University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ DCZC/11	Course name: Citation in International Journal, Reviewed Proceeding	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent	
Number of credits: 1	0	
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 0	
	abs	n
	0.0	0.0
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.		
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DCMO/11	Course name: Citation in	Monograph	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent		
Number of credits: 2	20		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
<b>Course assessment</b> Total number of asses	ssed students: 0		
	abs	n	
	0.0	0.0	
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience		
Course ID: ÚFV/ DCDC/11	Course name: Citation in	National Journal, Reviewed Proceeding	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of credits: 5			
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asse	ssed students: 1		
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.			
Date of last modification:			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ DCCD/11	Course name: Citation Re	gistered in Citation Databases	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of credits: 2	20		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
<b>Recommended</b> litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 3			
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.			
Date of last modification:			
Approved: prof. RNDr. Peter Kollár, DrSc.			

University: P. J. Šafa	árik University in Košice
Faculty: Faculty of S	Science
<b>Course ID:</b> ÚFV/ DPPL/11	Course name: Computer-Based Physical Laboratory
Course type, scope a Course type: Lectu Recommended cou Per week: 1 / 2 Per Course method: pr	and the method: re / Practice irse-load (hours): • study period: 14 / 28 resent
Number of credits:	5
Recommended sem	ester/trimester of the course: 1., 3.
Course level: III.	
Prerequisities:	
<b>Conditions for cour</b> partial assessment ba Students' active part examination is aime The project assessme (30 points max.) as y	se completion: ased on: tests 20 points, icipation 10 points d at the presentation of the project that students work on during the semester. ent is within 0-70 points. The final assessment includes the partial assessment well as the examination - project assessment (70 points max.)
Learning outcomes: Students are given technologies used in experiment, videome phenomena. Different to the methods used	an overview of the inquiry-based education methods enhanced by digital n experimentation supported by datalogging in particular (computer-aided easurements of physical phenomena) and mathematical modelling of physical nt technologies aimed at these applications will be introduced in with regard in teaching. The student gains skills and competencies to the effective use of

these technologies with understanding of the appropriate methods aimed at scientific inquiry with active students' participation. The level of the gained skills will be presented by design of their own activities enhanced by digital technologies for physics teaching at lower and upper secondary level.

#### Brief outline of the course:

Scientific inquiry in education in physics, activities aimed at inquiry

Computer modelling of physical phenomena (dynamic, static, different schools systems available) Computer-aided experiment and its effective use in the class (methods, demonstrations, in groups, labworks, school systems available)

Videomeasurments of physical phenomena on the computer and its implementation into the teaching (how to prepare a videoclip, standard and high speed videoclip, school systems available) Comparing theory and experiment (model and experimental data), model simulated for different parameters in order to get good correspondence theory vs. experiment

Students independent work on the activities aimed at different levels of inquiry enhanced by digital technologies.

#### **Recommended literature:**

Demkanin, P. a kol. Počítačom podporované prírodovedné laboratórium, FMFI UK Bratislava, 2006, ISBN:80-89186-10-6

Ješková, Z., a kol. Využitie informačných a komunikačných technológií v predmete Fyzika pre stredné školy : učebný materiál - modul 3. - 1. vyd. - Košice : Elfa, 2010. - 242 s., ISBN 978-80-8086-146-9

Duľa, I. a kol. Využitie informačných a komunikačných technológií v predmete Fyzika pre základné školy : učebný materiál - modul 3. - 1. vyd. - Košice : Elfa, 2010. - 240 s., ISBN 978-80-8086-154-4

<b>Course language:</b> Slovak, English		
Notes:		
<b>Course assessment</b> Total number of assessed students: 6		
N	Р	
0.0	100.0	
Provides: doc. RNDr. Zuzana Ješková, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ DSDP/11	Pi D: ÚFV/ Course name: Co-partner of a National Project		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent		
Number of credits: 5	5		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asse	ssed students: 23		
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
Course ID: ÚFV/ DSMP/11	Course name: Co-partner	of an International Project	
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of credits: 1	5		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 2			
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.			
Date of last modification:			
Approved: prof. RNDr. Peter Kollár, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science				
<b>Course ID:</b> ÚFV/ ODZP/14	Course ID: ÚFV/ Course name: Defence of Doctoral Thesis DDZP/14			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present				
Number of credits: 3	0			
Recommended seme	ster/trimester of the cours	e:		
Course level: III.				
Prerequisities:				
Conditions for cours	e completion:			
Learning outcomes:				
Brief outline of the c	ourse:			
Recommended litera	iture:			
Course language:				
Notes:				
Course assessment Total number of assessed students: 11				
	Ν	Р		
	0.0	100.0		
Provides:				
Date of last modification: 03.05.2015				
Approved: prof. RNI	Approved: prof. RNDr. Peter Kollár, DrSc.			

University: P. J. Šafárik University in Košice			
Faculty: Faculty of S	cience		
<b>Course ID:</b> ÚFV/ DVUP/11	Course name: Develop	nent of a Teaching Tool	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent		
Number of credits: 1	0		
Recommended seme	ster/trimester of the cou	rse:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	Brief outline of the course:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asse	ssed students: 2		
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.			
Date of last modification:			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
Course ID: ÚFV/ DPEM/11Course name: Developm	ent of Pedagogical Materials		
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: 5			
Recommended semester/trimester of the cour	se: 3.		
Course level: III.			
Prerequisities:			
<b>Conditions for course completion:</b> student prepares five proposals of basic types of pedagogical materials oral examination			
<b>Learning outcomes:</b> The main objective is to prepare students to gain skills and competencies in order to be able to create basic types of pedagogical materials, scientific publication and conference contribution.			
<ul> <li>Brief outline of the course:</li> <li>Journals aimed at education, types of publications, different journal columns, guidelines for authors, paper review</li> <li>Searching references, citations, electronic databases</li> <li>Conferences aimed at education, conference goals, thematic areas, forms of papers, proceedings, electronic/ printed proceedings. Presentation at the conference, oral presentation. Paper abstract, key words, oral presentation and poster, contribution to the proceedings, reviewed journal paper (Slovak or international journal), case study.</li> <li>The main idea of the paper, different approaches, design of the paper structure, further editing, references, stylistics, content, editing of graphs, pictures, tables, electronical documents.</li> <li>Design and principles of the teacher's materials, worksheets and educational texts.</li> </ul>			
Recommended literature: KATUŠČÁK, Dušan: Ako písať záverečné a kvalifikačné práce. Nitra: Enigma, 2004. 162 s. il. ISBN 80-89132-10-3			
Course language: Slovak,, English			
Notes:			
Course assessment			
N	Р		
0.0	100.0		

Provides: doc. RNDr. Marián Kireš, PhD., PaedDr. Renáta Orosová, PhD.

