Course title: History and Philosophy of Physics

Lecturer: Darko Kapor

Required Course: elective

Number of ECTS: 15

Prerequisites:

Course Objective:

Understanding of the historical laws underlying the development of sciences, physics in particular.
Recognition of the philosophical standpoints of scientists and their influence to the interpretation of the scientific results.

Course Outcome:

After taking the course, the student should have developed:

- General capabilities: basic knowledge of this field, following the literature, analysis of various influences of historic circumstances to the development of physics.
- Subject-specific capabilities: using the examples from the history of physics in teaching; recalling

the biographies of great scientists for educationl purposes; observing the flaws in students reasoning relating them to examples from the history of physics.

Course Content:

Theoretical instruction

Early period of the development of science. Physics between religion and philosophy. The rise of mechanics interacting with astronomy and mathematics. Optics and quantum mechanics: the conflict between particle and wave concept. Electricity and magnetism: overlap and unification fields. Thermodynamics and kinetic theory of matter: from phenomenology to sophsticated theory. Particles and fields: develpment in cycles. Quantum mechanics and relativity, quantum field theory. The significance of key experiments in the development of physics today.

Student research

Two seminars

Reading Lists

1. М. Млађеновић, Историјски развој физике Томови 1 – 5, Грађевинска књига, Београд
2. Р. Ђорђевић, Увод у философију физике, Јасен, Београд (2004)
3. Н. Сесардић, уредник: Филозофија науке, Нолит, Београд (1972)
4. К. Хемпел, Филозофија природних наука, Плато, Београд (1997)
5. З. Марић, Оглед о физичкој реалности, Нолит, Београд (1986)
6. Т. Кун, Структура научних револуција, Нолит, Београд (1972)
7. П. Дијем, Циљ и структура физичког експеримента, З.Стојановић, С.Карловци (2002)
8. Edmund Whittaker: A History of the Theories of Aether and Electricity (Vol. I and II), Harper brothers, new York (1960)
9. William H. Cropper: Great Physicists, Oxford University Press, Oxfors (2001)

Total hours:		10	
Lectures: 5	Practicals:	Other:	Student research work: 5

Methods of instruction:

Consultations

Assessment (maximum number of points 100)

Requirements

Active participation in lectures 20 pts, Seminar work 30 pts
Oral exam 50pts