UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2013/14/2
Course:	Physics I
Code:	VEMKFI1312A
Responsible department:	Institute of Physics and Mechatronics
Department code:	MKFI
Responsible instructor:	dr. István Szalai

Course objectives:

The main objectives of this introductory physics course are: to provide a clear and logical presentation of the basic concepts and principles of physics, especially the in the classical mechanics and the special relativity.

Course content:

1. The objective and methods of the physics. The four fundamental interactions. Observation, experiment, hypothesis, theory. 2. Kinematics. Coordinate systems, position vector, path, displacement, velocity, acceleration, projectile motion, circular motion, simple harmonic motion. 3. Newton's Laws. Mass, linear momentum, force. 4. Constrained motion, incline, friction. Motion in accelerated frames. 5. Gravitation. Motion of planets. Kepler's laws, the law of universal gravitation, the gravitational field. 6. Work, energy, power. Work and kinetic energy, conservative forces, potential energy, gravitation potential and field. Conservation of mechanical energy. 7. Oscillatory motion I. Dynamics of harmonic oscillation, the simple pendulum, superposition of oscillations, Fourier's theorem. 8. Oscillatory motion II. Dumped oscillations, forced oscillations. 9. Mechanics of particle system I. Center of mass, conservation of momentum, collisions, angular momentum. 10. Mechanics of particle system II. Mechanics of rigid body. Moment of inertia, torque, angular acceleration. Precessional motion of top. 11. Mechanics of continuum I. Equation of continuity, elastic bodies, extension, shear, torsion, compression. 12. Mechanics of continuum II. Fluid mechanics. Hydrostatics. Boundary phenomenon. Hydrodynamics. Mechanic's of gas. 13. Mechanical waves. The linear wave equation, the velocity of waves, energy of waves, interference, standing waves, sound waves. 14. The theory of special relativity. I. Ether theorem, the Michelson-Morley experiment, Lorentz transformation. 15. The theory of special relativity. II. Simultaneity, time dilatation, length contraction, velocity transformation, relativistic dynamics.

Requirements, evaluation and grading:

exam

Required and recommended readings:

Vonderviszt-Németh-Szalai: Fizika I. Veszprémi Egyetemi Kiadó, 2003. Budó Ágoston: Kísérleti fizika I. Tankönyvkiadó, Budapest Feynman: Mai fizika, 1, 2, 4, Műszaki Könyvkiadó, Budapest Dede Miklós:

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Required and recommended readings:

Kísérleti Fizika I., II., Tankönyvkiadó, Budapest Baranyi Károly: A fizikai gondolkodás iskolája 1, Akadémiai Kiadó, Budapest Serway, R. A.: Physics for Scientists & Engineers, Saunders College Publishing