**Date of last modification:** 03.05.2015

Approved: prof. RNDr. Peter Kollár, DrSc.

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DPPC/11	ID: ÚFV/     Course name: Direct Pedagogical Activities       1     1		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of credits: 5	) 		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of assessed students: 22			
	abs	n	
	100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc.			
Date of last modification:			
Approved: prof. RNDr. Peter Kollár, DrSc.			

University: P. J. Šafá	University: P. J. Šafárik University in Košice			
Faculty: Faculty of S	Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DZS/14	ourse ID: ÚFV/ Course name: Doctoral Thesis Examination ZS/14			
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present				
Number of credits: 5				
Recommended seme	ster/trimester of the cours	e:		
Course level: III.				
Prerequisities:				
<b>Conditions for cours</b> Obtaining required no	e completion: umber of credits as given by	the study plan.		
<b>Learning outcomes:</b> Evaluation of compet	<b>Learning outcomes:</b> Evaluation of competences of the student according to his/her scientific profile.			
Brief outline of the c Presentation of the re answering questions compulsory and one the program accordin addresses the current	ourse: esults in the thesis for diser of exam committee. Two optional subject, respectiv ng to the study plan and sci state of work on dissertation	tation exam, responding to referee's comments, questions are selected subsequently from one rely. The subjects are selected by guarantee of entific profile of the student. The third question in thesis.		
Recommended literature:				
Course language: english				
Notes:				
Course assessment Total number of assessed students: 31				
	N P			
	0.0	100.0		
Provides:				
Date of last modifica	Date of last modification: 03.05.2015			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.			

University: P. J	. Šafárik Univers	ity in Košice			
Faculty: Facult	y of Science				
Course ID: CJF AJD1/07	P/ Course na	Course name: English Language for PhD Students 1			
Course type, sc Course type: I Recommended Per week: 2 Pe Course metho	ope and the met Practice d course-load (h er study period: d: present	thod: ours): 28			
Number of crea	lits: 2				
Recommended	semester/trimes	ster of the cours	<b>e:</b> 1.		
Course level: II	I				
Prerequisities:					
Conditions for	course completi	on:			
Learning outco	omes:				
Brief outline of	the course:				
Recommended	literature:				
Course languag	ge:				
Notes:					
Course assessm Total number of	<b>ent</b> f assessed studen	ts: 425			
N	Ne	Р	Pr	abs	neabs
0.0	0.0	67.53	0.0	32.47	0.0
Provides: PhDr	. Helena Petruňo	vá, CSc., Mgr. Z	uzana Kolaříková	i, PhD.	
Date of last mo	dification: 03.05	5.2015			
Approved: prof	. RNDr. Peter Ko	ollár, DrSc.			

University: P. J.	. Šafárik Univers	ity in Košice			
Faculty: Faculty	y of Science				
Course ID: CJP AJD2/07	Course na	Course name: English Language for PhD Students 2			
Course type, sc Course type: F Recommended Per week: 2 Po Course metho	ope and the met Practice I course-load (h er study period: d: present	thod: ours): 28			
Number of crea	lits: 3				
Recommended	semester/trimes	ster of the cours	e: 2.		
Course level: II	Course level: III.				
Prerequisities:					
Conditions for	course completi	on:			
Learning outco	mes:				
Brief outline of the course:					
Recommended	literature:				
Course language:					
Notes:					
Course assessm Total number of	ent f assessed studen	ts: 421			
N	Ne	Р	Pr	abs	neabs
0.0	0.0	89.79	1.9	8.31	0.0
Provides: PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD., Mgr. Barbara Mitríková					
Date of last mo	dification: 03.05	5.2015			
Approved: prof	. RNDr. Peter Ko	ollár, DrSc.			

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DZGP/11	Course name: Gained Grant Support	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent	
Number of credits: 1	0	
Recommended seme	ster/trimester of the co	urse:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 8	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND: Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., do Dr. Jozef Hanč, PhD.	oc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DMKV/11	Course name: International Conference, Oral		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent		
Number of credits: 8	; 		
Recommended seme	ster/trimester of the co	urse:	
Course level: III.			
Prerequisities:	Prerequisities:		
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
<b>Course assessment</b> Total number of asse	ssed students: 4		
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RND: Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., do Dr. Jozef Hanč, PhD.	c. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián	
Date of last modifica	tion:		
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DMKP/11	Course name: International Conference, Poster		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent		
Number of credits: 6			
Recommended seme	ster/trimester of the cours	;e:	
Course level: III.			
Prerequisities:	Prerequisities:		
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 19		
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.		
Date of last modification:			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

	·1		
University: P. J. Safá	University: P. J. Safárik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DZRC/11	Course name: International Reputable Journal		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent		
Number of credits: 2	20		
Recommended seme	ster/trimester of the cours	se:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 3		
	abs	n	
	100.0	0.0	
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.		
Date of last modification:			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
<b>Course ID:</b> ÚFV/ DZRZ/11	Course name: International Reviewed Journal		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent		
Number of credits: 1	0		
Recommended seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:	Prerequisities:		
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:			
Notes:			
Course assessment Total number of asses	ssed students: 0		
	abs	n	
	0.0	0.0	
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.		
Date of last modification:			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ DZSP/11	rse ID: ÚFV/ Course name: International Study Stay		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	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 seme	ster/trimester of the cours	<b>e:</b> 5., 6, 7., 8	
Course level: III.	Course level: III.		
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 16			
	abs n		
	100.0 0.0		
Provides: prof. RNDr. Peter Kollár, DrSc.			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
Course ID: ÚFV/ DVOK/11	Course name: Member of Organizing Committee of a Conference, Event		
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent		
Number of credits: 2			
Recommended seme	ster/trimester of the cours	e:	
Course level: III.	Course level: III.		
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	ature:		
Course language:	Course language:		
Notes:			
Course assessment Total number of asses	ssed students: 7		
	abs	n	
	100.0 0.0		
Provides: prof. RND	r. Peter Kollár, DrSc.		
Date of last modifica	Date of last modification:		
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

~ ~ ~		
University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ DMPC/11	FV/         Course name: Methodical and Popularization Activities	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent	
Number of credits: 5		
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 14	
	abs	n
	100.0 0.0	
Provides: prof. RND: Kireš, PhD., doc. RN	Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.	
Date of last modification:		
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
<b>Course ID:</b> ÚFV/ DMPV/11	Course name: Methodology of Educational Research
Course type, scope a Course type: Lectur Recommended cou Per week: 3 Per stu Course method: pro	ind the method: re rse-load (hours): ady period: 42 esent

Number of credits: 5

#### Recommended semester/trimester of the course: 4.

Course level: III.

