

Course Title	Physics for Engineers	Course Code	NS1002
Department	Department of Electrical Engineering (DEE)	Campus	Lahore
Knowledge Profile	Natural Sciences (WK1)	Credit Hrs.	3+1
Knowledge Area	Interdisciplinary Engineering (KA09)	Grading Scheme	Relative
HEC Knowledge Area	Natural Sciences	Applicable From	Spring 2023
Pre-requisite(s)	-		

Course Objective	To introduce the concepts of Waves & Oscillations and Electricity & Magnetism to enhance the understanding of other subsequent engineering courses.
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No.	Assigned Program Learning Outcome (PLO)
1	An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2	An ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

A = Assignment, Q = Quiz, M = Midterm, F=Final

No.	Course Learning Outcome (CLO) Statements	Assessment Tools	Taxonomy Levels	PLO
1	Demonstrate characterization of oscillations and waves for situations described schematically and verbally	A1, Q1, M1	C3	1
2	Apply Laws of electrostatics for a given charge distribution to find important properties of the electric field.	A2, Q2, M2, M2, F	C3	2
3	Explain the interactions between electric and magnetic fields involving current carrying conductors and sources of emf.	A3, Q3, F	C2	2

Text Book	Title	Fundamentals of Physics (Extended 10th Edition)
	Author	David Halliday, Jearl Walker, and Robert Resnick
	Publisher	© 2013 by John Wiley & Sons Inc.
Ref. Book(s)	Title	Physics for Scientists and Engineers with Modern Physics (6th Edition)
	Author	Raymond A. Serway & John W. Jewett
	Publisher	Cengage
	Title	Physics for Scientists and Engineers – A Strategic Approach with Modern Physics
	Author	Rendall D. Knight
	Publisher	Pearson 4 th Edition

Week	Course Contents/Topics	Chapter*	CLO
1	Simple Harmonic Motion, the Force Law for SHM, Angular SHM, Simple Pendulum	15	1
2	Damped SHM, Circular Motion & SHM, Energy in SHM and Conservation	15	1
3	Types of Waves, Sinusoidal Waves, Wavelength and Frequency, Speed of Wave	16	1
4	Principle of Superposition of Waves & Interference, Sound Waves, Doppler's Effect	16	1
5	Electric Charge & Properties, Electrostatic Force, Coulomb's Law, Electric Field, Induction, Electric Field Due to Point Charge, Due to Electric Dipole,	21, 22	2
6	Gauss' Law, Flux, Flux of Electric Field, Gauss's Law, Equivalency of Gauss's Law and Coulombs' Law	23	2
7	Applications: Cylindrical Symmetry, Planar Symmetry, Spherical Symmetry	23	2
8	Electric Potential and Energy, Potential from Field, Electric Potential from Point Charge	24	2
9	Capacitance, Parallel Plate, Cylindrical & Spherical Capacitors, Capacitors in Parallel and in Series, Capacitors in Dielectrics	25	2
10	Electric Current, Current Density and Drift Speed, Resistance & Resistivity and Variation with Temperature, Ohm's Law, Basic Circuit	26	2
11	Magnetic Fields and Field Lines, Crossed Fields: Hall Effect, Circulating Charge Particles, Magnetic Force on Current Carrying Wire	28	3
12	Magnetic Field Due to Current, Ampere's Law, Magnetic Field Inside/Outside Wire, Solenoids and Toroids	29	3
13	Faraday's law of Induction, Lenz's law	30	3
14	Induction and Energy Transfers, Induced Electric Fields, Reformulation of Faraday's Law	30	3

* Chapters from the textbook

Assessment Tools	Weightage
Quizzes (3), Assignments (3)	20.0%
Midterms	30.0%
Final Exam	50.0%