# UNIVERSITY OF PANNONIA

## COURSE DATASHEET

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| **Semester:** | 2015/16/1 |
| **Course:** | Physics II |
| **Code:** | VEMKFI1312B |
| **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.

**Course content:**

Electricity 1. Electric Field I. Discrete charge distributions, Coulomb's law, Charge conservation and quantization, Millikan experiment. 2. Electric Field II. Continuous charge distributions, electric flux, Gauss's law, Calculations of electric field for different systems: point charge, charged surfaces etc… 3. Electric Field III. Dipole moment, torque of a dipole, potential energy, potential, potential difference (voltage), relation between potential and electric field strength, some applications (charged sphere, point charge, etc..). 4. Electric Field IV. The Van de Graaff Generator, capacitance, capacitors, parallel plate capacitors, potential energy of a capacitor. Gauss's law in dielectrics. 5. Electric currant. Motion in electric field, Resistance, Kirchhoff's laws, DC circuit, Measuring resistance. Magnetism 6. Magnetic field I. Interaction between magnets, definition of the magnetic field, magnetic moment, torque, DC motor, Measuring the currant with Deprez instrument. 7. Magnetic field II. Interaction between magnets, Biot-Savart law, Ampere's law, Applications for straight wire, solenoid, Magnetic force between parallel wires. Dia-, para- and ferromagnetism. 8. Magnetic induction. Magnetic flux, Lenz's law, Faraday's law, self- and mutual inductance, RL circuit, Applications 9. Alternating-currant circuits. AC generator, LC, RLC circuits, Resonance, phasors, transformer. 10. Mawwell's equations. Integrated and differential Maxwell's equations of the electromagnetic field, Electromagnetic waves, electric dipole radiation, Wave equation, Light Selected chapters 11. Geometrical optics, reflection, refraction, mirrors and lenses 12. Physical optics, electromagnetic waves, diffraction, interference etc. 13. Basic principles of classical and statistical thermodynamics 14. Basics of quantum mechanics, the solution of Schrödinger equation to simple problems

**Requirements, evaluation and grading:**

exam

**Required and recommended readings:**

1. Hevesi I.: Elektromosságtan, Nemzeti Tankönyvkiadó, Budapest 1992. 2. Budó Á.: Kísérleti fizika I-III.

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**Required and recommended readings:**

Tankönyvkiadó, Budapest 1992. 3. Bérces Gy., Erostyák J., Klebniczki J., Litz J., Pintér F., Radics P., Skrapits L., Süköds Cs., Tasnádi P.: A fizika alapjai, Nemzeti Tankönyvkiadó, Budapest 2002.