Prerequisities:

#### **Conditions for course completion:**

Students prepare a detailed description of the theory application on the subject of their research in the form of presentation. Students can receive maximum of 50 points, the needed minimum is 26 points.

oral exam 0 to 50 points; summative assessment is the result of continuous assessment and oral exam.

#### Learning outcomes:

Getting the requested overview of the scientific methods for own successful educational research. Specifying and understanding the terms of use, advantages and disadvantages of the basic research forms (observation, pre-research, experimental, quasi-experimental, case study, qualitative, quantitative, historical, mixed research). Identifying and analyzing the methods and forms of research studied in a specific monograph or journal literature. Getting skills to apply gained knowledge to own scientific research in didactics. Getting key skills how to plan, implement, conduct, continuously and critically review and evaluate own research as it progresses.

#### **Brief outline of the course:**

The scientific method and its use in didactics. Stages of research, its preparation and organization. Research problem and the creation of a scientific hypothesis. Basic overview of current approaches to educational research. Pedagogical experiment. Quasi-experiment and case study. Methods for qualitative and quantitative research. Mixed method research. Analysis and application of theory in the study of scientific publications dealing with educational research. Planning, evaluation and control (management) own research as a scientific research project. The method of critical chain and critical path. Collecting data and conducting research work in the field.

#### **Recommended literature:**

Creswell, J.W. (2008). Research Design: Qualitative, Quantitative and Mixed Methods Approaches, 3rd ed., London: Sage Publications, 272 pp., ISBN 141296556X Johnson, B., Christensen, L. (2007). Educational Research: Quantitative, Qualitative and Mixed Approaches, 3rd ed., London: Sage Publications, 664 pp., ISBN 1412954568 Cox III, J.F., Schleier Jr., J. G., eds. (2010). Theory of Coinstraints - handbook, New York: McGraw Hill, 1175 pp., ISBN 9780071665551 Leach, L.P. (2000). Critical Chain Project Managment, Boston: Artech House, 330 pp., ISBN 1580530745

Pelikán, J. (2011). Základy empirického výzkumu jevů pedagogických, 2. vyd. (in Czech), Praha: Karolinum, 272 s., ISBN 978-80-246-1916-3

Gavora, P. (2001). Úvod do pedagogického výskumu (in Slovak), Bratislava: Univerzita Komenského, 236 s. ISBN 8022316288

Chráska, M. (2007). Metody pedagogického výzkumu: Základy kvantitatívního výzkumu (in Czech), Praha: Grada, 265 s., ISBN 9788024713694

Р

100.0

#### **Course language:**

Slovak, English

Notes:

#### Course assessment

Total number of assessed students: 8

Provides: doc. RNDr. Jozef Hanč, PhD., Mgr. Nataša Čopíková, PhD.

**Date of last modification:** 03.05.2015

Approved: prof. RNDr. Peter Kollár, DrSc.

Ν

0.0

University: P. J. Šafa	árik University in Košice
Faculty: Faculty of S	Science
<b>Course ID:</b> ÚFV/ DMTV/11	Course name: Modern Technologies in Education
Course type, scope a Course type: Lectu Recommended cou Per week: 1 / 2 Per Course method: pr	and the method: are / Practice arse-load (hours): • study period: 14 / 28 resent
Number of credits:	5
Recommended sem	ester/trimester of the course: 1.
Course level: III.	
Prerequisities:	
<b>Conditions for cour</b> assessment of partia presentation and def A 100-90 B 89-80 C	se completion: l assignments20 points ence of the project 20 points, oral examination 60 points 2 79-70 D 69-60 E 59-50 F 49-0
Learning outcomes: Student gets familia: effective use in educe the devices and hand the examples of the the methods used in scientific and digital	r with the modern digital educational Technologies, their possibilities of their ation. Within the practice they will be training the basic skills in manipulating lling the technologies. They gain the skills to handle these technologies within concrete educational activities. The technologies are strongly connected to teaching and the content of the education in physics in order to develop the literacy of the students.
<b>Brief outline of the</b> 1. Digital tools for the modern digital tools 2. School documental documents, gallery of 3. Digital workplace cooperation and the 4. The science classis basic principles of th 5. Digital information interactive beamer, w 6. Digital picture pro- vector graphics, desi 7. Sound and video pi interactive multimed 8. The use of interaction interactive whiteboa 9. Learning by inqui measurement with the	course: he modern teacher - technological development and the profile of the graduate, to schools ation on-line of the objects, working calendars of the modern teacher use of the basic computer peripheries room for inquiry he classroom design and equipment and teaching in such a classroom on presentation visualiser, digital microscope, DVBT, full HD imaging beessing ign of computer animation processing lia objects tive educational systems in education rd, interactive response system, tablet ry in computer-based laboratory I. he use of datalogging

10. Learning by inquiry in computer-based laboration	atory II.	
measurement on videoclips		
11. Learning by inquiry in computer-based laboratory III.		
modelling and computer simulations		
12. Educational project		
interactive multimedia tools for learning by inqui	ry with the use of digital technologies	
Recommended literature:		
Penuel, W.R., Boscardin, Ch. K., Masyn, K., Cra response systems in elementary and secondary ec Educational Technology, Research and Developm Kireš, M. a kol.: Moderná didaktická technika v vyd Košice : Elfa, 2010 200 s., ISBN 978-80 Ješková, Z., a kol. Využitie informačných a komu pre stredné školy : učebný materiál - modul 3 1 978-80-8086-146-9 Duľa, I. a kol. Využitie informačných a komunik základné školy : učebný materiál - modul 3 1. v 978-80-8086-154-4	wford, V.M. (2007). Teaching with student lucation settings: A survey study, časopis nent, Vol. 55 (4), s. 315-346 práci učiteľa : Učebný materiál k modulu 2 1. -8086-135-3 unikačných technológií v predmete Fyzika vyd Košice : Elfa, 2010 242 s., ISBN ačných technológií v predmete Fyzika pre vyd Košice : Elfa, 2010 240 s., ISBN	
Course language:		
Slovak		
Notes:		
Course assessment		
Total number of assessed students: 7		
N P		
0.0 100.0		

**Provides:** doc. RNDr. Marián Kireš, PhD., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Jozef Hanč, PhD.

**Date of last modification:** 03.05.2015

Approved: prof. RNDr. Peter Kollár, DrSc.

