SAMSKRUTI COLLEGE OF ENGINEERING & TECHNOLOGY

Department of Electrical & Electronics Engineering

COURSE PLAN(2017-18)

SUB:ELECTRO MAGNETIC FIELDS **NAME OF THE FACULTY: P.JAGADEESH**

Sl. No	Name of the Topic	No. of Classes required	Cumulative number of periods
	UNIT-I ELECTRO STATICS		
1.	Introduction to Vector Algebra, co-ordinate Systems	1	1
2.	Introduction to Electrostatics, Coulomb's Law & EFI, EFI due to Line & surface Charges	2	3
3.	Gauss Law	1	4
4.	Applications of Gauss Law	1	5
5.	Work done in Moving Charge Particle, Electrical Potential	2	7
6.	Potential Gradient	1	8
7.	Problems on electrostatics	1	9
UNIT-II CONDUCTORS & DIPOLE& DIELECTRIC & CAPACITANCE			
8.	Laplace's and Poison's equations	1	10
9.	Solution of Laplace's equation in one variable.	1	11
10.	Electric dipole, Dipole moment – potential and EFI due to an electric dipole	2	13
11.	Torque on an Electric dipole in an electric field	1	14
12.	Behavior of conductors in an electric field – Conductors and Insulators.	2	16
13.	Electric field inside a dielectric material – polarization –	1	17
14.	Dielectric – Conductor and Dielectric – Dielectric boundary conditions	1	18
15.	Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics – Energy stored and energy density in a static electric field	2	20
16.	Current density,conduction and Convection current densitiy Ohm's law in point form – Equation of continuity	2	22
UNIT-III MAGNETO STASTICS& AMPERE'S CIRCUIT LAW AND ITS APPLICATIONS			
17.	Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Magnetic field intensity (MFI)	2	24
18.	MFI due to a straight current carrying filament , MFI due to , square and solenoid current Carrying wire	2	26
19.	Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0.	2	28
20.	Problems on magnetostatics	1	29

21.	Amperes's Circuit Law	1	30
22.	Magnetic Field Intensity due to an infinite sheet of current	1	31
23.	Magnetic Field Intensity due to a long current carrying filament	1	32
24.	Maxwell's Third equation and Curl	1	33
25.	Magnetic Field due to circular loop. Rectangular and square loop	2	35
UNIT-IV FORCE IN MAGNETIC FIELDS& MAGNETIC POTENTIAL			
26.	Magnetic force, Moving charges in a Magnetic field, Lorentz force equation.	2	37
27.	force on a current element in a magnetic field, Force on a straight and a long current carrying conductor in a magnetic field	2	39
28.	Force between two straight long and parallel current carrying conductors	2	41
29.	Magnetic dipole and dipole moment	1	42
30.	a differential current loop as a magnetic dipole, Torque on a current loop placed in a magnetic field	3	45
31.	Scalar Magnetic potential and its limitations, magnetic potential and its properties.	2	47
32.	Vector magnetic potential due to simple configurations, Vector Poisson's equations.	2	49
33.	Self and Mutual inductance, Neumans's formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane.	2	51
34.	Energy stored and density in a magnetic field. Introduction to permanent magnets, their characteristics and applications.	1	52
UNIT-V TIME VARYING FIELDS			
35.	Time varying fields, Faraday's laws of electromagnetic induction, Its integral and point forms.– Simple problems	2	54
36.	Maxwell's fourth equation,	1	55
37.	Statically and Dynamically induced EMFs	1	56
38.	Modification of Maxwell's equations for time varying field, Displacement current	2	58
39.	Poynting Theorem and Poynting vector.	2	60