NL1002 - PHYSICS FOR ENGINEERS LAB

NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES, FAST-NU

Course Title	Physics Lab for Engineers	**Course Code**	NL1002
Department	Department of Electrical Engineering (DEE)	**Campus**	Lahore
Knowledge Profile	Research Literature (WK8)	**Credit Hrs.**	1
Knowledge Area	Interdisciplinary Engineering (KA09)	**Grading Scheme**	Relative
HEC Knowledge Area	Natural Sciences	**Applicable From**	Fall 2023
Pre-requisite(s)	-		

Course Objective	To implement the concepts of Physics through different experiments.

No.	Assigned Program Learning Outcome (PLO)
4	An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
5	An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.
9	An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

CP = Class Participation, LW= Lab Work, F(W)= Final Exam (Written), F(P)= Final Exam (Practical), Q = Quiz

No.	Lab Learning Outcome (LLO) Statements	Assessment Tools	Taxonomy Levels	PLO
1	Display active individual / team work and high ethical standards.	CP1-CP14	A5	9
2	Practice experiments under supervision to acquire the required data/results using modern tools.	LW1-LW14	P3	5
3	Apply the knowledge of subject in the lab environment.	F(W), Q1	C3	4
4	Perform experiments individually without supervision.	F(P), Q2	P5	4

Text Book(s)	**Title**	Physics Lab Manual
	Author	PASCO
	Publisher	PASCO Scientific USA
Ref. Book(s)	**Title**	Fundamentals of Physics Extended 11th Edition
	Author	Halliday & Resnick
	Publisher	Wiley

Week	Course Contents/Topics of Experiments	LLO
1	To discover the relationship of centripetal force with mass, velocity and radial distance to study simple harmonic motion as circular motion.	1,2
2	To find the spring constant for several springs (Hooke's Law).	1,2
3	To calculate the period of oscillations from a plot of the angular displacement versus time from a torsional pendulum	1,2
4	To explore the dependence of the period of a simple pendulum on the acceleration due to gravity.	1,2
5	To calculate the ratio of specific heat by using the period of oscillations.	1,2
6	To find the coefficients of static and kinetic frictions for different surfaces.	1,2
7	To find the rotational inertia of a ring and a disc.	1,2
8	To verify the inverse-square relationship of Coulomb's law and find the value of Coulomb's constant from Coulomb's torsional balance.	1,2
9	To calculate the charge on an electron with Millikan's oil drop experiment.	1,2
10	Determine the role of resistors and capacitors and their time constants in electronic circuits and verify Ohm's law.	1,2
11	To calculate the equivalent capacitance in series and in parallel combination of capacitors.	1,2
12	To investigate the magnetic force of a current carrying wire by the effect of current, length of the conductor, and magnetic field on the magnetic force.	1,2
13	To calculate induced EMF in a circuit by Faraday's law of induction.	1,2
14	To plot the magnetic fields of different coils (single, double, solenoid) versus position.	1,2

Assessment Tools	Weightage
Class Participation (CP)	10.0%
Lab Work (LW)	40.0%
Quiz	20.0%
Lab Final (Practical)	20.0%
Lab Final (Written)	10.0%