic Quantum Tunneling; Cambridge U. Press, n.Y. 2002	
Course language: Slovak, English	
Notes:	
Course assessment Total number of assessed students: 13	
N	P
0.0	100.0
Provides: doc. RNDr. Karol Flachbart, DrSc.	
Date of last modification: 30.08.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MMTL/04	Course name: Modern Methods of Solids Structure Investigation
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 2.	
Course level: III.	
Prerequisites: ÚFV/MSA1/03	
Conditions for course completion: 75% written test 25% the ppt presentation from selected topic	
Learning outcomes: To obtain knowledges about frontier microscopic techniques and XRD techniques for structural analysis of materials.	
Brief outline of the course: New trends in Optic microscopy, Electron microscopy, Electron diffraction. Electron microprobe analysis: WDX spectrometer, EDX spectrometer, Auger spectroscopy. Self-emission microscopy. Modern electron diffraction methods (CBD, nanodiffraction), X-ray diffractometry, phase and profile analysis. Synchrotron radion: sources and application of SR in material science research, neutron scattering , Small angle scattering. Modern methods of surface observation: STM, AFM. Synchrotron radiation in material science research.	
Recommended literature: 1.S. Amelincks, D.van Dyck, J. van Landyut, Electron Microscopy – Principles and Fundamentals, 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: 65	
N	P
0.0	100.0
Provides: prof. RNDr. Pavol Sovák, CSc., doc. Ing. Karel Saksl, DrSc., RNDr. Jozef Bednarčík, PhD.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/DK/04	Course name: National Conference
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 143	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ NZ/04	Course name: Non-reviewed collections of papers and monographs published abroad or in the country of residence
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 109	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: KPE/ PgVU/17	Course name: Pedagogy for university teachers	
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: Per study period: 28s Course method: present		
Number of ECTS credits: 5		
Recommended semester/trimester of the course:		
Course level: III.		
Prerequisites:		
Conditions for course completion:		
Learning outcomes:		
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 33		
abs	n	neabs
100.0	0.0	0.0
Provides: doc. PaedDr. Renáta Orosová, PhD.		
Date of last modification: 08.06.2021		
Approved:		

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VYS/04	Course name: Presentation in Seminar
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 369	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ NSM/12	Course name: Processing, properties and applications of nanomaterials
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Final written test: 50% The ppt presentation from selected topic:50%	
Learning outcomes: To obtain the newest information about processing of nanostructured materials. To use concrete examples of nanostructured materials for documentation of their unique properties and also to indicate their possibilities for applications in real technical practise.	
Brief outline of the course: Processing of magnetic nanomaterials using lithography methods. Production and properties of thin films and multilayers. Processing of nanocrystalline metals, alloys and composites by electrodeposition. Diffusion in nanocrystalline materials: modelling of interface diffusion, specific aspects, correlation between diffusion and grain boundaries, selected examples of diffusion. Magnetic nanoparticles and their applications, fundamental physics of nanoparticles: bulk ferromagnetism, magnetic clusters, molecular magnetism, ideal monodomain particle, surface and interface effects, exchange interactions between nanoparticles. Magnetic properties of some nanosystems: amorphous Fe-M-B alloys, FINEMET, influence of atomic substitutions on properties of FINEMET based alloys, Fe-Zr-Nb-B alloys, Fe-Nb-B-P-Cu alloys produced in atmosphere, influence of grain size on Currie temperature and on volume fraction of amorphous matrix. Mechanical properties of NCM: models and computer simulations of mechanical behaviour, density, pores and microcracks, hardness, yield and ultimate strengths, ductility of NCM. Nanostructured Electronics and Optoelectronic materials: NCM and data storage, nanorobotics, nanoelectronics – superlattice, quantum waves and dots, porous Si and Si clusters.	
Recommended literature: 1. C.C. Koch, Nanostructured Materials – processing, Properties and Applications, WA Publishing, 2007. Springer Hanbook of Nanotechnology, B. Bhusnan (Ed.), Springer 2007. 2. Nanomagnetism and Spintronics, T. Shinjo (Ed.) Elsevier 2009. 3. M.A. White, Physical Properties of Materials, CRC Press 2012. 4. N. Dahotre and A. Samant, Laser Machining of Advanced Materials, CRC Press 2011. 5. R. Oganov, Modern Methods of Crystal structure Prediction, Wiley-VCH, 2011.	