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
Course ID: ÚFV/ DMTF/11	Course name: Modern Trends in Physics Education
Course type, scope a Course type: Lectur Recommended cour Per week: 2 / 1 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 28 / 14 esent
Number of credits: 5	5
Recommended seme	ster/trimester of the course: 1., 3.
Course level: III.	
Prerequisities:	
Conditions for cours two semestral project oral exam	e completion:
Learning outcomes: To present results of education and their in students familiar with out at the conception	research in the field of education and learning theory, in the field of science fluence to changes in the contents and methods of science education. To make h modern trends in science education those are applied worldwide. To point of modern educational methods and their benefits for science education.
Brief outline of the c Research results in th Reforms in science technologies in build methods of active exp of case studies of per importance and trend	ourse: the field of education and learning theory and in the field of science education. education. Importance of active approach in education. Role of digital ling of scientific literacy. International projects dedicated to application of ploration by pupils. Results of research activities in science education. Analysis dagogical experiments and educational procedures. Informal education – its s. Concept maps.
Recommended litera Bransford, J.D., Brow and school. Washingt www.nap.edu/openbo Inquiry Resources." <a href="http://www.explorate">http://www.explorate</a> Rocard, M., Csemely Education now: A Re ISBN – 978-92-79-03 Wieman, C. , Perkins č. 11, 2005, s. 36 – 4 perkins-05.pdf>	<ul> <li>where:</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Cocking, R.R. How people learn: Brain, mind, experience</li> <li>why A.I., Docking, D. Stational Academy Press, 1999. Dostupné na internete &lt;a href="http://www.http:/&lt;/td&gt;</li></ul>
Course language: Slovak, English	

Notes:		
Course assessment		
Total number of assessed students: 8		
Ν	Р	
0.0	100.0	
<b>Provides:</b> doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD., RNDr. Ľudmila Onderová, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DDKV/11	Course name: National C	onference, Oral
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent	
Number of credits: 4		
Recommended seme	ster/trimester of the cours	ie:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 21	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND: Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., doc. Dr. Jozef Hanč, PhD.	NDr. Zuzana Ješková, PhD., doc. RNDr. Marián
Date of last modifica	ition:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of Science		
<b>Course ID:</b> ÚFV/ DDKP/11	Course ID: ÚFV/     Course name: National Conference, Poster       DKP/11     Course name: National Conference, Poster	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent	
Number of credits: 2		
Recommended seme	ster/trimester of the cour	se:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asses	ssed students: 7	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., doc. Dr. Jozef Hanč, PhD.	RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ DDNC/11	ourse ID: ÚFV/ Course name: National Non-Reviewed Journal DNC/11	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent	
Number of credits: 2	2	
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asses	ssed students: 1	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., doc. I Dr. Jozef Hanč, PhD.	RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DDRC/11	Course ID: ÚFV/       Course name: National Reviewed Journal         DDRC/11       Course name: National Reviewed Journal	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent	
Number of credits: 5		
Recommended seme	ster/trimester of the cou	rse:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 2	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND: Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., doc Dr. Jozef Hanč, PhD.	. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ DNZZ/11	Course name: Non-Reviewed International or National Proceedings	
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): ly period: esent	
Number of credits: 2		
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asses	ssed students: 2	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	r. Peter Kollár, DrSc., doc. l Dr. Jozef Hanč, PhD.	NDr. Zuzana Ješková, PhD., doc. RNDr. Marián
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

#### Ε ΙΝΕΩΟΜΑΤΙΩΝ Ι ΕΤΤΕΟ -----

	COURSE INFORMATION LETTER	
University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ Course name: Physics Observation, Exploring and Measurements DPOM/11		
Course type, scope a Course type: Lectur Recommended cou Per week: 1 / 2 Per Course method: pre	nd the method: re / Practice rse-load (hours): study period: 14 / 28 esent	
Number of credits: 5	5	
Recommended seme	ster/trimester of the course: 2., 4.	
Course level: III.		
Prerequisities:		
<b>Conditions for cours</b> Student prepares an observation and meas oral exam connected	<b>completion:</b> d carries out two experimentally solved problems in the form of school surement. with realization and explanation of experimental problems.	
To develop experime physics interpretation a school physics labor solution of more diff	ntal skills to propose, make and evaluate a school physics experiment. To link n of phenomenon with its observation, demonstration and measurements in pratory. Student obtains an insight into different approaches to experimental icult physics problems and to complex exploration of selected phenomena.	
Brief outline of the c Observation and der bulge; Coanda effect waves. Exploration of physic cell; Dynamics of me balloon as the energy tungsten filament of Measurement of phy temperature upon coo A ratio between the t	ourse: nonstrations of phenomena: Inelastic collision; Multiple-ball collision; Ice ; Magnetohydrodynamics; Steam boat; Siphon; Spreading of electromagnetic es phenomena: Electrochemical cell; Peltier effect; Efficiency of hydrogen fuel ovement of a model car powered by an engine using an elastic air-filled toy- source; Total internal reflection; Magnetic levitation; Non-stationary state of bulb when switch on; Geyser. esical quantities: Electric conductivity of gelatine solution as a function of boling; Determination efficiency of heat engine; Coefficient of restitution. hermal energy and light energy emitted from an electric bulb.	
Recommended litera Kluiber, Z.: Tvůrčí na J. Walker, "The Flyir J. Walker, "The Flyir &Sons,(2007) Z. Kluiber, T. Stanisi (2008).	nture: áboj úloh Turnaje mladých fyziků. MAFY, Hradec Králové, (2005) ng Circus of Physics with Answers," New York: John Wiley &Sons,(1977) ng Circus of Physics with Answers," 2ns edition, New York: John Wiley c, V. Skocdopole, "The future is influenced by the Gifted", Prague: Orbis,	
<b>Course language:</b> Slovak, English		
Notes:		
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<b>Course assessment</b> Total number of assessed students: 0		
Ν	Р	
0.0	0.0	
<b>Provides:</b> doc. RNDr. Marián Kireš, PhD., doc. RNDr. Zuzana Ješková, PhD., RNDr. Ľudmila Onderová, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	Faculty: Faculty of Science	
Course ID: ÚFV/ DVYS/11	Course name: Presentation	on at a Seminar
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent	
Number of credits: 2		
Recommended seme	ster/trimester of the cour	se:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asse	ssed students: 6	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND: Kireš, PhD., doc. RN	<b>Provides:</b> prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.	
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	Faculty: Faculty of Science	
<b>Course ID:</b> ÚFV/ DRZZ/11	Course name: Reviewed I	nternational or National Proceedings
Course type, scope a Course type: Recommended cour Per week: Per stud Course method: pre	nd the method: rse-load (hours): y period: esent	
Number of credits: 5		
Recommended seme	ster/trimester of the cours	e:
Course level: III.		
Prerequisities:		
Conditions for cours	e completion:	
Learning outcomes:		
Brief outline of the c	ourse:	
Recommended litera	iture:	
Course language:		
Notes:		
Course assessment Total number of asses	ssed students: 24	
	abs	n
	100.0	0.0
<b>Provides:</b> prof. RND Kireš, PhD., doc. RN	Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD.	
Date of last modifica	tion:	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DPBP/11	Course name: Review of I	Bc. Thesis	
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 seme	ster/trimester of the cours	e:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:	Learning outcomes:		
Brief outline of the c	ourse:		
Recommended litera	iture:		
Course language:	Course language:		
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc.			
Date of last modification:			
Approved: prof. RNI	Dr. Peter Kollár, DrSc.		

