

Level: bachelor				
Course title: Qualitative Methods in Physics				
Status: elective				
ECTS: 6				
Requirements: none				
Learning objectives Introduce students to the possibility of obtaining results without the use of rigorous mathematical formalisms.				
Learning outcomes After completion of the course student should have developed: - General skills: reading professional literature, analysis of different solutions and selecting the most appropriate ones, creativity; - Subject-specific skills: the ability of independent formulation of models of physical phenomena, ability of dimensional analysis of the problem; using symmetry of problems to give a qualitative explanation; estimation of order of magnitude of various effects.				
Syllabus <i>Theoretical instruction</i> The difference between quantitative and qualitative approaches in the exact sciences. The formation of models. Examples: solid body, ideal gas, Lorentz approach to electrodynamics. Dimensional analysis. An elementary approach. Pi-theorem. Fluid Mechanics. Application of symmetry to simplify the calculations. The law of conservation. Application of the theory of groups. Analytical properties. Example: the theory of dielectric constant. Analytical properties of the field theory. Analogies in physics: the exponential growth and decline, saturation, oscillations <i>Practical instruction</i> Computational exercises and seminars.				
Weekly teaching load				Other:
Lectures: 45	Exercises: 15	Other forms of teaching:	Student research: 15	