

00 rotational & irrotational fields, gradient

0 divergence, divergence theorem Lecture Schedule.

Lecture Subject curl.

- 1 Coulomb's Law, Lorentz Force Law, Maxwell's Eqs
- 2 Maxwell's Eqs, constitutive relationships, Examples of integrals
- 3 examples of integral Maxwell Eqs, differential forms
- 4 Boundary conditions
- 5 examples of B.C.'s, charge conservation
- 6 scalar & vector potentials, Laplace & Poisson's Eqs.
- 7 **EXAM** Lorentz condition, Maxwell Eqs (static) work & electric potential
- 8 potential for charge dist, Φ, E for electric dipole, parallel plate capacitor
- 9 corona, capacitance, 1-D Laplace equation
- 10 1-D Laplace, spherical, 2D Laplace rectangular
- 11 2-D Laplace
- 12 Uniqueness Theorem, Laplace in cylindrical
- 13 general cylindrical, examples
- 14 spherical coordinates
- 15 dipole in conducting sphere

17 dielectrics and polarization

- 18 magnetostatics, Green's solution for vector potential
- 19 **EXAM** Examples: linear current element, magnetic dipole
- 20 magnetic dipole
- 21 Biot Savart law, flux linkage
- 22 inductance calculations, magnetic scalar potential, MMF and \mathcal{R}
- 23 magnetic circuits and materials

24 1-D wave equation, derivation & functional solutions from back.

25 phase solution of wave equation

26 waves in conducting media, phase velocity

27 plane waves in conducting media

28 Poynting vector, energy flow

29 complex Poynting theorem.

30 propagation in arbitrary direction; polarization

31 normally incident plane waves - dielectric

32 waves in bounded structures - transmission lines

33 TEM waves on lossless lines

34 TEM analysis of transmission line; transients on line

35 transients on transmission line

36 sinusoidal steady state transmission lines

37 sinusoidal steady state transmission lines

43. impedance and VSWR, frequency dependence of line effects
44. Lossy lines and dispersion

45. spare

EEAP 210 COURSE SYLLABUS

1. Rotational and irrotational fields, gradient
2. Divergence and Curl, Laplace and Poisson's equations
3. Coulomb's Law, Lorentz force law, Maxwell's Equations
4. Maxwell's equations, constitutive relationships, integral examples
5. Examples of integral forms, differential forms
6. Boundary conditions
7. Exam #1 - Mathematics, Maxwell's equations
8. Examples of integral forms
9. Work and electric potential, B.C.'s for electric potential, potential of point charge, Green's function solution for charge distribution, electric dipole potential and fields
10. Conductors, conductivity and current density, charge conservation, B.C.'s for conductors
11. Resistor examples, Ohm's Law, dielectrics and bound charge
12. Polarization and displacement vector, dielectric B.C.'s
13. B.C. examples: dielectric-dielectric and dielectric-metal interfaces, fields and potential in a parallel plate capacitor
14. Capacitance, one dimensional Laplace equation
15. One-dimensional Laplace, two-dimensional Laplace (rectangular and cylindrical)
16. Two-dimensional Laplace (continued)
17. Examples in cylindrical coordinates
18. Numerical solution of Laplace's equation
19. Exam #2 - Electrostatics and Laplace's equation
20. Magnetostatics, Green's function solution for vector potential