



## COURSE DATASHEET

<b>Semester:</b>	2014/15/2
<b>Course:</b>	Electron and photonphysics
<b>Code:</b>	VEMKF11214I
<b>Responsible department:</b>	Institute of Physics and Mechatronics
<b>Department code:</b>	MKFI
<b>Responsible instructor:</b>	dr. Péter Gurin

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### Course objectives:

Teaching basic knowledge about micro-physical processes that have important role in the hardware of informatics, moreover developing skill on modeling of various processes.

### Course content:

1. Experimental basis of quantum physics. 2. Bohr's theory. 3. Physical observables in quantum mechanics: operators. Coordinate, momentum, angular momentum. 4. State of a system. Schrödinger's equation. 5. Special problems: particle in a box. 6. Harmonic oscillator, hydrogen atom. 7. Perturbation theory. 8. Relativistic quantum theory. Dirac's equation. 9. Many particle problem in quantum mechanics. 10. Electron in periodic potential. Bands in a solid. 11. Quantum statistics: fermions and bosons. 12. Semiconductor devices. 13. Edison's effect, Schottky's effect. 14. Quantum theory of electromagnetic field. 15. Interaction of atoms with electromagnetic field.

### Requirements, evaluation and grading:

exam

### Required and recommended readings:

N. Garcia, A. C. Damask: Physics for computer Science students, John Wiley & Sons, New York, 1986. Nagy Károly: Kvantummechanika, Tankönyvkiadó, Budapest, 1986. R. P. Feynman, R. B. Leighton, M. Sands: Mai fizika 7-9, Műszaki Könyvkiadó, Budapest, 1986 S. Brandt, H. D. Dahmen: Quantum Mechanics, Springer-Verlag, Berlin, 1994.