*Physics 104 course:* ( Electricity and Magnetism)

# Text book:

*Physics for Scientists and Engineers, Fourth edition, Raymond A. Serway, College Publishing*

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***COURSE SYLLABUS:***

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| **Chapter** | **Content** | **Sections** | **Examples** | **problems** |
| **23** | **Electric Field:**  **Coulomb’s Law, The Electric Field, Electric Field Lines, Motion of Charged Particles in a Uniform Electric Field.** | **3, 4, 6, 7** | **2, 3, 4, 7, 8, 13, 14** | **7, 9, 15, 19, 25, 47, 48** |
| **24** | **Gauss’s Law:**  **Electric Flux, Gauss’s Law, and Application of Gauss’s Law to Various Charge Distributions, Conductors in Electrostatic Equilibrium.** | **1 ,2, 3, 4** | **1, 4, 5, 6, 7, 8** | **1, 11, 15, 24, 37, 41** |
| **25** | **Electric Potential:**  **Potential Difference and Electric Potential, Potential Differences in a Uniform Electric Field, Electric Potential and Potential Energy Due to point Charges.** | **1, 2, 3** | **2, 3, 5** | **3, 13, 23, 24, 27, 29** |
| **26** | **Capacitance and Dielectrics: Definition of Capacitance, Calculating Capacitance, Combinations of Capacitors, Energy Stored in a Charged Capacitor, and Capacitors with Dielectrics.** | **1, 2, 3, 4, 5** | **1, 4, 5, 6, 7** | **10, 15, 29, 31, 49, 61, 68** |
| **27** | **Current and Resistance:**  **Electric Current, Resistance, Resistance and Temperature, Electric Power.** | **1, 2, 3, 6** | **1, 3, 4, 6, 9, 10, 11** | **21, 22, 25, 32, 35, 49, 53, 57** |
| **28** | **Direct Current Circuits:**  **Electromotive Force, Resistors in Series and Parallel, Kirchoff’s Rules,**  **RC Circuits.** | **1, 2 ,3** | **1, 3, 4, 7, 8, 9** | **6, 12, 19, 21, 31, 32, 36, 40** |
| **29\*** | **Magnetic Field:**  **Magnetic Fields and Forces, Magnetic Force Acting on a Current-Carrying Conductor, Motion of a Charged Particle in a Uniform Magnetic Field, Applications Involving Charged Particle Moving in a Magnetic Field.**  **[\*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]** | **1, 2, 4, 5** | **1, 2, 4, 5** | **5, 9, 14, 29, 35, 39** |
| **30\*\*** | **Sources of the Magnetic Field:**  **The Biot-Savart Law, The Magnetic Force Between Two Parallel Conductors, Ampère’s Law, The Magnetic Field of a Solenoid, Magnetic Flux, Gauss’s Law in Magnetism.**  **[\*\* Section 1: Equation 30.7 only and without proof ]** | **1, 2, 3, 4, 6, 7** | **4, 8** | **19, 21, 24, 37, 38, 62, 63, 64** |
| **31** | **Faraday’s Law:**  **Faraday’s Law of Induction, Motional emf. Induced emf and Electric Fields.** | **1, 2** | **1, 2, 6** | **2, 5, 11, 18, 21** |
| **32+** | **Inductance:**  **Self Inductance, RL Circuits, Energy in a Magnetic field, Mutual Inductance. [Section 3: including Fig 32.2 and equation 32.6]** | **1, 3** | **1, 2** | **7, 9, 16, 32, 33, 38, 69** |
| **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.**  **[Section 7: up to Fig 33.14]** | **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**

**Distribution marks**

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

2) Class activities and Attendanc                     = 5 marks

3) Practical work (lab)                                      = 25 marks

 4) Final exam                                                  = 50 marks

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