University: P. J. Šaf	árik University in Košice
Faculty: Faculty of	Science
<b>Course ID:</b> ÚFV/ DSFP1/11	Course name: Science Exploration of Selected Physical Problems I
Course type, scope Course type: Lectu Recommended cou Per week: 2 Per st Course method: pr	and the method: are arse-load (hours): udy period: 28 resent
Number of credits:	5

**Recommended semester/trimester of the course:** 1.

Course level: III.

Prerequisities:

#### **Conditions for course completion:**

three semester projects (individual work on selected physical problems) oral exam

#### Learning outcomes:

Presenting selected physical problems in mechanics, molecular physics, thermodynamics and thermics with the aim of a deeper understanding of the complexity of the physical phenomena around us with links to their physical interpretation related to students' knowledge level at secondary schools. Getting skills to prepare and modify selected physical problems for solving physical competitions tasks and for working with talented youth.

#### Brief outline of the course:

Selected problems of mechanics of particles, multiparticle systems, rigid bodies (fictitious forces in non-inertial systems, rigid body dynamics, and rotational motion): Rotational and translational motion of a cylinder, force effect of a falling chain, falling magnet in a metal tube, hourglass.

Fluid Mechanics (real fluid flow, motion in fluids): Rotation of a drowning ice cube, water current collisions, capillary waves.

Molecular Physics (molecular phenomena in liquids): Drying drops of water, kinematics of a water motion in capillaries of different radii, Reflection of water drops on hydrophobic surfaces.

Selected problems of thermodynamics: Condensation of water vapor in a saturated water solution, Ice relegation and thermal conductivity.

Selected problems of mechanical vibrations and waves (acoustics): Measuring speed of sound in liquids, Falling spring, Surface wave on water, Playing cymbals by lightning.

#### **Recommended literature:**

Hlavička, A. a kol. Fyzika pre pedagogické fakulty, SPN, Praha, 1971

Halliday, D., Resnick, R., Walker, J. Fyzika, vysokoškolská učebnice obecné fyziky, český preklad, Vysoké učení technické v Brně, nakladelstvo VUTIUM, 2000

Cummings, K., Laws, P., Redish, E., Cooney, P. Understanding physics, John Wiley & Sons, 2004

Serway, R., A., Jewet., J., W. Principles of Physics, 2002 Thomson Learning Sherwood, B., Chabay, R. Matter and interactions I., Modern mechanics, dostupné na Internete

<b>Course language:</b> Slovak, English		
Notes:		
<b>Course assessment</b> Total number of assessed students: 8		
Ν	Р	
0.0	100.0	
Provides: prof. RNDr. Michal Jaščur, CSc., doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Mariá Kireš, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice
Faculty: Faculty of S	cience
<b>Course ID:</b> ÚFV/ DSFP2/11	Course name: Science Exploration of Selected Physical Problems II
Course type, scope a Course type: Lectur Recommended cou	re restre control cont

Per week: 2 Per study period: 28

Course method: present

Number of credits: 5

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

#### **Conditions for course completion:**

three semester projects (individual work on selected physical problems) oral exam

#### Learning outcomes:

Presenting selected physical problems in electricity and magnetism with the aim of a deeper, unifying view and understanding fundamental theoretical knowledge together with modern trends in the field. Getting skills to prepare and modify selected physical problems with the application theme, which demonstrate the importance of physical education for society and of which interpretation is related to students' knowledge level at secondary schools.

#### Brief outline of the course:

Review of key concepts and principles in electricity and magnetism. Application of knowledge in different systems using computer simulations. Knowledge of theory of relativity in the context of electricity and magnetism. Microscopic view of the phenomena in electrical circuits. Selected physical problems (sparks in the air and atmospheric electricity, surface charges in circuits, accelerators and relativistic collisions of elementary particles, heart electrocardiogram, bone strength)

Review of basic concepts of condensed matter magnetism. Carriers of the magnetic moment. Magnetic properties of matter without magnetic ordering. Magnetic properties of matter with magnetic ordering. Processes of magnetic reversal. Magnetic resonance. Transport properties of semiconductors. Phenomena occurring at the interface between two semiconductors, metal and semiconductor. Applications of the theory in describing semiconductors devices.

#### **Recommended literature:**

R. Chabay, B. Sherwood: Matter and interactions II - Electric and Magnetic Interactions, J.Willey and Sons, Inc. New York, 2007

S. Chikazumi: Physics of Magnetism, J.Willey and Sons, Inc. New York, London, Sydney, 1997 H. Kronmüller: Handbook of magnetism and advanced magnetic materials, Willey, 2007R.

Dalven, Introduction to applied solid state physics, Plenum press, 1990

D.J.Roulston An Introduction to the Physics of Semiconductor Devices, Oxford University Press, 1999

<b>Course language:</b> Slovak, English		
Notes:		
<b>Course assessment</b> Total number of assessed students: 7		
Ν	Р	
0.0	100.0	
Provides: prof. RNDr. Andrej Bobák, DrSc., prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Jozef Hanč, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafárik University in Košice			
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DVDF/11	Course name: Selected Cl	napters from Didactics 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: 5	5		
Recommended seme	ster/trimester of the cours	e: 2.	
Course level: III.			
Prerequisities:			
<b>Conditions for cours</b> project work Project: 40 points + F	e completion: Exam: 60 points		
<b>Learning outcomes:</b> To widen the knowle methods, forms and t	<b>Learning outcomes:</b> To widen the knowledge from didactics of physics towards familiarization with modern teaching methods, forms and tools in physics education.		
<b>Brief outline of the course:</b> History of didactics of physics in Slovakia. Educational systems in Slovakia and abroad. Reforms in science education. Interactive and activating methods in science education. Modern didactic tools and organization forms. Importance of primary knowledge and its utilization in development of conceptual understanding. Evaluation of knowledge and skills. Standardized international tools for evaluation (PISA, TIMSS, conceptual tests). Teacher as a creator of a grant project.			
Recommended literature: Janovič, J. a kol.: Didaktika fyziky, MFF UK Bratislava, 1990 Janovič, J. a kol.: Vybrané kapitoly didaktiky fyziky, MFF UK Bratislava, 1999 Kašpar, E. a kol.: Didaktika fyziky, SPN Praha, 1978 Mechlová, E.: Didaktika fyziky 1, 2, PdF Ostrava, 1989 Fenclová, J. Úvod do teórie a metodológie didaktiky fyziky, SPN Praha, 1982 Učebnice fyziky pre rozličné stupne škôl			
<b>Course language:</b> Slovak, English			
Notes:			
Course assessment Total number of asses	Course assessment Total number of assessed students: 7		
	N	Р	
	0.0	100.0	

**Provides:** doc. RNDr. Zuzana Ješková, PhD., doc. RNDr. Marián Kireš, PhD., doc. RNDr. Jozef Hanč, PhD., RNDr. Ľudmila Onderová, PhD.

