 UiTM	FAIL KURSUS FAKULTI SAINS GUNAAN UNIVERSITI TEKNOLOGI MARA 40450 SHAH ALAM SELANGOR	Keluaran : 1
		Pindaan : 0
		Tarikh : 8/3/2006
		Muka surat : 1/5
		FK-FSG-PHY 407

Course Planning PHY407-Material for Technologist

Objectives:

This course begins by discussing the presence of charges in matter and the electric field that these charges created leading to Coulomb's Law and the motion of charged particles when placed in the vicinity of other charges. The movement of charged particles and the dynamics of the it are then probed by discussing the electromotive force, electric potential difference, electric energy stored, resistance and resistivity, capacitors and capacitance and the current in a circuit can then be determined or controlled by using the ideas of potential and fields. The dynamics of motion is further analyzed when charges are placed in a magnetic field, either as point charges or as current in a wire, the intensity of the magnetic field determined via Ampere's law. Forces on a current-carrying wire, is then applied to analyze electric motors. Further, the concept of inducing current in a wire/circuit via Faraday's and Lenz's law is probed and analyzed and applied to electric generators before introducing the concept of inductors, inductance, storing of magnetic field, alternating current, phasors, root-mean-square current or voltage, and resonance. The discussion of electromagnetic waves especially light which exhibits the ability to be reflected, refracted, diffracted and interfered through Michelson Morley's and Young's Double-slit experiment will be done following the discussion of light as waves.. Finally, the wave properties of particles and the nature of atom associated with photons will be discussed.

Week	Total Hours	Contents
1	2	Diagnostics and Learning Skills <ul style="list-style-type: none"> • Force Concept Inventory • Learning Styles • Concept Mapping
2	2	Electric Forces Electric Fields and Gauss' Law <ul style="list-style-type: none"> • charged objects and the electric force • conductors and insulators • charging by contact and by induction • Coulomb's law • the electric field • electric field lines • the electric field inside a conductor • Gauss' law
3	2	Electric Potential Energy, Electric Potential and Capacitance <ul style="list-style-type: none"> • potential energy • the electric potential difference • the electric potential difference created by point charges • capacitors and dielectrics • capacitors in series and parallel • RC circuits



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Week	Total Hours	Contents
4	2	<p><i>Quiz 1</i></p> <p>Resistance, resistivity and Ohm's Law</p> <ul style="list-style-type: none"> electromotive force and current Ohm's law resistance and resistivity electric power series and parallel wiring circuits wired partially in series and partially in parallel
5	2	<p><i>Quiz 2</i></p> <p>Electric circuits & Kirchoff's Laws</p> <ul style="list-style-type: none"> internal resistance Kirchhoff's rules the measurement of current and voltage
6	2	<p><i>Test 1</i></p> <p>Magnetic Forces and Magnetic Fields</p> <ul style="list-style-type: none"> • magnetic fields • the force that a magnetic field exerts on a moving charge • the motion of a charged particle in a magnetic field • the mass spectrometer • the force on a current in a magnetic field
7	2	<p><i>Quiz 3</i></p> <p>Force on a current in a magnetic field</p> <ul style="list-style-type: none"> • the torque on a current-carrying coil • magnetic fields produced by currents • Ampere's law • magnetic materials



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FK-FSG-PHY 407

Week	Total Hours	Contents
8		Mid-Term Break
9	2	Electromagnetic Induction <ul style="list-style-type: none"> • Induced emf and induced current • motional emf • magnetic flux
10	2	<i>Quiz 4</i> Faraday's and Lenz's Law; Inductance <ul style="list-style-type: none"> • Faraday's law of electromagnetic induction • Lenz's law • the electric generator • mutual inductance and self-inductance
11	2	<i>Test 2</i> Electromagnetic Oscillations and Alternating Current <ul style="list-style-type: none"> • capacitors and capacitive reactance • inductors and inductive reactance • circuits containing resistance, capacitance, and inductance • resonance in electric circuits • semiconductor devices
12	2	Electromagnetic Waves and Snell's Law <ul style="list-style-type: none"> • the nature of electromagnetic waves • the electromagnetic spectrum • the speed of light • the energy carried by electromagnetic waves • the index of refraction • Snell's law and the refraction of light • total internal reflection
		<i>Quiz 5</i>



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Muka surat : 4/5
FK-FSG-PHY 407

Week	Total Hours	Contents
13	2	Interference/Diffraction and Young's double-slit experiment the principle of linear superposition <ul style="list-style-type: none">• Young's double-slit experiment• the Michelson interferometer• diffraction• the diffraction grating• x-ray diffraction
14	2	Particles and Waves <ul style="list-style-type: none">• the wave-particle duality• blackbody radiation and Planck's constant• photons and the photoelectric effect• the De Broglie wavelength and the wave nature of matter
15	2	<i>Quiz 6</i> The Nature of the Atom <ul style="list-style-type: none">• Rutherford scattering and the nuclear atom• line spectra• the Bohr model of the hydrogen atom• De Broglie's explanation of Bohr's assumption about angular momentum• the quantum mechanical picture of the hydrogen atom• x-rays• the laser
16	2	<i>Test 3</i>
17		FINAL EXAMINATION

Grading:

Assignment (end of chapter questions): 10%

Quizzes: (5 x 2%) = 10%

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Tests: 3 x 10% = 30%

Final exam: 50%

Textbook: Physics by Cutnell & Johnson 7th edition (algebra based)

Reference: Halliday/Resnick