Course Profile - Department of Physics

Course Number : PHYS 102	**Course Title :** General Physics II
Required / Elective : Required	**Pre / Co-requisites :** -
Catalog Description: Charge and matter; electric field and Gauss' law; electric potential; capacitors; DC circuits; magnetic field; Ampere's law; Faraday's law; inductance; magnetic properties of matter; Maxwell's equations.	**Textbook / Required Material :** Douglas C. Giancoli, *Physics for Scientists and Engineers with Modern Physics*, Prentice Hall, New Jersey, 2009 (4^{th} Edition).
Course Structure / Schedule : **(3+0+0) 3 / 5 ECTS**	
Extended Description : Calculus-based introductory physics course on electricity and magnetism. Electric charge. Conductors, insulators and semiconductors. Coulomb's law. Electric field and electric force. Electric field calculations. Field lines. Electric dipoles. Electric flux. Gauss's law and its applications. Electric potential energy. Electric potential. Calculating electric potential. Equipotential surfaces. Potential gradient. Capactors and dielectrics. Capacitors in series and parallel. Energy storage in capacitors and electric-field energy. Dielectrics. Electric current. Resisitivity and resisitance. Electromotive force. Electric circuits. Energy and power in circuits. DC circiuts. Resistors in series and parallel.Kirchhoff's laws. RC circuits. Magnetism and the magnetic field. Magnetic field lines, magnetic flux, the motion of charged particles. Applications. Magnetic force. Force and torque on a current loop. Sources of magnetic field. Ampere's law and its applications. Electromagnetic induction. RL and RLC circuits. Faraday's law. Lenz's law. Induced emf. Maxwell's displacement current. Maxwell's equations. Electromagnetic waves. The nature of light and the electromagnetic spectrum.	
Design content : None	**Computer usage**: Linking to course web site for homework assignments and other announcements, and to Course Online for homework and exam solutions. Optional use of Java applets.

Course Learning Outcomes [relevant program outcomes in brackets]**:**

On successful completion of this course students will be able to

1. demonstrate a conceptual understanding of the fundamental physical laws of electricity and magnetism [1, 2];
2. recognize how the fundamental physical laws can be applied to solve a variety of problems [6];
3. analyze the properties of direct current electrical circuits [6];
4. describe Maxwell's equations and electromagnetic waves [1];
5. explain the historical development of these concepts [1, 9];
6. discuss how physics is relevant to the world around them [5, 10].

Recommended reading

H.D. Young and R.A. Freedman, *University Physics*, 11th Edition, Pearson Education Inc., New York, 2004.

Teaching methods

Three lectures per week (utilizing blackboards and overhead projectors); pre-readings and homework problems.

Assessment methods (Related to course outcomes)**:**

Two mid-term examinations, a final examination, weekly homework assignments, quizzes.

Student workload:

Preparatory reading	28 hrs
Lectures, discussions	42 hrs
Homework	30 hrs
Independent work	20 hrs
Exams	5 hrs

TOTAL …… 125 hrs … to match 25 x 5 ECTS

Prepared by : Rahmi Guven, 06.02.2010	**Revision Date :**