Study Program: Physics

Type and level of studies: Bachelor studies

Course name: Introduction to Theoretical Mechanics

Lecturer: Tijana Kevkić

Status: Compulsory

ECTS: 6

Attendance Prerequisites: Mathematics 1,2; Physical Mechanics; Molecular Physics and Thermodynamics

Course aims

Acquiring basic knowledge of the laws of classical mechanics.

Course outcome

By the end of the course, the student should have obtained:

- knowledge of the main application of the basic dynamic equation for the laws of particle motion incited by some force;
- knowledge of Lagrange's and Hamilton's formalism;
- knowledge of the laws of central force motion, small oscillations and rigid body motion;
- knowledge of the basics of relativistic mechanics.

Course content

Theoretical part

Particle kinematics. Newton's laws of mechanics. Isolated and non-isolated systems. Basic equation of particle dynamics. Differential equations of motion of particle systems. Work and force effect. Conservative forces. Law of kinetic energy, momentum and momentum of a system. Free and forced system response. Response and types of response. D'Alambert-Lagrange principle. Generalized coordinate method. Lagrangian equations of motion. Hamilton's principle. Hamilton's equations. Central force motion. Small oscillations. Rigid body motion. Relative motion. Fundamentals of special theory of relativity. Relativistic mechanics.

Practical part

Computational exercises: particle cinematics, conservation laws, free and forced motion, central force motion, small oscillations, rigid body motion, relativistic mechanics.

Literature

1. Ђ. Мушицки, Увод у теоријску физику – теоријска механика, Београд, 1980.
2. Б. Милић, Курс класичне теоријске физике I део – Њутнова механика, Студентски трг, Београд, 1997.
3. Л. Ландау, Е. Лифшиц: Механика, Грађевинска књига, Београд 1961.

Number of active classes				Other classes:
Lectures: 2	Practical classes: 2	Other forms of teaching: 0	Students' research work	

Teaching methods

Lectures (2 classes per week during the semester), computational exercises (2 classes per week).

Assessment (maximum 100 points)			
Course assignments	**points**	Final exam	**points**
activity during lectures	20	written exam	30
practical classes	20	oral exam	30
Total	40		60