Regulation GRBT-20	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. I Sem (1 semester)			
Course Code PCC	**ELECTROMAGNETIC FIELDS**				
Teaching	Total contact hours - 45	L	T	P	C
Prerequisite(s): semi conductor Physics , mathematics		3	0	0	3

COURSE OBJECTIVES:

1. To introduce the basic mathematical concepts related to electromagnetic vector fields

2. To impart the concepts of Electrostatic fields, electrical potential, energy density and their applications. Magneto static fields, magnetic flux density, vector potential and its applications.

3. Different methods of emf generation and Maxwell's equations

4.Electromagnetic waves and characterizing parameters

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Analyze field potentials due to static changes and static magnetic fields
CO2:	Explain how materials affect electric and magnetic fields.
CO3:	Analyze the relation between the fields under time varying situations.
CO4:	Discuss the principles of propagation of uniform plane waves.
CO5:	Justify the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves, TV signals, radar beams and light rays.

University Nominee
(Dr.Y.Srinivasa Kishore Babu)

Subject Expert
(Dr.N.Viswanathan)

Subject Expert
(Dr.B.Ravi Kumar)

Internal Member
(Mr.T.Amar Kiran)

Internal Member
(Mrs B Kavya Santhoshi)

Internal Member
(Mr V Suresh)

Chairman-BOS
(Dr.D.Ravi Kishore)

UNIT I Coulomb's Law, Electric Field Intensity and Flux density

Experimental law of Coulomb, Electric field intensity, Field due to continuous volume charge distribution, Field of a line charge, Electric flux density.

UNIT II Gauss's law and Divergence

Gauss' law, Divergence. Maxwell's First equation (Electrostactics), Vector Operator ▼and divergence theorem. Energy expended in moving a point charge in an electric field, The line integral, Definition of potential difference and potential, The potential field of point charge, Current and Current density, Continuity of current.

UNIT III Poisson's and Laplace's Equations

Derivation of Poisson's and Laplace's Equations,Uniqueness theorem, Examples of the solution of Laplace's equation. Biot-Savart Law, Ampere's circuital law, Curl, Stokes' theorem, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic Potentials.

UNIT IV Magnetic Forces

Force on a moving charge, differential current elements, Force between differential current elements. Magnetisation and permeability, Magnetic boundary conditions, Magnetic circuit, Potential Energy and forces on magnetic materials.

UNIT V Time-varying fields and Maxwell's equations

Farday's law, displacement current, Maxwell's equations in point form, Maxwell's equations in integral form. Wave propagation in free space and good conductors. Poynting's theorem and wave power, Skin Effect.

University Nominee
(Dr.Y.Srinivasa Kishore Babu)

Subject Expert
(Dr.N.Viswanathan)

Subject Expert
(Dr.B.Ravi Kumar)

Internal Member
(Mr.T.Amar Kiran)

Internal Member
(Mrs B Kavya Santhoshi)

Internal Member
(Mr V Suresh)

Chairman-BOS
(Dr.D.Ravi Kishore)

TEXT BOOKS:

1. Mathew N. O. Sadiku, 'Principles of Electromagnetics', 6th Edition, Oxford University Press Inc. Asian edition, 2015.

2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill Special Indian edition, 2014.

3.Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 2010.

REFERENCES

1. V.V.Sarwate, 'Electromagnetic fields and waves', First Edition, Newage Publishers, 1993.

2. J.P.Tewari, 'Engineering Electromagnetics – Theory, Problems and Applications', Second Edition, Khanna Publishers.

3. Joseph. A.Edminister, 'Schaum's Outline of Electromagnetics, Third Edition (Schaum's Outline Series), McGraw Hill, 2010.

4. S.P.Ghosh, Lipika Datta, 'Electromagnetic Field Theory', First Edition, McGraw Hill Education(India) Private Limited, 2012.

5. K A Gangadhar, 'Electromagnetic Field Theory', Khanna Publishers; Eighth Reprint :2015

University Nominee
(Dr.Y.Srinivasa Kishore Babu)

Subject Expert
(Dr.N.Viswanathan)

Subject Expert
(Dr.B.Ravi Kumar)

Internal Member
(Mr.T.Amar Kiran)

Internal Member
(Mrs B Kavya Santhoshi)

Internal Member
(Mr V Suresh)

Chairman-BOS
(Dr.D.Ravi Kishore)

Web Links:

1. www.electrical4u.com

2. www.nptel.com

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	-	-	2	-	-	-	-	2
CO2	3	-	2	2	-	1	2	1	1	-	1	2
CO3	2	1	2	1	-	-	2	-	1	-	-	2
CO4	1	2	2	2	-	2	1	1	-	-	-	2
CO5	2	2	2	1	1	1	2	-	1	1	2	3

University Nominee
(Dr.Y.Srinivasa Kishore Babu)

Subject Expert
(Dr.N.Viswanathan)

Subject Expert
(Dr.B.Ravi Kumar)

Internal Member
(Mr.T.Amar Kiran)

Internal Member
(Mrs B Kavya Santhoshi)

Internal Member
(Mr V Suresh)

Chairman-BOS
(Dr.D.Ravi Kishore)