UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2016/17/1
Course:	Electromagnetism
Code:	VEMKFIM144E
Responsible department:	Institute of Physics and Mechatronics
Department code:	MKFI
Responsible instructor:	dr. Szabolcs Varga

Course objectives:

The main objectives of this course to provide a clear and logical presentation of the basic concepts and principles of electrodynamics.

Course content:

1. Scalar and vector field, Vector algebra, Gauss and Stokes laws, Tensors, Complex analysis. 2. Basis of Electrodynamics: Maxwell equations 3. Electric circuits: electric currant, Kirchhoff's laws, DC circuits, power. 4. Elements of circuits: resistance, induction, capacitor, diode and transistor. 5. Theory of network: basis, classification. Simplifying methods of networks: reciprocity, Norton's law, Theverin's law. 6. AC circuits: alternating currant, sinus wave, networks with periodic currant. Complex impedance. Complex power. Poly-phase networks. 7. Passive two-poles: characteristics, chain bridge, transition quantities. Bode diagrams. 8. Application of Laplace transformation for transient properties. 9. Spectral analysis of signals: Fourier analysis 10. Electric currant in conductors and semiconductors. Fermi statistics. Fermi-levels 11. Semiconductors. Properties of semiconductors, Devices: diodes, transistors. P-N border of semiconductors 12. Contact and thermoelectric phenomena. Movement of electrons in metals. Contact potential. Seebeck, Peltier and Thomson effects. 13. Electric field in dielectric media: polarization, ferroelectromagnetism, piezo and piroelectromagnetism. 14. Magnetic field in different medias: diamagnetic, paramagnetic, ferromagnetic materials. Magnetic data storage. Giant magnetic resonance. Spintronics. 15. Electromagnetic waves: planar waves, antenna, information transfer.

Requirements, evaluation and grading:

exam

Required and recommended readings:

1. Hevesy Imre: Elektromosságtan, Nemzeti Tankönyvkiadó, 1998. 2. Simonyi Károly: Villamosságtan. Akadémiai Kiadó 1983. 3. Török Miklós: Elektronika, JATE PRESS, 2000. 4. Simonyi, Fodor, Vágó: Elméleti villamosságtan példatár. Tankönyvkiadó, 2001. 5. Tipler, Mosca: Physics for scientist and engineers , Freeman and Company, 2004.