



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

Course Title: Electricity, Magnetism and Modern Physics **Course Code:** PHY 132 **Credit Unit:** 3

Course Staff:

Lecturer: Abdullahi Mikailu, Abdulhamid Abdullahi Magama & Lawan Musa Yelwa

Room Number: A5, A10 & B12

Laboratory Instructor: Mal.

Course Prerequisites: O - Level

Lecture Period: Monday, 09:00 am – 11:00 am & Thursday, 2:00 pm – 4:00 pm

Lecture Venue: Monday@ Hall C, Lecture Room 3 & Lecture Room 4 &
Thursday@ Hall C, Lecture Room 5 & Lecture Room 6

Reference Texts:

1. **Electricity, Magnetism and Modern physics**, 2007, by *M. M. Kashimbila*.
2. **Physics**, 5th Ed, 2002, Wiley. ISBN 978-0-471-40194-0, by *Krane, Kenneth; Halliday, David; Resnick, Robert*.
3. **Electricity and Magnetism**, McGraw-Hill, 1985. ISBN 0-07-004908-4, by *Purcell, Edward Mills*.
4. **Electricity, Magnetism and Light**, Academic press, 2002. ISBN 0-12-619455-6, by *Saslow and Wayne M*.
5. **Physics for Scientist and Engineers** 6th Ed, 2007, W.H. Freeman. ISBN 978-1-4292-0133-9, by *Tipler, Paul; Mosca, Gene*.

Lecture Notes: Lecture guides will be given to the class representative at least a day before each lecture.

Course Objectives:

The objectives of the course are as follows:

1. To apply the basic concept of Coulomb's law, the electric field; electric potential, capacitors, dielectrics, and the electric circuit.
2. To determine the basic principle of Magnetic effects of currents: The current balance measurement of the elm rations mass spectrograph and isotopes.

3. To apply the basic concept of Electromagnetic induction; the cyclotron chemical effects of electric current and magnetic properties of materials.
4. To define and state theory of magnetism, compare & contrast between A.C and D.C. generators, electric motor, Eddy currents, the transformer, alternating current circuit, radiation of EM-Waves (qualitatively).
5. To have an in depth study of full electromagnetic spectrum and its applications.

Measurement of Course Outcome:

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

1. Define, state and derive the expressions of Coulomb's law, the electric field; electric potential, capacitors, dielectrics, and the electric circuit.
2. define and derive expressions and understand the basic concept of the Magnetic effects of currents and Electromagnetic induction
3. describe and make calculations of Coulomb's law, the electric field; electric potential, capacitors, the electric circuit and alternating current circuit

Course Grading:

1. Assignments: **10%**
2. Continuous Assessment Tests: **30%**
3. Final Examination: **60%**

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 lecture or 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 six and eleven 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.

Lecture Schedule

Lect. No.	Date	Topic
1	Week 1	Revision of O-level electricity & magnetism, Course overview and early history of electric charge.
2	Week 2	Coulomb's law, the electric field and electric potential.
3	Week 3	Electric circuit and its applications
4	Week 4	Electromagnetic induction and the cyclotron chemical effects of electric current.
5	Week 5	Magnetic properties of materials and introduction to magnetism
6	Week 6	Test 1 and introductory part of the theory of magnetism
7	Week 7	Theory of magnetism: A.C and D.C. generators, electric motor and Eddy currents.
8	Week 8	The transformer and alternating current circuit
9	Week 9	Alternating current circuit cont'd. and radiation of EM waves
10	Week 10	Electromagnetic spectrum.
11	Week 11	Test 2 and solution of test 1&2
12	Week 12	Electromagnetic spectrum cont. and it applications
13	Week 13	General Course Revision

Problem Sets

P.S No.	Topic	Date Assigned	Duration
1	Coloumb's and Gauss Law problem set 1	Week 3	1 Week
2	Capacitance and dielectric Problem set 2	Week 4	1 week
3	Kirchoff's law, Lorentz force and Torque on a current loop.	Week 9	1 Week
4	Faraday's law of induction, AC & DC circuits, and inductance.	Week 10	1 week
5	Applications: LRC & R-C circuits and electromagnetic spectrum	Week 12	1 week