SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
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Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada
Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

Department of Electrical and Electronics Engineering

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods/ Week	Academic Year	Date of Commencement of Semester
20EE3T02	ELECTRO MAGNETIC FIELDS	III	EEE	6	2021-22	06-11-2021

Course Outcomes: *After successful completion of this course, students should be able to:*

1	Evaluate electric fields & potentials using Gauss law or solve Laplace's or Poisson's equations [K5]
2	Apply the concepts of conductors, dielectrics and capacitance in electrostatic fields [K3]
3	Explain the application of Ampere's law, Maxwell's second and third law[K2]
4	Analyze the Magnetic Forces and Torque Produced by Currents in Magnetic Field.[K4]
5	Develop knowledge on time varying fields.[K6]

Unit	Outcome/Bloom's Level	Topics No.	Topics/ Activity	Text Book/ Reference	Contact Hour	Delivery Method
I	Evaluate electric fields & potentials using Gauss law or solve Laplace's or Poisson's equations [K5]	1.1	Introduction to the subject	T1,T2,R1	1	Chalk and Board
		1.2	Introduction to Vector Analysis	T1,T2,R1	1	Chalk and Board
		1.3	Numerical Examples	T1,T2,R1	1	Chalk and Board
		1.4	Coulomb's Law	T1,T2,R1	1	Chalk and Board
		1.5	Electric Field Intensity, Electrical Field Intensity Due to Point Charges	T1,T2,R1	1	Chalk and Board
		1.6	Electrical Field Intensity Due to Line, Surface and Volume Charge distributions	T1,T2,R1	2	Chalk and Board
		1.7	Maxwell's First Equation $(\text{div}(D) = \rho_v)$	T1,T2,R1	1	Chalk and Board
		1.8	Gauss Law and Its Applications	T1,T2,R1	1	Chalk and Board
		1.9	Work done in moving a point charge in an electrostatic field	T1,T2,R1	2	Chalk and Board
		1.10	Electric potential, potential gradient	T1,T2,R1	1	Chalk and Board
		1.11	Laplace's and Poison's equations	T1,T2,R1	1	Chalk and Board

			charges in a Magnetic field – Lorentz force equation			Board
		3.8	Force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field	T1,T2,R1	2	Chalk and Board
		3.9	Force between two straight long and parallel current carrying conductors	T1,T2,R1	1	Chalk and Board
		3.10	Magnetic torque, Magnetic moment and Magnetic dipole.	T1,T2,R1	1	Chalk and Board
				Total	13	
IV	Analyze the Magnetic Forces and Torque Produced by Currents in Magnetic Field.[K4]	4.1	Determination of self-inductance of a solenoid and toroid	T1,T2,R1	1	Chalk and Board
		4.2	Mutual inductance between a straight long wire and a square loop wire in the same plane	T1,T2,R1	2	Chalk and Board
		4.3	Energy stored and density in a magnetic field.	T1,T2,R1	1	Chalk and Board
		4.4	Numerical Problems	T1,T2,R1	2	Chalk and Board
				Total	6	
V	Develop knowledge on time varying fields.[K6]	5.1	Faraday's laws of electromagnetic induction – integral and point forms	T1,T2,R1	2	Chalk and Board
		5.2	Maxwell's fourth equation (Curl(E) $=-\partial B/\partial t$),	T1,T2,R1	1	Chalk and Board
		5.3	Statically and dynamically induced EMF	T1,T2,R1	1	Chalk and Board
		5.4	Maxwell's equations for time varying fields, displacement current,	T1,T2,R1	1	Chalk and Board
		5.5	Poynting theorem and Poynting vector.	T1,T2,R1	1	Chalk and Board
		5.6	Numerical problems	T1,T2,R1	1	Chalk and Board
				Total	07	
				Overall classes	57	

Text Books:

S. No.	Authors, Book Title, Edition, Publisher, Year of Publication
1	"Engineering Electromagnetics" by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2006.
2	"Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd edition.