



Coordinators



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Syllabus

References

COURSE OUTLINE

This course covers lessons on vector analysis, divergence theorem, Stoke's theorem, Coulomb's law, Gauss law, Poisson's and Laplace equations, Biot Savart law, Ampere's circuital, Faraday's law and Maxwell equations, Helmholtz equation and finite difference method.

COURSE DETAIL

S.No	Topic
1	Introduction
2	Vector Analysis
3	Coordinate systems and Transformations
4	Line, surface and volume integrals
5	Divergence Theorem
6	Stoke's theorem
7	Introduction
8	Coulomb's Law
9	Electric Field
10	Electric flux density
11	Gauss's Law with Application
12	Electrostatic Potential and Equipotential Surfaces
13	Boundary conditions for Electrostatic fields
14	Capacitance and Capacitors
15	Electrostatic Energy and Energy Density
16	Poisson's and Laplace's Equations
17	Uniqueness Theorem
18	Method of Images
19	Electrostatic boundary value problem
20	Introduction
21	Current Density and Ohm's Law
22	Electromagnetic force and Kirchoff's Voltage Law
23	Continuity Equation and Kirchoff's Current Law.
24	Power Dissipation and Joule's law
25	Introduction
26	Biot- Savart Law and its Applications
27	Ampere's Circuital Law and its Applications
28	Magnetic Flux Density
29	Magnetic Scalar and Vector Potentials
30	Boundary Condition for Magnetic Fields
31	Inductance and Inductor
32	Energy stored in Magnetic Field
33	Introduction
34	Faraday's Law of electromagnetic Induction
35	Maxwell's Equation
36	Boundary Conditions for Electromagnetic fields
37	Time Harmonic Fields
38	The Helmholtz Equation
39	Plane waves in Lossless medium
40	Plane waves in a lossy medium
41	Poynting Vector and Power Flow in Electromagnetic Fields
42	Polarisation of plane wave
43	Behaviour of Plane waves at the interface of two media
44	Introduction
45	Fundamentals of Radiation
46	Radiated field of an Hertzian dipole
47	Basic Antenna Parameters
48	Half Wave Dipole Antenna
49	Quarter Wave Monopole Antenna
50	Small Loop Antennas
51	Introduction to Antenna Arrays
52	Introduction
53	Finite difference Method

54	Basic Concepts of the Method of Moments
55	Method of Moment for Wire Antennas and Wire Scatterers
56	Additional Solved Example-Mathematical Fundamentals
57	Assignment Problems-Mathematical Fundamentals
58	Additional Solved Example-Static Electric Fields
59	Assignment Problems-Static Electric Fields Fundamentals
60	Additional Solved Example-Steady Electric Currents
61	Assignment Problems-Steady Electric Currents
62	Additional Solved Example-Steady Magnetic Field
63	Assignment Problems-Steady Magnetic Field
64	Additional Solved Example-Time varying fields and Maxwell's equations
65	Assignment Problems-Time varying fields and Maxwell's equations
66	Additional Solved Example-Electromagnetic wave
67	Additional Solved Example-Fundamentals of Antennas and Radiating systems
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69	Advanced level
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