6. G.B. Sergeev, Nanochemistry, Elsevier 2008.	
7. M.A.Mayers et al: Nano and Microstructural Design of Advanced Materials, Elsevier 2003.	
Course language: english	
Notes:	
Course assessment Total number of assessed students: 21	
N	P
0.0	100.0
Provides: Mgr. Vladimír Komanický, Ph.D.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: KPPaPZ/PsVU/17	Course name: Psychology for University Lecturers	
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: Per study period: 28s Course method: present		
Number of ECTS credits: 5		
Recommended semester/trimester of the course:		
Course level: III.		
Prerequisites:		
Conditions for course completion:		
Learning outcomes:		
Brief outline of the course: University teacher and his work in the teaching process with a focus on: teacher in relation to himself (cognitive, personality, social competencies and competencies in the use of methods), in relation to students and as part of the teacher-student relationship based on selected areas of cognitive psychology, psychology of emotions and motivation, developmental psychology, social psychology, educational psychology and health psychology with application to the university environment.		
Recommended literature: Alexitch, L. R. (2005). Applying social psychology to education. Social Psychology.–Ed.: Schneider F., Gruman J., Coutts L.–Sage Publications, Inc, 205-228. Fry, H., Ketteridge, S., & Marshall, S. (2008). A handbook for teaching and learning in higher education: Enhancing academic practice. Routledge. Mareš, J.: Pedagogická psychologie. Portál, 2013. Kniha psychologie. Universum, 2014 Čáp, J., Mareš, J.: Psychologie pro učitele. Praha: Portál 2007. Vágnerová, M.: Školní poradenská psychologie pro pedagogy. Praha: Karolínium 2005.		
Course language:		
Notes:		
Course assessment Total number of assessed students: 37		
abs	n	neabs
100.0	0.0	0.0
Provides: PhDr. Anna Janovská, PhD.		
Date of last modification: 28.06.2021		

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚFV/KTM/14		Course name: Quantum Theory of Magnetism					
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 ECTS credits: 5							
Recommended semester/trimester of the course:							
Course level: II., III.							
Prerequisites:							
Conditions for course completion:							
Learning outcomes:							
Brief outline of the course: The definition of basic lattice-statistical models in the quantum theory of magnetism. The one-dimensional quantum Heisenberg model, spin waves and the grounds of Bethe-ansatz method. Valence-bond-crystal ground states of the Majumdar-Ghosh and Shastry-Sutherland models. The one-dimensional quantum XY model in a transverse magnetic field, Jordan-Wigner fermionization and quantum critical points. The spin-wave theory, bosonization and Holstein-Primakoff transformation.							
Recommended literature: 1. J. B. Parkinson, D. J. J. Farnell, An Introduction to Quantum Spin Systems, Lecture Notes in Physics 816 (Springer, Berlin Heidelberg, 2010). 2. U. Schollwöck, J. Richter, D. J. J. Farnell, R. F. Bishop, Quantum Magnetism, Lecture Notes in Physics 645 (Springer, Berlin Heidelberg, 2004). 3. N. Majlis, The Quantum Theory of Magnetism (World Scientific, Singapore, 2000).							
Course language: EN - english							
Notes:							
Course assessment Total number of assessed students: 22							
A	B	C	D	E	FX	N	P
13.64	36.36	18.18	4.55	9.09	4.55	0.0	13.64
Provides: doc. RNDr. Jozef Strečka, PhD.							
Date of last modification: 03.05.2015							
Approved:							

