UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2015/16/2
Course:	Physics III exercses
Code:	VEMKFIM122F
Responsible department:	Institute of Physics and Mechatronics
Department code:	MKFI
Responsible instructor:	dr. Péter Gurin

Course objectives:

Strengthen the understanding of physical concepts, laws and methods discussed in the lecture course with solution of problems in a few selected subjects of modern physics.

Course content:

1. Solving problems based on the van der Waals equation of state of gases. 2. Computation of refractive index of dilute and dense gases. 3. Derivation of electrical and heat transport coefficients in frame of Drude model. 4. Handling of operators, calculation a few basic commutators, demonstration of Heisenberg's relation. 5. Analysis of the Stern-Gerlach experiment. 6. Using of the equation of state of degenerated Fermi gas. Computation of the bulk moduli of alkali metals. 7. Essay written: 1 or 2 complex problems, 90 minutes. 8. The hydrogen atom. 9. Origin of the covalent bond: analysis the cases of H2 molecule and H2+ ion. 10. Estimation of the Madelung energy of alkali halids. 11. Estimation of cohesive energies of metallic crystals based on the ground state energy of degenerated electron gas. 12. Einstein's radiation laws. 13. Derivation of ferromagnetic properties based on the Weiss model. 14. Estimation of masses and cohesive energies of nuclei based on the drop model. 15. Essay written: 1 or 2 complex problems, 90 minutes.

Requirements, evaluation and grading:

Successful problem solving in the essays.

Required and recommended readings:

Budó-Mátrai: Kísérleti fizika III., Tankönyvkiadó, 1977. Feynman-Leighton-Sands: Mai fizika 7-9. kötetek, Műszaki Könyvkiadó, 1986. Kittel: Bevezetés a szilárdtestfizikába, Műszaki Könyvkiadó, 1981. Muhin: Kísérleti magfizika, Tankönyvkiadó, Bp., 1985.