

Branch Name:	Information and Communication Technology
Program Code:	ET107
Course Title:	Engineering Electromagnetics and Wave Propagation
Course Code:	2ET1070402T
Pre-requisite:	Basic knowledge of vector calculus, Electric and Magnetic fields and its laws.

Course Objective:

1. This course provides strong foundation for understanding the fundamental principles and laws of electromagnetism to understand transmission, radiation and propagation theory.
2. Students can understand the physical interpretation and application of various laws and theorems of electric and magnetic fields. The students can also understand the principles of transmission lines.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)									Total (Marks)
					Theory(Marks)				Practical(Marks)					
	L	T	P	Total	SEE		CCA		SEE		CCA			
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
3	3	-	-	3	24	60	16	40	-	-	-	-	100	

SubjectContents					
Sr. No	Topic			Total Hours	Weight (%)
1	Review of Vector Calculus Overview of Vector Algebra, Dot Product, Cross Product, Coordinate Systems, Conversion of a Vector from One Coordinate system to another, Del Operator, Divergence, Gradient and Curl.			07	15
2	Overview of Electrostatic & Steady Magnetic Fields Coulomb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume Charge Distributions, Gausslaw, Divergence Theorem, Electric potential, Potential Gradient, Biot-Savart Law, Magnetic Flux and Magnetic Flux Density, Ampere's Circuital Law, Stoke's theorem Scalar and Vector Magnetic potentials, Lorentz Force equation.			12	25
3	Time Varying Fields and Maxwell's Equations Faraday's Law, Displacement Current, Maxwell's Equationsin Point Form, Maxwell's Equations in Integral Form, The Retarded Potentials.			8	20
4	Uniform Plane Wave Wave Propagation in Free Space, Wave Propagation in Die-Electric, The Poynting Vector and Power Considerations, Propagation in Good Conductors: Skin Effect, Wave Polarization.			9	20
5	Plane Waves at Boundaries and in Dispersive Media Reflection of Uniform Plane Wave at Normal Incidence, Standing Wave Ratio, Wave Reflection from Multiple Interfaces, Plane Wave Propagation in General Directions, Plane Wave Reflection at Oblique Incidence Angle.			9	20

List of References:

1. W. Hayt, "Engineering Electromagnetics", Seventh Edition, McGraw Hill Education, 2012.
2. M.N.O. Sadiku, "Elements of Electromagnetics", Oxford University Publication, 2014.
3. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India, 2005
4. A. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.
5. Electromagnetics Fields and Waves Third Edition by Simon Ramo, John Whinnery Wiley India Edition.
6. Narayana Rao, N: Engineering Electromagnetics, 3rd, Prentice Hall, 1997.
7. E. C. Jordan & K.G. Balmain, Electromagnetic waves & Radiating Systems, Prentice Hall, India.

E-Resources:

1. nptel.ac.in

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand about Vector Algebra, Dot Product, Cross Product, Coordinate Systems	2 Understanding
CLO2	Understand about Electrostatic & Steady Magnetic Fields	2 Understanding
CLO3	Understand and use of Maxwell's Equations in Point Form, Maxwell's Equations in Integral Form,	2 Understanding 3 Applying
CLO4	Observing Wave Propagation in Free Space, Wave Propagation in Die-Electric	4 Analyze
CLO5	Understand less Transmission Lines, Smith Chart, Applications of Transmission Lines	2 Understanding 3 Applying

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	SO1	SO2	SO3	SO4
CLO1	M	M	H	L	M	M				M			H	M		
CLO2	M	L	H	M	M	M				M	L		M	M		
CLO3	H	M	M	L	M	M				M	M		M	H		
CLO4	H	H	M	L	M	H				M			M	H		
CLO5	H	M	M	H	M	H				L	M	L	M	H		

H:High,M:Medium,L:Low