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ RSM/12	Course name: Rastrovacie sondové mikroskopie
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: oral exam	
Learning outcomes: Students will learn basic principles and state of the art techniques of scanning probe microscopies	
Brief outline of the course: Principles of scanning probe microscopies (STM, AFM, MFM etc.), tunneling and point contact spectroscopy of metals and superconductors, experiments in vacuum and at low temperatures, preparation of crystal surfaces, monolayers and thin films. 1. Introduction – From optical microscope to scanning tunneling microscope Optical microscopy, electron microscopy, scanning tunneling microscopy 2. Quantum tunneling History, theory, tunneling current and conductivity, tunneling current vs. barrier, effect of temperature and magnetic field 3. Scanning tunneling microscopy (STM) Piezoelectric effect in STM, methods of approaching the STM tip to the surface of the sample, controller electronics, scanning modes, principles of the PID feedback loop, topography imaging, numerical methods of data analysis. 4. Tunneling spectroscopy (TS) Principles of tunneling spectroscopy, tunneling through planar and vacuum barrier, electronic structure of metals, semiconductors and superconductors; Current vs. voltage and differential conductance vs. voltage characteristics, controller electronics, conductance imaging tunneling spectroscopy (CITS), numerical methods of data analysis; TS of metals, semiconductors, molecules and various nanostructures 5. Tunneling spectroscopy of superconductors NIS and SIS tunneling contacts, superconducting energy gap, effect of temperature and magnetic field, superconducting vortices, vortex pinning and dynamics 6. Point contact spectroscopy (PCS) Elastic and non-elastic PCS of metals and superconductors; types of point contacts: thin films, needle – anvil, edge – to – edge, lithography, break junctions; effect of temperature and magnetic field	

7. Experimental methods Mechanical design; Low temperatures equipment: historical overview, helium liquefaction, cooling methods, refrigerator types, low temperature technologies; vacuum equipment: pumping, pressure gauges, vacuum technologies; sample preparation: surface cleaning, preparation of thin films and nanostructures by evaporation, sputtering etc. 8. Visit of low temperature STM laboratory, experiment preparation and realization 9. Scanning probe microscopies (SPM) History, principles of Atomic force microscope (AFM), scanning modes, detection of the probe - sample interaction; some other types of SPM: magnetic force microscopy, Kelvin probe microscopy, scanning Hall probe microscopy, 10. STM modifications Spin polarized STM, electrochemical STM, Fourier transformation STM, Josephson STM etc. 11. Nanomanipulation, Lithography by SPM Dip pen, local anodic oxidation, nanoscratching, nanoindentation, atomic manipulation etc. 12. Visit of SPM and nanotechnology laboratory, experiment preparation and realization					
Recommended literature: Roland Wiesendanger: Scanning Probe Microscopy and Spectroscopy: Methods and Applications, Cambridge University Press 1994 Yu.G. Naidyuk, I.K. Yanson: Point contact spectroscopy, Springer, 2003 E.L. Wolf: Principles of electron tunneling spectroscopy, Oxford university press, 1989 K. Oura, V.G. Lifshits, A.A. Saranin, A.V. Zotov, M. Katayama: Surface Science: An Introduction, Springer, Berlín 2003 P. Samuely (ed.), Kryofyzika a nanoelektronika, ÚEF SAV 2011					
Course language: Slovak or English					
Notes:					
Course assessment Total number of assessed students: 8 <table> <tr> <th>N</th><th>P</th></tr> <tr> <td>0.0</td><td>100.0</td></tr> </table>		N	P	0.0	100.0
N	P				
0.0	100.0				
Provides: Mgr. Tomáš Samuely, PhD.					
Date of last modification: 15.06.2021					
Approved:					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ RZ/04	Course name: Reviewed Proceedings
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 235	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚFV/VPM/18		Course name: Selected problems of numerical methods in micro-magnetism					
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 ECTS credits: 2							
Recommended semester/trimester of the course: 2., 4.							
Course level: II., III.							
Prerequisites:							
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	N	P
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Provides: RNDr. Kornel Richter, PhD.							
Date of last modification: 09.03.2018							
Approved:							

