

DOCTORAL STUDIES IN SCIENCE AND MATHEMATICS EDUCATION

STUDY PROGRAMME: PHYSICS EDUCATION

List of courses – Physics Education						
Sem.	Courses	Hours		ECTS	Type	Course ID
		L	E/S			
I	Methodology of Educational Research I	30	45	9	Mandatory	EDU 601
	Cognitive Psychology	30	30	7	Mandatory	EDU 602
	Selected Chapters in Teaching of Physics	30	30	7	Mandatory	PED671
	Elective courses from 3rd group of courses (7 ECTS)					
	Selected Chapters in General and Modern Physics I	30	15	7	Elective	PTH671
	Gravitation, Cosmology and Astrophysics	30	15	4	Elective	PTH597
	Selected chapters in atomic and molecular physics	30	15	3	Elective	PTH590
	Sum	120	120	30		
II	Methodology of Educational Research II	30	30	10	Mandatory	EDU 651
	Elective courses from 2nd group of courses (10 ECTS)					
	Educational Planning and Curriculum Development in Physics Education	30	30	10	Elective	PED673
	Assessment of Students' Learning Outcomes in Physics	30	30	10	Elective	PED672
	Modern Physics Education Research	30	30	10	Elective	PED674
	Elective courses from 3rd group of courses (10 ECTS)					
	Selected Chapters in General and Modern Physics II	30	30	10	Elective	PTH672
	Advanced Course in Electrodynamics	30	30	10	Elective	PTH602
Selected Chapters in Quantum Physics	30	30	10	Elective	PTH673	
Sum	90	90	30			
III	Doctoral Research Seminar I (presentation of the research proposal)	0	60	30	Mandatory	EDU 661
IV	Doctoral Research Seminar II	0	60	30	Mandatory	EDU 662
V	Doctoral Research Seminar III	0	60	30	Mandatory	EDU 663
VI	Doctoral Research Seminar IV (presentation of the draft version of the thesis)	0	40	20	Mandatory	EDU 664
	Doctoral Thesis Defense		20	10	Mandatory	EDU 665
	Sum			30		
TOTAL		210		180		

GOALS OF THE STUDY PROGRAMME

The goals of the study programme are as follows:

- broadening and deepening of students' knowledge about modern, research-based approaches to physics teaching
- acquiring systems thinking skills related to reasoning about physics education and factors that may influence educational policy
- developing additional skills related to didactic analysis of challenging topics in introductory and modern physics
- developing skills for effective planning, conducting and evaluation of physics education research, including the skill of writing scientific articles in the area of physics education

LEARNING OUTCOMES

The diploma holder is able to:

- Compare and evaluate modern approaches to teaching physics at different levels of education
- Analyse different approaches to popularization of physics
- Perform didactic analysis of selected topics in introductory and modern physics
- Develop psychometrically-sound instruments for assessment of students' learning outcomes in physics
- Prepare reviewer reports for scientific articles in the area of physics education
- Analyse trends in physics education research and identify most important conclusions from recent research
- Plans and conducts qualitative, quantitative and mixed research in the area of physics education
- Writes physics education articles

PROFESSIONAL STATUS

The PhD in Physics Education degree qualifies the holder to teach university-level introductory physics and physics education courses. Additionally, the holder is qualified for working as advisor in: the Ministry of Education, in various agencies devoted to assuring quality of education, at faculties and institutes devoted to educational research, as well as in other institutions that employ candidates with a doctoral degree in physics education.