Modul type: Bechelor Physics / Master Programme for Professors of Physics

Module title: Mechanics

Module type: obligatory

No ESPB: 7

Prerequisites: -

Module aims:

The first course which introduces students to classical mechanics.

Learning outcomes

After the following course the student should be able to:

- General abilities: The student is capable of correctly performing experiments, as well as analise the obtained experimental data and computational tasks in clasicall mechanics
- Course specific abilities: By successfully mastering this course the student adopts knowledge from the basic physical principles of mechanics.

Syllabus

Theoretical part:

Units. Dimensions. Measurements. Speed. Velocity. Acceleration. Reference Frames. Newton′s Laws. Gravity. Newton′s Law of Universal Gravitation. Work, Kinetic Energy, Potential Energy. Conservative Forces. Conservation of Mechanical Energy. Non-conservation Forces-Resistive Forces. Impulse-Rockets. Momentum. Conservation of Momentum. Center of Mass. Frame of Centre of Mass. Rotating Rigid Bodies. Angular Momentum. Torques. Statics. Oscillating Bodies. Kepler′s Laws. Rolling Motion. Gyroscopes. Simple Harmonic Oscillations. Breakdown of Classical-Quantum Mechanics.

Practical part:

Selected experimental exercises: Measurement of length and time. Measurement of mass. Determination of the density of liquid and solid bodies. Hook's law of elasticity. Atwood's machine. Mathematical pendulum. Determination of the moment of inertia. Determination of coefficient of surface tension by micro scale method. Determination of viscosity coefficient by Stokes and Ostvald method. Determining the velocity of sound waves by a resonant method. Computational exercises from all fields of mechanics.

Reading list

1. Feynman, Leighton and Sands, Volumen 1, http://www.feynmanlectures.caltech.edu/

Contact hours 3+2+2	**Theoretical :** 3 hours per week	**Practical:** 4 hours per week

Methods of delivery

Lectures (3 hours per week), comp. laba (2 hours per week) and laboratory (2 hours per week).