**Date of last modification:** 03.05.2015

Approved: prof. RNDr. Peter Kollár, DrSc.

University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DVKF1/11	Course name: Selected Ch	apters of Physics I
Course type, scope a Course type: Lectur Recommended cour Per week: 3 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 42 esent	
Number of credits: 5	5	
Recommended seme	ster/trimester of the course	e: 1., 3.
Course level: III.		
Prerequisities:		
<b>Conditions for cours</b> partial assessment ba examination	se completion: sed on two semestral project	S.
Learning outcomes: Based on the concrete by the student at the with regard to the the include the selected p (study programmes o	e goals of the student's thesis master level the course will esis topic. The concrete con- parts of the physics master de f Fm, FKLm,BFm, JSFm).	and the extent and content of the subjects attended provide deeper insight into the branch of physics tent will be selected by the guarantee and it will egree courses at Faculty of Science, UPJS Kosice
Brief outline of the c Based on the corresp	ourse: onding master degree physic	es course programme.
<b>Recommended litera</b> Literature correspond Current and up-to-da	<b>iture:</b> ling to the selected physical te scientific publications con	topics inected with the selected physical topics
<b>Course language:</b> Slovak, English		
Notes:		
Course assessment Total number of asse	ssed students: 7	
	Ν	Р
	0.0	100.0
Provides: prof. RND	r. Peter Kollár, DrSc., prof. I	NDr. Michal Jaščur, CSc.
Date of last modifica	ntion: 03.05.2015	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DVKF2/11	Course name: Selected Ch	apters of Physics II
Course type, scope a Course type: Lectur Recommended cour Per week: 3 Per stu Course method: pre	nd the method: re rse-load (hours): dy period: 42 esent	
Number of credits: 5	5	
Recommended seme	ster/trimester of the cours	e: 1., 3.
Course level: III.		
Prerequisities:		
<b>Conditions for cours</b> partial assessment ba examination	se completion: sed on two semestral projec	ts.
Learning outcomes: Based on the concrete by the student at the with regard to the the include the selected p (study programmes o	e goals of the student's thesis master level the course will esis topic. The concrete con parts of the physics master do f Fm, FKLm,BFm, JSFm).	and the extent and content of the subjects attended provide deeper insight into the branch of physics tent will be selected by the guarantee and it will egree courses at Faculty of Science, UPJS Kosice
Brief outline of the c Based on the corresp	ourse: onding master degree physic	es course programme: Fm, FKLm, BFm, JSFm.
<b>Recommended litera</b> Literature correspond Current and up-to-da	<b>nture:</b> ling to the selected physical te scientific publications cor	topics mected with the selected physical topics
<b>Course language:</b> Slovak, English		
Notes:		
Course assessment Total number of asse	ssed students: 3	
	Ν	Р
	0.0	100.0
Provides: prof. RND:	r. Peter Kollár, DrSc.	
Date of last modifica	ntion: 03.05.2015	
Approved: prof. RNI	Dr. Peter Kollár, DrSc.	

University: P. J. Šaf	ărik University in Košice	
Faculty: Faculty of	Science	
<b>Course ID:</b> ÚFV/ DMOF/11	Course name: Selected Topics in Modern Physics	
Course type, scope Course type: Lecta Recommended cou Per week: 3 Per st Course method: pr	and the method: ure urse-load (hours): rudy period: 42 resent	
Number of credits:	5	
Recommended sem	ester/trimester of the course: 1., 3.	

Course level: III.

Prerequisities:

#### **Conditions for course completion:**

Students prepare a seminar work in form of a scientific paper, which is dealt with an application of modern physics in everyday phenomena and devices around us. The work contains not only basic physical information but also includes a correct mathematical theory describing the chosen phenomena or device. In addition the seminar work concerns visualization of the phenomena, which means using virtual PC experiments (simulations). Students can receive maximum of 50 points, the needed minimum is 26 points.

oral exam 0 to 50 points; final assessment is the result of continuous assessment and oral exam.

#### Learning outcomes:

Consolidating and expanding the theoretical knowledge gained from previous undergraduate studies in quantum mechanics and general relativity.

Getting a higher level of conceptual (physical) understanding and the unifying view of the fundamental principles of modern physics. Getting knowledge in application and didactic aspects of the issue (what practical applications we know; how to apply theoretical knowledge in practical tasks and applications of modern physics, with which we encounter in everyday life; what virtual PC experiments can be used; what conceptual understanding is needed).

#### Brief outline of the course:

Overview of basic concepts and principles of special relativity. Description of flat and curved spacetime in the vicinity of spherical objects - the Minkowski, Schwarzschild and Kerr metrics, corresponding symmetries and conservation laws, theory tests in the solar system, computer simulations as virtual experiments in relativity. Applications of theory: accelerators, modern diagnostic techniques (PET, MRI); GPS, motion around black holes, gravitational lenses.

Overview of basic concepts and principles of quantum mechanics. The standard model and elementary particles. Description of the micro-world in terms of path integrals, concept of propagator, theory application in elementary quantum systems, symmetries and their fundamental consequences for quantum statistics of multi-particle systems, conceptual issues of quantum mechanics, computer simulations as virtual experiments in quantum theory.

