

Subject: Fundamentals of Electricity and Magnetism (1)	No. of hours: 3Theo. +3Lab.	7Units
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Contents	No. of hours
<p align="center">Chapter 1 : Coulomb 's Law</p> <p>Atomic structure, Electrical charges, Charge and matter, Charge conservation law, Conductors, insulator and semiconductors, Coulomb 's law, Units of electric charge.</p>	8
<p align="center">Chapter 2 : Electric Field \vec{E}</p> <p>Electric field, Calculation of \vec{E}, Electric field of dipole, E for continuous charge distribution, line of force , Gauss s' law, \vec{E} for infinite line of charge, \vec{E} for an infinite sheet of charge, \vec{E} for charged conductors, \vec{E} between parallel charged conducting plate, Millikan 's oil drop experiment.</p>	10
<p align="center">Chapter 3 : Electric Potential</p> <p>Electric Potential, Potential Energy, Electrical Potential difference, Potential of charged spherical conductor, Electric intensity, Potential and charge distribution, Equipotential surface, Potential gradient, sharing of charges by conductors Van de Graff generator.</p>	8
<p align="center">Chapter 4 : Capacitors and Dielectric</p> <p>Capacitance, Electrical Capacitor, Parallel plate capacitor,</p>	10

Contents	No. of hours
Capacitors in Parallel and series, Parallel-plate capacitor with dielectric, Electric polarization, Electric displacement, Energy storage in capacitors, Dielectric constant and relative permittivity, Charge distribution for different dielectric.	
<p style="text-align: center;">Chapter 5 : Current and Resistance</p> <p>Current and current density, Resistivity, Resistance and Ohm 's law, Standard resistor, Rheostat and constant resistance, Calculation of resistance, Resistivity variation with temperature, Calculating of current, Voltage and resistance, Wheatstone bridge, Average and effective value of a current.</p>	9
<p style="text-align: center;">Chapter 6 : D.C Circuits</p> <p>Electromotive force (e.m.f), Electrical circuit equation, Potential difference between points in circuit, Potential drop and potential rise across(e.m.f source), Potential meter, Series and parallel connection of resistance, circuits (Network) contains many sources, Kirchhoff 's law, Energy and power measuring.</p>	9
<p style="text-align: center;">Chapter 7 : Electrochemical e.m.f</p> <p>Cell potential, Electrical cells, Daniel cell, Laclanche cell, Polarization, Dry cell, Ni-Fe secondary cell, Standard cell, Electrolysis, Thermal e.m.f, Thomson e.m.f, Peltier e.m.f, Seeback e.m.f, Thomson effect, Dependence of e.m.f on temperature, Thermocouple, Principle thermocouple equation and it 's application.</p>	10

Contents	No. of hours
<p align="center">Chapter 8 : Magnetic field</p> <p>Magnetism, Magnetic field, Magnetic induction, Magnetic flux, Motion of electrical charges in magnetic field, Cyclotron, Magnetic force on a current carrying conductors, Force and torque on a current loop (for rectangular, circular, solenoid), Force and torque on a current loop.</p>	<p align="center">8</p>

المراجع:

1. الكهربائية والمغناطيسية (يحيى عبد الحميد).

2. Electricity by sears

3. Electrical magnetism by Halliday and Resnick.

4. University physics (Young Freedman).