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL1a/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 1.	
Course level: III.	
Prerequisites:	
Conditions for course completion: Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language: Slovak, English	
Notes:	
Course assessment Total number of assessed students: 99	
abs	n
100.0	0.0

Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.
Date of last modification: 02.07.2021
Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL1b/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 2.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language:	
Notes:	
Course assessment Total number of assessed students: 99	
abs	n
100.0	0.0

Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.
Date of last modification: 02.07.2021
Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL2a/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 3.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 86	
abs	n
100.0	0.0
Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.	
Date of last modification: 02.07.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL2b/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 4.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: Contents is determined by the lectures and varies every year.	
Recommended literature: Selected scientific journals.	
Course language:	
Notes:	
Course assessment Total number of assessed students: 90	
abs	n
100.0	0.0
Provides: prof. Ing. Martin Orendáč, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc.	
Date of last modification: 02.07.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL3a/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 5.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 75	
abs	n
100.0	0.0
Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.	
Date of last modification: 02.07.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL3b/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 6.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 74	
abs	n
100.0	0.0
Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.	
Date of last modification: 02.07.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL4a/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 7.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 65	
abs	n
100.0	0.0
Provides: doc. RNDr. Alžbeta Orendáčová, DrSc., Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.	
Date of last modification: 02.07.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SFKL4b/04	Course name: Seminar in Solid State Physics
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 1 / 1 Per study period: 14 / 14 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course: 8.	
Course level: III.	
Prerequisites:	
Conditions for course completion: 1. Participation on the seminars (valid also for on-line form of presentations). Students are obliged to participate on the seminars. Reasons should be given for any absence, students may absent up to twice per semester without further consequences. For more frequent absence student will prepare presentation focused on a topic which will be consulted with the supervisor of the seminar. Each student has to present at least one his/her contribution, usually before defending his/her diploma thesis. 2. Activity on the seminar, participation in discussion. Level of presenting student's own presentation.	
Learning outcomes: Students will obtain informations about scientific results of various research groups from Košice and from their cooperating foreign institutions and will be stimulated for scientific discussion. They will also improve their presentation skills.	
Brief outline of the course: The program of seminars from condensed matter physics is prepared every year and is devoted to the recent results achieved in the field of condensed matter physics and material research at the laboratories in Košice and abroad. Scientific workers from laboratories from Košice as well as domestic and foreign guests give the talks. The program also involves presentation of PhD and diploma theses.	
Recommended literature: Selected scientific journals.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 66	
abs	n
100.0	0.0
Provides: Dr.h.c. prof. RNDr. Alexander Feher, DrSc., prof. Ing. Martin Orendáč, DrSc.	
Date of last modification: 02.07.2021	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice							
Faculty: Faculty of Science							
Course ID: ÚFV/ SAA/18		Course name: Sensors and actuators based on selected physical phenomena					
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 ECTS credits: 2							
Recommended semester/trimester of the course: 2., 4.							
Course level: II., III.							
Prerequisites:							
Conditions for course completion:							
Learning outcomes:							
Brief outline of the course:							
Recommended literature:							
Course language:							
Notes:							
Course assessment Total number of assessed students: 3							
A	B	C	D	E	FX	N	P
33.33	0.0	0.0	0.0	0.0	0.0	0.0	66.67
Provides: prof. RNDr. Rastislav Varga, DrSc., RNDr. Ladislav Galdun, PhD.							
Date of last modification: 09.03.2018							
Approved:							

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: Dek. PF UPJŠ/JSD/14	Course name: Spring School for PhD Students
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: Per study period: 4d Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 154	
abs	n
100.0	0.0
Provides: doc. RNDr. Marián Kireš, PhD.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ SVM/07	Course name: Structural properties of 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 ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: successful passing final exam	
Learning outcomes: Obtaining knowledge on preparation, structure, influence of defects, phase equilibrium and phase transformation in selected types of unconventional materials.	
Brief outline of the course: Crystal structure of metals, alloys, intermetallics, ceramics and glasses. Crystal defects and their influence on properties of materials. Phase diagrams and phase transformations, solidification, crystal growth. Preparation and properties of progressive single-crystalline, polycrystalline, nano-crystalline and glassy materials.	
Recommended literature: J. M. Ziman, The Physics of Metals, Cambridge University press, Cambridge, 2011. J. Blackman, Handbook of Metal Physics: Metallic Nanoparticles, Elsevier Science, 2009.	
Course language: Slovak, English	
Notes:	
Course assessment Total number of assessed students: 1	
N	P
0.0	100.0
Provides: Ing. Pavel Diko, DrSc.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ ZSP/04	Course name: Study Stay Abroad
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 259	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

