Sule Lamido University, Kafin Hausa
Faculty of Natural and Applied Sciences
Department of Physics
2019/2020 Second Semester

Course Title: Basic experimental physics II **Course Code:** PHY 118 **Credit Unit:** 1

Course Staff:

Lecturer: Abdulhamid Abdullahi Magama, Musbahu Ja'afar Yusuf & Aliyu Yahaya

Room Number: A10 & B12

Laboratory Instructor: Mal.

Course Prerequisites: O - Level

Lecture Period: Wednesday, 2:00 pm – 5:00 pm.

Lecture Venue: Physics Laboratories

Reference Texts:

1. **Comprehensive practical physics,** 2009, Macmillan, Nigeria publishers Limited, ***by O.O. Okunola.***
2. **Master Alternative to practical physics,** IEC publication bereau, ISBN: 978-978-901-307-4, ***by Phyl, Awele Uche & Chris, Uche Ugenyi.***
3. **Practical physics** 4th ed, 2010, ISBN-13: 978-0521779401, by G. L. Squires.
4. Methods of experimental physics, 2015, CRC Press Taylor and Francis group, ***by M. I. Pergament.***
5. **Experimental Physics: Modern methods,** Oxford University Press, ISBN: 0195049497, ***by R.A. Dunlap and Richard A. Dunlap.***
6. **An introduction to experimental physics,** 1996, UCL Press, ISBN: 0-203-98362-9, ***by Colin Cooke.***
7. **The art of experimental physics,** Willey, 1991, digitized 2010, ISBN: 0471847488, ***by Daryl W. Preston and Eric R. Dietz.***
8. **EXPERIMENTAL PHYSICS: Methods and Apparatus,** 1969, Consultant Bureau, New York, ISBN: 978-1-4684-0673-3, by D.V. Skobel'tsyn.

Lecture Notes: Lecture guides (Experimental Manual) will be given to the class representative at the beginning of the semester.

Course Objectives:

The objectives of the course are as follows:

1. To determine the e.m.f and internal resistance of a cell using an ammeter and voltmeter.
2. To determine the potential difference across a potentiometer.
3. To determine an unknown resistance using a wheatstone bridge.
4. To determine the lateral displacement of a rectangular block.
5. To determine the angle of minimum deviation and refractive index of a glass prism.
6. To investigate the law of reflection using plane mirror.
7. To determine the mass per unit length of the sonometer wire.
8. To determine the focal length of convex lens by displacement method.

Measurement of Course Outcome:

At the end of the course lectures, a student will be able to:

1. Understand the practical application and concept of E.M.F, internal resistance, Potential difference and resistance.
2. Define and state Snell's law and hence, understand the practical application of light, minimum deviation, refractive index and law of reflection using both glass prisms and mirror.
3. Define and explain the velocity of sound and hence, understand the practical application of sound within a medium.
4. Define and differentiate the working principle of convex and concave lenses.

Course Grading:

1. Attendance: **10%**
2. Continuous Assessment Tests: **40%**
3. Final Examination: **50%**

General Information:

1. Students must attend a minimum of 75% of the total lecture hours in order to be eligible to write the final exam. Students should notify the course staff of any intended absence from a lecture or laboratory at least a day prior to such laboratory. In a situation where the student is ill, an official documentation should be obtained from the university clinic.
2. The continuous assessment tests will be conducted in the weeks five and ten of the semester; thereafter, lecture commence for the week.
3. The final examination timetable will be as scheduled by the Faculty. Students are expected to liaise with the Sub-dean of the faculty to make sure that there are no clashes on their examination schedule.
4. Students are encouraged to meet with course staff to sort out any administrative and academic issues they may have relating to the course before sitting.
5. Any complain prior to the condition mentioned above, will not be entertained after the examination.

Lecture Schedule

Lect. No.	Date	Topic
1	Week 1	Revision of basic O-level electricity, sound and light practical and general overview of the course.
2	Week 2	Measurement of e.m.f and internal resistance of a cell using an ammeter and voltmeter.
3	Week 3	Determination of p.d across a potentiometer.
4	Week 4	Measurement of unknown resistance using a wheatstone bridge.
5	Week 5	**Test 1**
6	Week 6	Lateral displacement of a rectangular block.
7	Week 7	Refractive index of triangular glass prism.
8	Week 8	Investigation of law of reflection using plane mirror.
9	Week 9	Determination of sound in air using resonance tube.
10	Week 10	**Test 2**
11	Week 11	Displacement method for focal length.
12	Week 12	Solution to test 1&2
13	Week 13	General Course Revision

Problem Sets

P.S No.	Topic	Date Assigned	Duration
1.	From the experiment (week 2), Tabulate your result, plot a graph of *V(v)* and *I(A)*, measure the intercept on the ***V*** axis and calculate the slope **m** of the line. Compare ***E*** and the internal resistance of the cell deducted from the graph with the theoretical value.	Week 3	1 Week
2	From the experiment (week 3) determine the unknown resistance (R) using the general wheatstone bridge relation.	Week 4	1 week
3	From the experiment (week 4) tabulate your findings, plot a graph of ***d (cm)*** against ***i*** $(^{o})$. Draw a smooth curve through the point. From the graph determine the value of **d,** when ***i*** = 90^{o}, Explain why refraction occurs at the boundary between two media.	Week 5	1 Week
4	From the experiment (week 7) tabulate your findings, plot a graph of $\boldsymbol{e}^{o}$ against $\boldsymbol{i}^{o}$, plot a graph of $\boldsymbol{D}^{o}$ against $\boldsymbol{i}^{o}$.	Week 8	1 week
5	From the experiment (week 9), what are the characteristics of sound wave? On what factor do the velocity of sound in a material depend? What is resonance? Give three examples of it in sound and mechanics respectively.	Week 10	1 week