

Study program	Level of the study program		<b>Second cycle</b>	
	Study program name		<b>Physics Education</b>	
Course name	<b>EVOLUTION OF PHYSICAL THEORIES</b>			
Course ID	Semester	Course status	ECTS credits	L+E
<b>PHY8311</b>	<b>I or II</b>	<b>ELECTIVE</b>	<b>3</b>	<b>2+0</b>
Lecturer				
Aims and intended learning outcomes	<p>The aim of this course is to further develop the students' understanding about the evolution of physics, from the rise of the mechanical view to development of quantum physics.</p> <p>Intended learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Describe and interpret the evolution of selected physical theories.</li> <li>2. Analyse the nature of scientific discovery within the context of development of specific physics concepts and theories.</li> <li>3. Relate the development of ideas throughout history of physics with the development of corresponding ideas in an individual.</li> </ol>			
<b>Course content</b>				
<p>The rise of the mechanical view– part 1 (Vectors. Motion). The rise of the mechanical view– part 2 (The heat concept). The rise of the mechanical view– part 3 (Molecular-kinetic theory. The philosophical background of the mechanical view). The decline of the mechanical view - part 1 (Electric fluid. Magnetic fluid). The decline of the mechanical view – part 2 (Light as substance. Velocity of light. The color concept). The decline of the mechanical view – part 3 (The wave concept. Wave theory of light. Ether and the mechanical view). The field concept and relativity – part 1 (Field as representation. The reality of the field. Field and ether). The field concept and relativity – part 2 (Ether and motion. Time, distance and relativity). The field concept and relativity – part 3 (Relativity and mechanics. Time-space continuum). The field concept and relativity – part 3 (General relativity. Geometry and experiments). Quantum physics – part 1 (Continuity and discontinuity. Elementary quanta). Quantum physics– part 2 (Electromagnetic spectrum. Waves of matter). Quantum physics – part 3 (Probabilistic laws. Physics and reality). Current challenges. Theory of everything.</p>				
Student workload (hours)		Grading		
Lectures and Exercises	30	Assessment method	Points	
Exam preparation	25	Partial exam	40	
Assignments	15	Seminar paper	20	
Other	5	Final exam	40	
Total	75			
		Total	100	
<b>Literature</b>				
<ol style="list-style-type: none"> <li>1. Supek, I. (1995). <i>Filozofija, znanost i humanizam</i>. Zagreb: Školska knjiga</li> <li>2. Einstein, A., &amp; Infeld, L. (1967). <i>The evolution of physics: the growth of ideas from early concepts to relativity and quanta</i>. NY: Touchstone.</li> <li>3. Torretti, R. (1998). <i>The Philosophy of Physics</i>. Cambridge: CUP.</li> </ol>				
<b>Remarks</b>				