Applications of theory: quantum theory of conductivity in LED devices, semiconductor laser, SQUIDs sand MOSFETs

#### **Recommended literature:**

Hartle, J. B. (2003). Gravity: Introduction to Einstein's General Relativity, San Francisco: Addison Wesley

Taylor, E.F., Wheeler, J.A. (2000). Exploring Black Holes: Introduction to General Relativity, San Francisco: Addison Wesley

Schutz, B. (2004). Gravity from Ground Up: An Introductory Guide to Gravity and General Relativity, Cambridge: Cambridge University Press

Sakurai, J.J., Napolitano, J.J (2010). Modern Quantum mechanics, 2nd ed., New York: Addison Wesley

Zajonc, A.G., Greenstein, G. (2006), The Quantum Challenge: Modern Research on the Foundations of Quantum mechanics, Boston: Jones and Barlett publishersBelloni, M., Christian, W., Cox, A.J., Physlet Quantum Physics: An Interactive Introduction, London: Pearson education Wittmann, M.C., Steinberg, R.N., Redish, E.F. (2005), Activity-Based Tutorials 2: Modern Physics, New York: John Wiley and Sons

**Course language:** 

Slovak

Notes:

Course assessment

Total number of assessed students: 4

Ν

0.0

\_\_\_\_\_

**Provides:** prof. RNDr. Peter Kollár, DrSc., prof. RNDr. Stanislav Vokál, DrSc., doc. RNDr. Jozef Hanč, PhD.

Р

100.0

Date of last modification: 03.05.2015

Approved: prof. RNDr. Peter Kollár, DrSc.

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
<b>Course ID:</b> ÚFV/ DTVF1a/11	Course name: Seminar Theory of Physics Teaching I		
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 credits: 3			
Recommended seme	ster/trimester of the course: 1.		
Course level: III.			
Prerequisities:			
<b>Conditions for course completion:</b> individual presentation at the seminar, active participation at the seminars completion			
Learning outcomes: Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays rnational conferences, seminars and other events that deal with education in		
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>			
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ture: c up-to-date information sources ngs, web portals of events and conferences ducation, other publications aimed at physics education		
<b>Course language:</b> Slovak, English			

Course assessment		
abs n		
100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Marián Kireš, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
Course ID: ÚFV/ DTVF1b/11	Course name: Seminar Theory of Physics Teaching II	
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 credits: 3		
Recommended seme	ster/trimester of the course: 2.	
Course level: III.		
Prerequisities:		
<b>Conditions for cours</b> individual presentation	e completion: on at the seminar, active participation at the seminars	
Learning outcomes: Discuss systematically about the up-to-date problems concerning education in physics and research in the field of physics education in Slovakia and abroad in order to expand knowledge and enhance argumentation skills and competencies, use the experience and knowledge gained at study stays and national and international conferences, seminars and other events that deal with education in physics.		
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>		
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ture: c up-to-date information sources ngs, web portals of events and conferences ducation, other publications aimed at physics education	
<b>Course language:</b> Slovak, English		

Course assessment Total number of assessed students: 8		
abs n		
100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience		
<b>Course ID:</b> ÚFV/ DTVF2a/11	Course name: Seminar Theory of Physics Teaching III		
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 credits: 3			
Recommended seme	ster/trimester of the course: 1., 3.		
Course level: III.			
Prerequisities:			
<b>Conditions for cours</b> individual presentation	<b>Conditions for course completion:</b> individual presentation at the seminar, active participation at the seminars completion		
Learning outcomes: Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays ernational conferences, seminars and other events that deal with education in		
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>			
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ature: c up-to-date information sources ngs, web portals of events and conferences education, other publications aimed at physics education		
<b>Course language:</b> Slovak, English			

Course assessment Total number of assessed students: 7		
abs n		
100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Marián Kireš, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	cience		
<b>Course ID:</b> ÚFV/ DTVF2b/11	Course name: Seminar Theory of Physics Teaching IV		
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 credits: 3			
Recommended seme	ster/trimester of the course: 2., 4.		
Course level: III.			
Prerequisities:			
<b>Conditions for cours</b> individual presentation	e completion: on at the seminar, active participation at the seminars		
<b>Learning outcomes:</b> Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays rnational conferences, seminars and other events that deal with education in		
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>			
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ture: c up-to-date information sources ngs, web portals of events and conferences ducation, other publications aimed at physics education		
<b>Course language:</b> Slovak, English			

Course assessment Total number of assessed students: 7		
abs n		
100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
<b>Course ID:</b> ÚFV/ DTVF3a/11	Course name: Seminar Theory of Physics Teaching V		
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 credits: 3			
Recommended seme	ster/trimester of the course: 5.		
Course level: III.			
Prerequisities:			
<b>Conditions for cours</b> individual presentation	e completion: on at the seminar, active participation at the seminars		
Learning outcomes: Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays rnational conferences, seminars and other events that deal with education in		
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>			
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ture: c up-to-date information sources ngs, web portals of events and conferences ducation, other publications aimed at physics education		
<b>Course language:</b> Slovak, English			

Course assessment Total number of assessed students: 5		
abs n		
100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Marián Kireš, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DTVF3b/11	Course name: Seminar Theory of Physics Teaching VI	
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 credits: 3		
Recommended seme	ster/trimester of the course: 6.	
Course level: III.		
Prerequisities:		
<b>Conditions for cours</b> individual presentation	e completion: on at the seminar, active participation at the seminars	
Learning outcomes: Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays rnational conferences, seminars and other events that deal with education in	
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>		
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ture: c up-to-date information sources ngs, web portals of events and conferences ducation, other publications aimed at physics education	
<b>Course language:</b> Slovak, English		

Course assessment Total number of assessed students: 5		
abs n		
100.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
<b>Course ID:</b> ÚFV/ DTVF4a/11	Course name: Seminar Theory of Physics Teaching VII		
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 credits: 3			
Recommended seme	ster/trimester of the course: 7.		
Course level: III.			
Prerequisities:			
<b>Conditions for cours</b> individual presentation	e completion: on at the seminar, active participation at the seminars		
Learning outcomes: Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays rnational conferences, seminars and other events that deal with education in		
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>			
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ature: c up-to-date information sources ngs, web portals of events and conferences education, other publications aimed at physics education		
<b>Course language:</b> Slovak, English			

Course assessment Total number of assessed students: 0		
abs n		
0.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Marián Kireš, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice	
Faculty: Faculty of S	cience	
<b>Course ID:</b> ÚFV/ DTVF4b/11	Course name: Seminar Theory of Physics Teaching VIII	
Course type, scope a Course type: Lectur Recommended cour Per week: 1 / 1 Per Course method: pre	nd the method: e / Practice rse-load (hours): study period: 14 / 14 esent	
Number of credits: 3		
Recommended seme	ster/trimester of the course: 8.	
Course level: III.		
Prerequisities:		
<b>Conditions for cours</b> individual presentation	e completion: on at the seminar, active participation at the seminars	
Learning outcomes: Discuss systematicall in the field of physics argumentation skills and national and inte physics.	y about the up-to-date problems concerning education in physics and research education in Slovakia and abroad in order to expand knowledge and enhance and competencies, use the experience and knowledge gained at study stays rnational conferences, seminars and other events that deal with education in	
<ul> <li>Brief outline of the course:</li> <li>The seminar content will be updated according to the current situation and events running in the field of physics education, however generally, it will have the following structure:</li> <li>Conferences aimed at the education in physics, conference theme, invited lectures, presentations, trends and themes to foster future cooperation</li> <li>Survey of the content of journals, browsing and searching towards the certain topic</li> <li>Current events for teachers and students: goals, presentation topics, outputs</li> <li>PhD students' presentations to the partial problems concerning their PhD thesis</li> <li>Presentations of the members of the physics education group</li> <li>Presentations of invited lectures from partner institutions</li> </ul>		
<b>Recommended litera</b> Printed and electronic Conference proceedin Journals on physics e	ture: c up-to-date information sources ngs, web portals of events and conferences ducation, other publications aimed at physics education	
<b>Course language:</b> Slovak, English		

