Course outline for physics-104 (Electricity and Magnetism)

Text book:

Physics for Scientists and Engineers with Modern Physics 6th edition Raymond A. Serway Saunders College Publishing ISBN 0-03-015654-8

Chapters & Sections for the Text

23. Electric Fields
Coulomb's Law.
The Electric Field.
Electric Field Lines.
Motion of Charged Particles in a Uniform Electric Field.

24. Gauss's Law
Electric Flux.
Gauss's Law.
Application of Gauss's Law to Various Charge Distributions.
Conductors in Electrostatic Equilibrium.

25. Electric Potential
Potential Difference and Electric Potential.
Potential Differences in a Uniform Electric Field.
Electric Potential and Potential Energy Due to Point Charges.

26. Capacitance and Dielectrics
Definition of Capacitance.
Calculating Capacitance.
Combinations of Capacitors.
Energy Stored in a Charged Capacitor.
Capacitors with Dielectrics.

27. Current and Resistance
Electric Current.
Resistance.
A Model for Electrical Conduction.
Electrical Power.

28. Direct Current Circuits
Electromotive Force
Resistors in Series and Parallel.
Kirchhoff's Rules.

29. Magnetic Fields
Magnetic Field and Forces.
Magnetic Force Acting on a Current-Carrying Conductor.
Motion of a Charged Particle in a Uniform Magnetic Field.
Applications Involving Charged Particles Moving in a Magnetic Field.

30. Sources of Magnetic Field
The Biot-Savart Law.
The Magnetic Force Between Two Parallel Conductors.

Ampere's Law.
The Magnetic Field of a Solenoid.
Magnetic Flux.
Gauss's Law in Magnetism.

31. Faraday's Law
Faraday's Law of Induction.
Motional emf.

32. Inductance
Self-Inductance.
Energy in a Magnetic Field.

33. Alternating Current Circuits
AC Sources.
Resistors in an AC Circuit.
Inductors in an AC Circuit.
Capacitors in an AC Circuit.
The RLC Series Circuit.
Power in an AC Circuit.
Resonance in a Series RLC Circuit.

Chapter	Sections	Examples	Exercises and problems
23	3, 4, 6, 7	2,3,4,7,8,13,14	7,9,15,19,25,47,48
24	1,2,3,4,	1,4,5,6,7,8,	1,11,15,24,37,41
25	1,2,3,	2,3,5,	3,13,23,24,27,29
26	1,2,3,4,5	1,4,5,6,7	10,15,29,31,49,61,68
27	1,2,3,6	1,3,4,6,9,10,11	21,22,25,32,35,49,53,57
28	1,2,3	1,3,4,7,8,9	6,12,19,21,31,32,36,40
29*	1,2,4,5	1,2,4,5	5,9,14,29,35,39
30**	1,2,3,4,6,7,	4,8	19,21,24,37,38,62,63,64
31	1,2	1,2,6	2,5,11,18,21
32+	1,3	1,2	7,9,16,32,33,38,69
33++	1,2,3,4,5,6,7	1,2,4,5,6,7,8	3,12,19,25,28,31,34,38,45

*Section 2: up to equation 29.3 *Example 29.3 is replaced by problem 29.13 *Section 4: up to equation 29.14 *Section 5: up to equation 29.16 ** Section 1: Equation 30.7 only and without proof

+ Section 3: including Fig 32.2 and equation 32.6 ++ Section 7: up to Fig 33.14

Marks distribution;

1) Two mid term exams each 10 marks---------- =20 marks

2) Class activities and Attendance---------- =5 marks

3) Practical work (lab)---------- =25 marks

4) Final exam---------- = 50 marks

Total-------- = 100 marks