SCHEME OF COURSE WORK

Course Details:

Course Title	**: ELECTROMAGNETICS**		
Course Code	**: 13EE1103**	**L T P C**	**: 4 1 0 3**
Program:	**: B. Tech.**		
Specialization:	**: ELECTRICAL AND ELECTRONICS ENGINEERING**		
Semester	**: III SEM**		
Prerequisites	**: Vector Calculus, Coordinate systems MATHEMATICS-I, II**		
Courses to which it is a prerequisite	**: ----------**		

Course Outcomes (COs): At the end of the course students will be able to:

1	Summarize the laws of Electrostatics and apply them in electrostatic field.
2	Summarize the laws of Magnetostatics and apply them in static magnetic field
3	Compute the force experienced by charged bodies in magnetic field
4	Identify magnetic potential and its properties
5	Identify the time varying field and understand Faraday's Laws of Electromagnetic Induction

Program Outcomes (POs):

1	Be on part with those from any advanced institution.
2	Take up any job either in the core industry (or) in allied disciplines.
3	Fit to write any competitive examinations for getting selected either for M.S. program (or) to undertake relevant career at a high end.
4	Develop a techno ethical personality that makes him serve the people in general & Electrical & Electronics Engineering in particular.
5	Enable the students adopt themselves in any socio-technological situation.
6	Develop communication and leadership skills so that the candidates in their future become leaders in the industry & academia.
7	Make students do projects either of fundamental nature (or) of the ones useful to industry such that in either case they enter the frontiers of research.
8	Have a basic capability to analyze and /or design an electrical &electronics system and be useful to the community in general.
9	Function effectively as an individual and also as a member and leader in diverse teams.
10	Communicate effectively problems of his discipline to the experts of other disciplines.
11	Have sufficient working knowledge in IT tools for him to correctly model the system and predict the solution.
12	Prepare for a life-long learning in the broadest context of technological changes.

Course Outcome Versus **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	S	S	M	M	M	M	M	M	-	M
CO-2	S	S	S	S	S	S	M	M	M	M	-	M
CO-3	S	S	S	S	S	M	M	M	M	M	-	M
CO-4	S	S	S	S	S	M	M	M	M	M	-	M
CO-5	S	S	S	S	S	S	M	M	M	M	-	M

S - Strongly correlated, *M - Moderately* correlated, *Blank - No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	UNIT-I: Introduction to electrostatic fields,Coloumbs Law,EFI,Gauss's Law	CO1	Define Potential Gradient	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test 1 (Week 8) Seminar (Week 1)
2	Laplace's and Poissons equation Electric Dipole,Electric field inside a dielectric material.	CO1	Define Electric dipole? Discuss behaviour of conductors in an electric field	▫ Lecture ▫ Discussion ▫ Problem solving	Mid-Test 1 (Week 8) Seminar (Week 2)
3	Energy stored and energy density in a static electric field	CO1	Discuss dielectric boundary conditions? Define energy stored and Energy Density in a static electric field?	▫ Lecture ▫ Discussion ▫ Problem solving	Mid-Test 1 (Week 8) Seminar (Week 3)
4	**UNIT-II: MAGNETOSTATICS** Biot savart's Law,Oesterd's Experiment,Magnetic field Intensity	CO2	Derive the expression for Magnetic Field Intensity due to a circular and solenoid current carrying wire	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test 1 (Week 8) Seminar (Week 4)
5	Ampere's Circuital Law and its applications,MFI due to an infinite sheet of current	CO2	MFI due to an infinite sheet of current and a long current carrying filament.	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test 1 (Week 8) Seminar (Week 5)
6	Field due to a circular loop of wire	CO2	Discuss about field due to a circular loop of wire	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test 1 (Week 8) Seminar (Week 6)
7	**UNIT-III: Forces in magnetic fields** Magnetic force, Moving charges in magnetic field,Force between two straight long and parallel current carrying conductors	CO3	Discuss Lorentz force expression	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test 1 (Week 8) Seminar (Week-7)
8	**Mid-Test 1**		**UNIT I, II AND HALF PART IN IIIrd.**		
9	Magnetic dipole and dipole moment	CO3	Discuss force on a current element in a magnetic field.	▫ Lecture ▫ Discussion ▫ Problem solving	Mid-Test (Week 17) Seminar (Week-9)
10	Torque on a current loop placed in a magnetic field	CO3	Derive the expression for torque on a current loop placed in magnetic field.	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test (Week 17) Seminar (Week-10)
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11	**UNIT IV: Magnetic Potential** Scalar magnetic potential and its limitations,Vector magnetic potential and its limitations	CO4	Discuss vector magnetic potential and its properties	▫ ▫ Lecture ▫ Discussion Problem Solving	Mid-Test (Week 17) Seminar (Week-11)
12	Determination of self inductance of solenoid and toriod and mutual inductance between straight long wire and square loop wire	CO4	Explain about Self inductance and mutual inductance of solenoid	▫ Lecture ▫ Discussion ▫ Problem solving	Mid-Test (Week 17) Seminar (Week-17)
13	Energy stored and energy density in magnetic fields, Neumann's formulae	CO4	Derive the expression for energy stored in magnetic fields	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test (Week 17) Seminar (Week-13)
14	**UNIT-V:** Maxwell's equation,Statically and dynamically induced emf	CO5	Explain statically induced and dynamically induced emf	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test (Week 17) Seminar (Week-14)
15	Displacement current	CO5	Explain about displacement current	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test (Week 17) Seminar (Week-15)
16	Poynting theorem	CO5	Discuss about poynting theorem	▫ Lecture ▫ Discussion ▫ Problem Solving	Mid-Test (Week 17) Seminar (Week-16)
17.	**Mid-Test 2**		**UNIT IV, V AND HALF PAT IN IIIrd**		
18.	**Preparation and Practical Examination**		**----------**		
19,20	**END EXAM**		**UNIT-I,II,III,IV,V**		Assessment will be on all topics at END EXAM