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

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ VBP/04	Course name: Supervisor/consultant of bachelor thesis
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 6	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 40	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PPC/04	Course name: Teaching activities
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 1	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 252	
abs	n
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ TS/12	Course name: Termodynamika supravodičov
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Succesful passing final exam	
Learning outcomes: Introduction of basic theoretical and experimental aspects of thermodynamic properties of superconductors with a focus on the modulated calorimetry.	
Brief outline of the course: Thermodynamic properties of superconductors (entropy, heat capacity in normal and superconducting state). Methods of heat capacity measurements (adiabatic, relaxation, pulsed, modulated). Modulated calorimetry – historical overview. Modulated calorimetry – theoretical basis. Modulated calorimetry – experiment (experimental setup, measurement of temperature and temperature oscillations). Heat capacity of superconductors in zero magnetic field – alpha model. Heat capacity of superconductors in zero and non-zero magnetic field – temperature dependence and its relation to the properties of an s-wave superconductor (determination of the upper critical field, thermodynamic critical field, superconducting energy gap, type of coupling). Heat capacity of superconductors in non-zero magnetic field – field dependence and its relation to the the properties of a superconductor. Heat capacity in special cases – two-gap superconductor, d-wave superconductor.	
Recommended literature: M. Tinkham, Introduction to superconductivity, McGraw-Hill, Inc., New York, 1996. Yaakov Kraftmakher, Modulation Calorimetry: Theory And Applications, Springer-Verlag, 2004. Specific heat of solids, Edited by C. Y. Ho, Hemisphere publishing corporation, 1988.	
Course language: Slovak, English	
Notes:	

Course assessment	
Total number of assessed students: 6	
N	P
0.0	100.0
Provides: RNDr. Jozef Kačmarčík, PhD., RNDr. Zuzana Vargaštoková, PhD.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ TSK/12	Course name: Teória silne korelovaných elektrónových systémov
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: 2 Per study period: 28 Course method: present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion: Succesful passing test and final exam	
Learning outcomes: To provide students with models, methods and physical applications in the area of strongly correlated electron systems.	
Brief outline of the course: Occupation number representation. Second quantization. Models of strongly correlated electron systems. Hubbard model. Periodic Anderson model. Falicov-Kimball model. t-J model. Analytical and numerical methods in the theory of strongly correlated electron systems. Method of canonical transformations. Green's function method. Perturbation theory. Gutzwiller variation method. Lanczos method. Quantum Monte Carlo method. Collective Phenomena. Valence transitions. Metal-insulator transitions. Formation of charge and spin ordering. Electronic ferroelectricity. Itinerant magnetism. Superconductivity. BCS theory. Ginzburg-Landau theory.	
Recommended literature: [1] P. Farkašovský., H. Čenčariková, Cooperative phenomena in Strongly Correlated Systems, LAP Saarbucken 2011, ISBN: 978-3-8465-0611-0	
Course language: Slovak, English	
Notes:	
Course assessment Total number of assessed students: 6	
N	P
0.0	100.0
Provides: RNDr. Pavol Farkašovský, DrSc.	
Date of last modification: 03.05.2015	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ POVK/04	Course name: Work in Organizing Committee of Conference
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
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
100.0	0.0
Provides:	
Date of last modification:	
Approved:	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PDS/18	Course name: Writing Dissertation Work
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present	
Number of ECTS credits: 0	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisites:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 22	
N	P
0.0	100.0
Provides:	
Date of last modification:	
Approved:	