

Course Information

Course Description:

PHYS104 aims to give an introduction to some core topics in electromagnetism through lectures, laboratories, reading and homework assignments. The key objectives of the course include a full understanding of the basis of electricity and magnetism, as well as developing problem-solving skills and communication skills.

Required Material:

“Physics for Scientists and Engineers” by Serway and Jewett (6th edition)

Course Website:

We will be using *Blackboard* for our course website.

Instructor:

Dr. Nadyah Alanazi

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Office Hours: ...

Notes:

- *Physics is best learned by attempting to solve problems.* This will help you become familiar with the concepts and comfortable with the mathematical techniques required.
- You may need to take notes during the lectures to help you study and understand the topics better.

Final Course Grade:

Your score will be calculated the following way:

Midterm I: 15%

Midterm II: 15%

Lab: 30%

Final Exam: 40%

Materials to be Covered:

Chapter	Sections	Examples	Problems
23. Electric Field	23.1 Properties of Electric Charges 23.3 Coulomb's Law 23.4 The Electric Field 23.6 Electric Field Lines 23.7 Motion of Charged Particles in a Uniform Electric Field	1, 2, 3, 5, 10, 11	4, 7, 10, 14, 20, 21, 42, 45, 46
24. Gauss's Law	24.1 Electric Flux 24.2 Gauss's Law 24.3 Application of Gauss's Law to Various Charge Distributions 24.4 Conductors in Electrostatic Equilibrium	2, 3, 4, 5, 6, 7, 8	3, 4, 9, 11, 21, 24, 31, 35, 37, 40, 42
25. Electric Potential	25.1 Potential Difference and Electric Potential 25.1 Potential Differences in a Uniform Electric Field 25.3 Electric Potential and Potential Energy due to Point Charges	1, 2, 3	2, 3, 6, 16, 17, 20
26. Capacitance and Dielectrics	26.1 Definition of Capacitance 26.2 Calculating Capacitance 26.3 Combinations of Capacitors 26.4 Energy Stored in a Charged Capacitor 24.5 Capacitors with Dielectrics	1, 4, 6, 7	1, 7, 9, 18, 21, 31, 36, 47, 54
27. Current and Resistance	27.1 Electric Current 27.2 Resistance 27.4 Resistance and Temperature 27.6 Electric Power	1, 2, 3, 6, 7, 8	1, 11, 12, 15, 16, 22, 32, 33, 36, 49, 56

Materials to be Covered (continue):

Chapter	Sections	Examples	Problems
28. Direct Current Circuits	28.1 Electromotive Force 28.2 Resistors in Series and Parallel 28.3 Kirchhoff's Rules	1, 4, 6, 8, 10	2,6,8,9,15, 20, 21, 36, 40
29. Magnetic Fields	29.1 Magnetic Fields and Forces 29.2 Magnetic Force Acting on a Current-Carrying Conductor 29.4 Motion of a Charged Particle in a Uniform Magnetic Field 29.5 Applications Involving Charged Particles Moving in a Magnetic Field	1, 6, 7	7, 9, 12, 14, 30, 37, 41
30. Sources of Magnetic Field	30.1 The Biot-Savart Law 30.2 The Magnetic Force Between Two Parallel Conductors 30.3 Ampere's Law 30.4 The Magnetic Field of a Solenoid 30.5 Magnetic Flux 30.6 Gauss's Law in Magnetism	4, 8	4, 16, 17, 31, 35, 63
31. Faraday's Law	31.1 Faraday's Law of Induction 31.2 Motional emf	1,5	2, 5, 13, 20
32. Induction	32.1 Self-Inductance 32.3 Energy in a Magnetic Field 32.4 Mutual Inductance	1, 2	6, 7, 9, 16, 29, 30, 31, 37
33. Alternating Current Circuits AC	33.1 AC Sources 33.2 Resistors in an AC Circuit 33.3 Inductors in an AC Circuit 33.4 Capacitors in an AC Circuit 33.5 The RLC Series Circuit 33.6 Power in an AC Circuit 33.7 Resonance in a Series RLC Circuit	1, 5, 6, 7	3, 10, 17, 21, 22, 26, 32, 33, 37