

**Department of Science Education
Institute of Education & Research
University of the Punjab, Lahore
Course Outline**



Programme	BS Science Education (1-8)	Course Code	SE- 312AL	Credit Hours	1
Course Title	Physics Lab. IV (Electricity and Magnetism)				
Course Introduction					
Physics Lab-IV focuses on providing hands-on experience in experimental physics, specifically in the domains of electricity and magnetism,					
Learning Outcomes					
By the end of this course, students will be able to:					
1. Accurately calibrate and utilize measurement instruments like ammeters, voltmeters, and potentiometers. 2. Analyze and interpret data from experiments involving magnetic and electric fields. 3. Measure and compute parameters such as inductance, capacitance, and resistance with precision. 4. Develop critical thinking and problem-solving skills through experimental design and analysis. 5. Correlate theoretical physics concepts with experimental observations effectively.					
Course Content				Assignments/Readings	
Week 1 & 2	Calibration of an ammeter and a voltmeter using a potentiometer.			Practical Copy Preparation	
Week 3	Determination of charge sensitivity of a ballistic galvanometer and comparison of capacitances using the ballistic galvanometer.			Practical Preparation	Copy
Week 4	To study the B.H. curve and measure the magnetic parameters			Practical Preparation	Copy
Week 5	Measurement of low resistance of a coil by a Carey Foster Bridge			Practical Preparation	Copy
Week 6	Study of the parameter of wave i.e. amplitude, phase and time period of a complex signal by CRO			Practical Preparation	Copy
Week 7	Measurement of self and mutual inductance			Practical Preparation	Copy
Week 8	To study the network theorems (Superposition, Thevinin, Norton)			Practical Copy Preparation	
Week 9	To study the application of Lorentz force by CRO (e/m by J. J. Thomson method),			Practical Preparation	Copy
Week 10	Determination of temperature coefficient of resistance of a given wire			Practical Preparation	Copy

Week 11	Determination of Stefan's constant	Practical Preparation	Copy
Week 12	Calibration of thermocouple by potentiometer	Practical Preparation	Copy
Week 13	Electric fields and potential in the plate capacitors	Practical Preparation	Copy
Week 14	Magnetic field outside a straight conductor	Practical Preparation	Copy
Week 15	Magnetic field of a pair of coils in the Helmholtz configuration	Practical Preparation	Copy
Week 16	To study the Acceptor and Rejecter circuits.	Practical Preparation	Copy
Textbooks and Reading Material			
1. Physics Laboratory Experiments by J. D. Wilson, Cengage Learning (2014). 2. General Physics Laboratory I Experiments by K. Clara Castoldi, Kendall Hunt (2015). 3. Physics Lab Experiments by M. French, Mercury Learning & Information (2016). 4. Experiments and Demonstrations in Physics: Bar-Ilan Physics Laboratory by Kraftmakher Yaakov, World Scientific (2014).			
Teaching Learning Strategies			
1. Lectures, interactive discussions, and problem-solving sessions. 2. Laboratory experiments for practical understanding.			
Assignments: Types and Number with Calendar			
1. Assignment 1: Calibration and Measurement Techniques Submission Deadline: Week 3 2. Description: Perform calibration of ammeters and voltmeters using potentiometers and submit a detailed report. 3. Assignment 2: Analysis of Magnetic and Electric Fields Submission Deadline: Week 6 4. Description: Conduct experiments on the B-H curve and electric field potentials; provide data analysis and observations. 5. Assignment 3: Network Theorems and Circuit Analysis Submission Deadline: Week 9 6. Description: Validate network theorems using experimental data; submit findings with theoretical comparisons. 7. Assignment 4: Thermodynamic Measurements 8. Submission Deadline: Week 12 9. Description: Determine Stefan's constant and temperature coefficient of resistance; provide a detailed experimental report.			