ELECTROMAGNETIC ENGINEERING

Course Code:	17B11EC411	**Semester:**	4th Semester, B. Tech (ECE)
Credits:	4	**Contact Hours:**	L-3, T-1, P-0

Unit	Topics	Book	Lectures
1.	**Vector Calculus**: Gradient, divergence and curl. Stoke's theorem and Gauss's divergence theorem.		4
2.	**Review of electrostatics and magneto static fields**. Maxwell's equations. Continuity equation, Displacement current. Conductors and dielectrics. Boundary conditions.		7
3	**Time dependent fields and Electromagnetic waves**: Time dependent Maxwell's equations (Differential and Integral form), Time and Frequency domain wave Equations, wave polarization (Circular and Elliptical), Boundary conditions, Reflection and refraction of waves, Poynting vector and Poynting theorem.		11
4	**Transmission Lines:** Time domain and Frequency Domain transmission line equations, Solution of transmission line equation, Standing wave ratio, quarter wave transmission line, Smith chart. Impedance matching circuits.		9
5	**Wave guides:** Parallel plate, rectangular and circular wave guides. Modes in RWG and CWGs and characteristics. Power transmission and losses. Resonators.		6
6	**Radiation and antennas:** Radiation from a current filament, half-wave dipole and small loop antennas. Antenna characteristics, radiation pattern, directivity and power gain. Effective area and Friss equation.		5
Total Number of Lectures			42

Evaluation Scheme

1. Test 1 :15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
    - 5 Marks : Class performance, Tutorial presentations
    - 15 Marks : Quizzes
    - 5 marks : Attendance

Text Books

1. Hayt Jr, William H. "John A. Buck." *Engineering Electromagnetic*, 8Th Edition, Tata McGraw-Hill Edition, 2011.
2. Sunil Bhooshan. *Fundamentals of Engineering Electromagnetics*, Oxford University press, 2012.
3. Pozar, David M. *Microwave engineering*. John Wiley & Sons, 2009.

Reference Books

1. Cheng, David Keun. *Field and wave electromagnetics*. Pearson Education India, 1989.
2. Jordan, E. C., and K. G. Balmain. *Electromagnetic Waves and Radiating Systems*, Prentice Hall." *Englewood Cliffs, New Jersey* (1968).