Course assessment Total number of assessed students: 0		
abs n		
0.0	0.0	
Provides: prof. RNDr. Peter Kollár, DrSc., doc. RNDr. Zuzana Ješková, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: D. L. Šeférik University in Kočice		
University. F. J. Salarik University in Kosice		
Faculty: Faculty of Science		
ourse ID: Dek. PF Course name: Spring School for PhD Students PJŠ/JSD/14		
Course type, scope and the method: Course type: Lecture Recommended course-load (hours): Per week: Per study period: 4d Course method: present		
Number of credits: 2		
Recommended semester/trimester of the course:		
Course level: III.		
Prerequisities:		
Conditions for course completion:		
Learning outcomes:		
Brief outline of the course:		
Recommended literature:		
Course language:		
Notes:		
Course assessment Total number of assessed students: 68		
abs n		
100.0 0.0		
Provides: doc. RNDr. Vladimír Zeleňák, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafárik University in Košice		
Faculty: Faculty of Science		
Course ID: ÚFV/ DSMV/11Course name: Statistical Methods in Educational Research		
Course type, scope and the method: Course type: Lecture / Practice Recommended course-load (hours): Per week: 2 / 1 Per study period: 28 / 14		

#### Number of credits: 5

#### Recommended semester/trimester of the course: 4.

Course level: III.

Prerequisities:

#### **Conditions for course completion:**

Using technologies students collect data from own research or find and prepare model data from an existing research for statistical analysis. Students prepare a detailed description of the theory application to model or own data in their research work in the software environment and create a report in the form of presentation. Students can receive maximum of 50 points, the needed minimum is 26 points.

oral exam 0 to 50 points; final assessment is the result of continuous assessment and oral exam.

#### Learning outcomes:

Getting the requested overview of statistical methods and digital technologies for collecting, analyzing and interpretation of data and research results in didactics. Understanding and getting skills to apply statistical methods in various forms of didactic research (observation, pre-research, pedagogical experiment, quasi-experiment, case study, qualitative research, mixed method research, historical research). Being familiar with software technologies and its use for effective data collection. Being familiar with statistical methods and their application to obtained research data in the chosen software environment (spreadsheet - Excel and professional software R). Identifying and analyzing validity and reliability of statistical methods of research studied in a specific monograph or journal literature. Getting skills to apply gained knowledge in statistical analysis of own scientific research in the field of didactics.

#### Brief outline of the course:

Scientific methods of educational research data collection. Available software technology for immediate and long-term data collection. Descriptive statistics in educational research. Visualization and interpretation of results in a spreadsheet (Excel). Analysis in professional statistical software (free software R). Inductive statistics in educational research. Methods of inductive statistics in a spreadsheet environment and professional statistical software. Statistical analysis, processing and interpretation of various research forms in didactics (observation, pre-research, pedagogical experiment, quasi-experiment, case study, qualitative research, mixed method research, historical research). Principles of analysis and evaluation of a survey and a diagnostic test using descriptive and inductive statistics in software environment. Statistical methods for assessing validity and reliability of obtained data and results. Analysis and application of statistical methods in the study of scientific publications and in own research work.

### **Recommended literature:**

Glass, G.V., Hopkins, K.D. (2008), Statistical methods in Educaton and Psychology, 3rd ed., Boston: Allyn & Bacon
Heiberger, R. M., Neuwirth, E. (2009) R Through Excel: A Spreadsheet Interface for Statistics, Data Analysis and Graphics, Springer
Crawley, M.J. (2005), Statistics: An Introdution using R, New York: Wiley
Utts, J.M. (2005), Seeing Through Statistics, London: Thomson Brooks/Cole
Anděl, J. (2005), Základy matematické statistiky, Praha: MatFyzPress (In Czech)
Zvára, K., Ščepán, J. (2001), Pravděpodobnost a matematická statistika, Praha: MatFyzPress, (in Czech)
Řezanková, H. (2010), Analýza dat z dotazníkových šetření, Praha: Professional Publishing, (in Czech)
Course language:
Slovak, English

Noles:		
Course assessment Total number of assessed students: 8		
N P		
0.0	100.0	
Provides: doc. RNDr. Jozef Hanč, PhD., Mgr. Nataša Čopíková, PhD.		
Date of last modification: 03.05.2015		
Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DVBP/11	ourse ID: ÚFV/ VBP/11Course name: Supervising Bc. Thesis		
Course type, scope and the method: Course type: Recommended course-load (hours): Per week: Per study period: Course method: present			
Number of credits: 6	)		
Recommended seme	ster/trimester of the cours	e: 5., 6, 7., 8	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
abs n			
0.0 0.0			
Provides: prof. RNDr. Peter Kollár, DrSc.			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	rik University in Košice		
Faculty: Faculty of Science			
<b>Course ID:</b> ÚFV/ DVPS/11	<b>Course name:</b> Supervising Student (university, high school) Scientific Work		
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 seme	ster/trimester of the cours	e: 5., 6, 7., 8	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the c	ourse:		
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 0			
	abs	n	
	0.0 0.0		
Provides: prof. RNDr. Peter Kollár, DrSc.			
Date of last modification:			
Approved: prof. RNI	Approved: prof. RNDr. Peter Kollár, DrSc.		

University: P. J. Šafá	University: P. J. Šafárik University in Košice		
Faculty: Faculty of S	Faculty: Faculty of Science		
<b>Course ID:</b> ÚFV/ PDS/14	<b>):</b> ÚFV/ <b>Course name:</b> 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 credits: 1	5		
Recommended seme	ster/trimester of the cours	2:	
Course level: III.			
Prerequisities:			
Conditions for cours	e completion:		
Learning outcomes:			
Brief outline of the course:			
Recommended literature:			
Course language:			
Notes:			
Course assessment Total number of assessed students: 32			
abs n			
100.0 0.0			
Provides:			
Date of last modification:			
Approved: prof. RNDr. Peter Kollár, DrSc.			