C.U.SHAH UNIVERSITY

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: -Electrical Engineering
BRANCH: Electrical Engineering
SEMESTER: - VI
COURSE:- B.Tech
CODE: - 4TE06ELM1
NAME – Electromagnetics

Teaching & Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			
							Sessional Exam		University Exam		Internal		University	Total
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE06ELM1	Electromagnetics	4	0	0	4	4	30	1.5	70	3	--	--	---	**100**

OBJECTIVES

1. To study various magnetics circuits namely inductive, capacitive and inductive capacitive mathematical modelling of physical systems.
2. To study design and implementation of modelling circuits using electromagnetics components.
3. To study design and simulation of linear electromagnetics circuits using components

PREREQUISITES

1. Basics and fundamental electro magnetics circuits and analysis.

COURSE OUTLINES

Sr. No.	Course Contents	Hours
1	**General Principles:** The field concept. Source of Electromagnetic field – classification, potential, boundary conditions. **Boundary Value Problems In Electrostatics:** Laplace and Poisson's equations, product solution method of solving Laplace's equation. Rectangular, Spherical and Cylindrical coordinates, Method of Images, Field plotting methods.	14
2	**Conformal Transformation Technique:** Complex transformations involving circular and elliptical boundaries, Bilinear	10

	and Sehwartz-christoffel transformations. **Numerical Methods:** Finite difference equivalent of Laplace's equation. Iteration and relaxation methods.	
3	**Magnetostatic Fields:** Laws of magneto-statics – vector potential, Boundary value problems in magneto-statics, current sheet and flux sheet. **Electromagnetic Fields:** Maxwell's equations in point and integral forms, Relation between field theory and circuit theory.	10
4	**Electromagnetic Wave Equation:** Propagation of Electromagnetic waves in dielectrics and conductors, space sheet, transmission lines.	10
5	**Radiation And Antenna:** Retarded potential, Hertzian dipole, Antenna pattern, directivity and gain, Application of field theory to electrical devices.	10

Learning Outcomes

After the completion of this course the students would be able to**:**

1. Design and implement various electromagnetic circuits.
2. Solving electromagnetic wave equations in space and transmission lines.
3. Understand advance electromagnetics devices.

Books Recommended

1 Rao, N. N., "Elements of Engineering Electromagnetic", 3rd Edition, Prentice Hall, India, 1992

2 Mathew, N. Sadiku, O., "Elements of Electromagnetic", 2nd Edition, Saunders College Publishing, 1994

3 Ramo, S., Whinnery, S., and Van Duzer, T., "Fields and waves in communication electronics", 3rd Edition, John Wiley and Sons, 1994.

4 Kraus, "Electromagnetic", 3rd Edition, McGraw Hill 1989.

5 Hayt William H., "Engineering Electromagnetic", McGraw Hill.