

Course Number and Title:	NS-115 Applied Physics		
Credit Hours:	3+0		
Pre Requisite	It will be assumed that the student has taken physics and mathematics at the F.Sc level, i.e. the 12th year of schooling		
Instructor (s):	Dr Malik Sajjad Mehmood		
Lab Engineer:	N/A		
Compulsory/Elective:	Compulsory		
If Elective:Depth Core/Breadth Core:			
Course Schedule:	Lecture:	3 hours/week	
	Lab:	N/A	
	Office hours:	4 hours/week	
Course Assessment:	Assignments/Course project:	4	
	Quizzes:	4	
	Lab work:	N/A	
	Exams:	Mid-semester and Final	
Grading Policy:	Quizzes:	10%	
	Assignments/ Course project:	10%	
	Lab work:	00%	
	Mid-Semester:	20%	
	End-Semester:	60%	
Text Book:	“College Physics” by Halliday, Resnick, and Krane (5 <sup>th</sup> edition).		
Reference Book(s):	“University Physics” by Young and Freedman		
Course Objective:	This course aims at providing the student a good understanding of physics concepts related to their core engineering domain at the elementary level.		
Course Learning Outcome	CLO Statement	PLO	Bloom
CLO-1:	Knowledge about the vector calculus and the fundamental laws of physics to understand Electrostatics	PLO-1	C1 C2
CLO-2:	Problem formulation and analysis of electromagnetic fields in the region surrounded by different static and moving charge configurations	PLO-2	C3 C4
Topics covered in the course and level of coverage:	❖ Fundamental of Physics, Vector and Scalars Physical quantities	3 hours	
	❖ Coulombs law and electric field intensity, Gauss’s Law	3 hours	
	❖ Energy and potential and Electric Current and Ohm’s Law	3 hours	
	Energy and potential, Electric Current and Ohm’s Law	3 hours	
	❖ Capacitors, Capacitance, Capacitors with Dielectric, RC circuits	6 hours	
	❖ Magneto-static fields	6 hours	
	❖ Magneto-static fields and materials, inductance calculation	6 hours	
	❖ LC, AC Circuits Fundamentals	6 hours	
	❖ Transformer	6 hours	
	❖ Conductions in solids, conductors, insulator, PN Junction, photodiode, optical sensors	6 hours	
Program learning outcomes	Detailed Contents	CLO	PLO

and how they are covered by specific course outcomes:	❖ Vectors Fundamentals , Coulombs law and electric field intensity	CLO-1	PLO-1
	❖ Electric field due to different charge distributions	CLO-1	PLO-1
	❖ Electric field arising from an infinite line, ring, disk of charge with examples	CLO-1	PLO-1
	❖ Gauss's law	CLO-1	PLO-1
	❖ Work done, Potential difference and absolute potential	CLO-1	PLO-1
	❖ Potential field due to different charge distributions	CLO-1	PLO-2
	❖ Potential gradient, Energy density	CLO-1	PLO-1
	❖ Current, OHM's law, Resistance in series and Parallel, Semi conductors, Semiconductor diodes, diodes in series and parallel	CLO-1	PLO-1
	❖ Capacitance calculation for parallel plate, cylindrical, and spherical capacitors	CLO-2	PLO-2
	❖ Polarization of dielectric materials	CLO-2	PLO-2
	❖ RC Circuits	CLO-2	PLO-2
	❖ Biot-Savart and Ampere's circuital laws	CLO-1	PLO-1
	❖ Magnetic flux density, Scalar and vector magnetic potentials	CLO-1	PLO-1
	❖ Steady magnetic field laws	CLO-2	PLO-2
	❖ Forces and torques on current carrying conductors	CLO-1	PLO-1
	❖ Magnetic circuit, Potential energy and forces on magnetic materials	CLO-2	PLO-2
	❖ Inductance and mutual inductance	CLO-2	PLO-2
	❖ Faraday's law and displacement current	CLO-2	PLO-2
	❖ LC Circuit	CLO-2	PLO-2
	❖ AC Circuits	CLO-2	PLO-2
❖ Transformer	CLO-2	PLO-2	
❖ Conduction in solids	CLO-1	PLO-1	
❖ Conductions in conductors and semi conductors	CLO-2	PLO-2	
❖ Photodiode, LED, Vector and Tunnel diode	CLO-2	PLO-2	

Mapping of CLOs with PLOs and Bloom's Taxonomy Cognitive Levels:

PLO	1	2	3	4	5	6	7	8	9	10	11	12
CLO-1	C1 C2											
CLO-2		C3 C4										

Mapping of CLOs with Assessment Methods:

CLOs/Assessment	CLO-1	CLO-2
Assignments:	√	√
Quizzes:	√	√
Lab work:		
Mid-Semester:	√	√
End-Semester:	√	√