



B. P. Poddar Institute of Management & Technology
Department of Electronics & Communication Engineering
Academic Year: 2024-25, Semester: Odd
Lesson Plan for Electromagnetic Waves (EC501)



Lecture No.	Topics to be Covered	References	Teaching Pedagogy
L1	Introduction on CO, PO, Basics of Vector calculus.	Te 1	Lecture, Discussion
L2	Orthogonal Coordinate Systems- Transformations of coordinate systems.	Te 1	Lecture, Discussion, PPT
L3	Del operator; Gradient, Divergence & Curl – their physical interpretations, Laplacian operator.	Te 1	Lecture, PPT, Numericals
L4	Coulomb's law, electric field intensity, charge distribution, Poisson's & Laplace's equations	Te 1	Lecture, PPT, web resource
L5	Gauss' law & its applications, flux density.	Te 1	Lecture, Discussion, PPT
L6	Uniqueness theorem, continuity eq. current density	Te 1	Lecture, Discussion, PPT
L7	Biot-Savart law, Ampere's law and its applications	Te 1	Lecture, Discussion, PPT
L8	Relation between J & H, Vector Potential, Stokes' theorem.	Te 1	Lecture, PPT, Numericals
L9	Faraday's law & Lenz's law, Displacement Current	Te 1	Lecture, PPT, Numericals
L10	Maxwell's equations, Time-harmonic fields.	Te 1	Lecture, PPT, Quiz
L11	Electric Boundary Conditions between media interface.	Te 1	Lecture, Discussion, PPT
L12	Magnetic Boundary Conditions between media interface.	Te 1	Lecture, Discussion, PPT
L13	Uniform plane wave, Wave Equation	Te 1	Lecture, Discussion, PPT
L14	Wave Propagation in Lossy Dielectric medium	Te 1	Lecture, Discussion, PPT
L15	Wave Propagation in Loss-less Dielectric, free space	Te 1	Lecture, PPT, Flip class
L16	Wave Propagation in Good Conductor, Skin Depth	Te 1	Lecture, PPT, Numericals
L17	Poynting Theorem, Power flow, Poynting vector	Te 1	Lecture, Discussion, PPT
L18	Reflection and Transmission coefficient for normal incidence.	Te 1	Lecture, web resource, PPT
L19	Transmission Lines: Concept of Lump parameters and Distributed parameters, Line Parameters.	Te 1	Lecture, Research paper, PPT
L20	Transmission line voltage and current equations	Te 1	Lecture, Discussion, PPT
L21	Propagation constant, Characteristic Impedance, velocity, Loss-less line & Distortion-less Line	Te 1	Lecture, web resource, PPT, Numericals
L22	Reflection and Transmission coefficients, Standing Waves.	Te 1	Lecture, PPT, Flip Class
L23	Derivation of input impedance	Te 1	Lecture, PPT, Numericals
L24	Applications of Smith Chart	Te 1	Lecture, PPT, Numericals
L25	Load Matching Techniques-Quarter wave Matching.	Te 1	Lecture, PPT, Quiz
L26	Waveguide and its characteristics	Te 1, Re 1	Lecture, Discussion, PPT
L27	Modal propagation in rectangular waveguide	Te 1, Re 1	Lecture, Discussion, PPT
L28	Modal propagation in rectangular waveguide, Surface currents on the waveguide walls	Te 1, Re 1	Lecture, PPT, Numericals
L29	Field visualization, Attenuation in waveguide.	Te 1, Re 1	Lecture, Discussion, PPT
L30	Millimeter wave technology & its applications*	Re 1,2	Lecture, web resource, PPT
L31	Antenna Concepts, Antenna Characteristics, Radiation patterns	Te 1, Te 2	Lecture, Research paper, PPT
L32	Directivity, Gain, HPBW, FNBW of antenna	Te 1, Te 2	Lecture, PPT, Flip Class
L33	Hertzian dipole (Radiation Fields, Radiation Resistance)	Te 1, Te 2	Lecture, Discussion, PPT
L34	Power radiated by hertz dipole	Te2, Re 2	Lecture, PPT, Numericals
L35	Monopole and Dipole antenna	Re 1	Lecture, Discussion, PPT
L36	Discussion on University Question papers		Discussion

Text Book:

Te 1. Matthew NO Sadiku - Elements of Electromagnetics

Te 2. JD Krauss - Antennas

Reference Book:

Re 1. Samuel Y. Liao - Microwave Devices and Circuits

Mr. Arindrajit Chaudhury

Course Faculty