Study program	Level of the study program		**Second cycle**	
	Study program name		**Physics Education**	
Course name	**AN INTRODUCTION TO THE PHILOSOPHY OF PHYSICS**			
Course ID	Semester	Course status	ECTS credits	L+E
PHY9311	**III**	**MANDATORY**	**3**	**2+0**
Lecturer				
Aims and intended learning outcomes	The aim of this course is to further develop students' understanding of historical-philosophical aspects of human thought about physical reality. Intended learning outcomes: 1. Analyse the evolution of prominent ideas about the physical world throughout the history of humankind. 2. Interpret the most important aspect of epistemology of physics. 3. Analyse the relationship between physics and philosophy.			

Course content

Ideas about physical reality in the antique era. Elementalism – Thales, Democritus; Ideas about representing the physical world through numbers – Pythagoras, Plato. Concept of force in the antique – Empedocles, Aristotle. The relationship between reality and its conceptual representation – Aristotle, Archimedes. Symmetries – Kepler. Development of language of kinematics – Galileo Galilei, Newton. Geometry and the concept of force – Descartes, Leibniz. Comparing physical ideas in early mediaeval Europe and in the antique era. Physics of the 19th and 20th century – loss of intuitiveness. Analogies between mechanics and electrodynamics.
Concept of physical field – physics and geometry. Development of quantum physics. Theory of everything.

Development of physical concepts and theories. Criteria for evaluation of scientific theories. Relationship between different theories. Importance of analogies in physics. Modern meaning of the causality concept. Causality and mathematisation of physics. Mereological approach to describing and explaining physical realities. Quest for causal mechanisms. The holistic approach to describing and explaining physical realities. Relationship between different approaches to explaining physical realities. Physics and empiricism. Setting hypotheses and developing models in physics. The role of the experiment in physics. Unity of physics. Relationship between physics and other sciences.

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

Literature

1. Lelas, S., Vukelja, T. (1996). *Filozofija znanosti*. Zagreb: Školska knjiga.
2. Torretti, R. (1998). *The Philosophy of Physics*. Cambridge: CUP.
3. Sieroka, N. (2014). *Philosophie der Physik: Eine Einfuehrung*. Muenchen: C.H. Beck.
4. Selected articles from physics education journals.

Remarks