

**Tribhuvan University**  
**Institute of Science and Technology**  
**Physics**

**Course Title:** Physics Laboratory  
**Course Code:** PHY102  
**Nature of Course:** Practical

**Year:** I  
**Full Marks:** 50  
**Pass Marks:** 20  
**Duration:** 180 hrs

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**Course Description:**

Physics Laboratory (General) Practical course consists of three sections: (a) Mechanical Experiments, (b) Heat & Thermodynamics Experiments, and (c) Electricity & Magnetism Experiments. Students have to perform at least 15 experiments in 180 working hours. Students are required to perform 3 hours laboratory work twice in a week. Students should complete at least 20 experiments in the first year. Students need to write a laboratory report on each experiment they perform and get them duly checked and signed by the concerned teacher. They should write their reports in a separate sheet, and to keep them neat and properly filed.

**Course Objectives:**

1. To provide students with skill and knowledge in the experimental methods.
2. To make them able to apply knowledge to practical applications.
3. To make them capable of presenting their results/conclusions in a logical order.

**B.Sc. First Year Lab Works**

**[180]**

1. To determine the value of acceleration due to gravity by using Bar Pendulum.
2. To determine the value of acceleration due to gravity by using Kater's pendulum.
3. Perform the experiment 1 and 2 and compile a dataset of acceleration due to gravity of your laboratory in a single set. Show the histogram and calculate the standard deviation and standard error. Interpret the result.
4. To determine the moment of inertia of a flywheel.
5. To determine the angular acceleration of a flywheel.
6. To determine the radius of gyration by of Bar Pendulum.
7. To determine the Young's modulus of the material by bending beam method.
8. To determine of modulus of rigidity of wire by Maxwell's vibration needle.

9. To study the conservation of momentum using Newton's Cradle.
10. To determine the surface tension of liquid by Jaeger's method.
11. To determine the coefficient of viscosity of water by Poiseuille's method.
12. To find the co-efficient of thermal conductivity of a bad conductor by Lee's method.
13. To find the co-efficient of thermal conductivity of insulating material (such as porcelain, wood, or Styrofoam) using Thermocouples and a Fluke 52 digital thermometer.
14. To determine the mechanical equivalent of heat by Callender and Barne's constant flow method.
15. To determine the sensitivity and constant of Ballistic galvanometer.
16. To determine the capacitance by Ballistic galvanometer.
17. To determine the high resistance by the method of leakage.
18. To determine the low resistance by Carey Foster bridge.
19. To determine the magnetic field using search coil.
20. To determine the impedance of LCR series circuit.
21. To determine the time constant for RL, RC and LCR circuit.
22. To determine the efficiency of an electric kettle (or heating element) under varying input voltages.
23. To determine the capacitance of a capacitor by ac bridge (de-Sauty's method).
24. To determine the inductance of an inductor by Maxwell inductance-capacitance bridge.
25. To determine the coefficient of mutual inductance of two coils.

#### **Text Books:**

1. *Arora C. L. - B.Sc. Practical Physics*, S. Chand and Company Ltd. (2010)
2. *Squires G. L. - Practical Physics*, Cambridge University Press (1999)

#### **Evaluation Scheme:**

1. Student must perform three hours laboratory work twice a week to complete PHY102 lab works.
2. PHY102 will be examined for the duration of six hours in two different three hours sessions.
3. The practical exam will be graded on the basis of the following marking scheme:

Record file:	20%	Experiment:	50%
Error Analysis:	10%	Viva:	20%