COURSE COMPACT OF PHY 121

Faculty: Faculty of Sciences
Department: Physics
Programme: B.Sc Physics
Course Code: PHY 121
Course Title: General Physics II **(Electricity, Magnetism and Modern Physics)**
Units: 3
Course Lecturer: **Dr. Ogungbemi K.**
Semester/Session: Second
Session: 2018/2019
Location: Lecture Room

A. Brief Overview of Course

Electrostatics; Methods of charging; Coulomb's law; Conductors, Insulators and Semiconductors; Currents; Conductivity; Dielectrics; Ohm's law and analysis of DC circuits; Electrical energy; Kirchhoff's laws; AC voltages applied to Inductors, Capacitors and Resistance; Magnetic fields and Electro-magnetic induction; Magnetic effect of current; Moving coil and ballistic galvanometers; Multi-meters; DC and AC motors and generators; Hysteresis; Power in AC circuits; Maxwell equations; Electromagnetic oscillations and waves; Gauss's theorem; Rectification;
Atomic and Nuclear Physics: Theory of atomic structure; Thompson, Rutherford and Bohr's theories; The hydrogen atom; Properties of nucleus; Natural radioactivity; wave particle duality of light; X- rays; Photo-electricity; Thermionic emission and Diode valve.

B. Course Objectives/Goals

At the end of this course, students are expected to:

- Have a good understanding of the concepts of static electricity and method of charging.
- Understand the concepts of current electricity.
- Define Ohm's law and the relationship between I, V and R
- Have a good understanding of basic DC circuits and its analysis
- Carry out simple calculation on Resistors in series and parallel
- Have a good understanding of the concepts of electro-magnetism and its applications
- Calculate inductance, Impedance in R-L-C series circuits
- Define of the electric field and magnetic fields.
- Why, we need to know something about the relationship between electric current

and magnetic fields.

- Predict the direction of the force on a moving charge or current carrying wire in a magnetic field by using the right-hand rule.
- Explain the relationship between electric current and magnetism.
- Describe and construct a simple electromagnet.
- Explain the concept of commutation as it relates to an electric motor.
- Explain how the concept of magnetic flux applies to generating electric current using Faraday's law of induction.
- Describe three ways to increase the current from an electric generator.
- Understand atomic structure and nucleus.
- Define radioactivity, half-life and Disintegration constant.
- Solve simple problems on radioactivity.

C. Methods of Lecture Delivery/Teaching Aids

- Lecture Delivery Methods
  - Interactive classroom session
  - Individual assignments
  - Lecture notes
- Teaching Aids
  - Multimedia projection

D. Course Outlines

- Modules & Details of Topics

Module I: Electricity

Week 1: Electrostatics; Methods of charging; Coulomb's law; Conductors, Insulators and Semiconductors; Currents; Conductivity; Dielectrics and simple problems on Coulomb's law.

Week 2: Ohm's law and analysis of DC circuits; DC circuit analysis; Kirchhoff's laws; and Electrical energy and simple problems.

Weeks 3 &4: Kirchhoff's laws; Capacitors and types of capacitors; Capacitor's connections, Energy stored in Capacitors, Uses of capacitors; Charging and Discharging of Capacitors. Simple calculations on capacitors

Home Work: Continuous Assessment I

Module II: Magnetism

Week 5: Magnetic fields and Electro-magnetic induction; Magnetic effect of current.

Week 6: Moving coil and ballistic galvanometers; Multi-meters; DC and AC motors and generators.

Weeks 7 & 8: Hysteresis; Power in AC circuits; Maxwell equations; Electromagnetic oscillations and waves; Gauss's theorem; Rectification.

Mid-Semester Test

Module III: Atomic and Nuclear Physics

Week 9: Atomic and Nuclear Physics: Theory of atomic structure; Thompson, Rutherford and Bohr's theories; The hydrogen atom; Properties of nucleus.

Week 10: Natural radioactivity.

Week 11: Wave particle duality of light; X- rays; Photo-electricity; Thermionic emission and Diode valve.

Week 12: Revision

E. Structure of the Programme /Method of Grading

- Continuous Assessment
  - Class test/Assignments/Attendance 20% Marks
  - Mid Semester test 10% Marks

- Examination 70% Marks

TOTAL **100%**

F. Ground Rules & Regulations

- 75% attendance is required to sit for the examination.
- Assignments must be submitted as at when due.
- Contributions to group discussion and class work are noted.

G. Ground Rules & Regulations

- 75% attendance is required to seat for the examination.
- Assignments must be submitted as at when due.
- Contributions to class discussion and class work are noted.

H. Recommended Texts Books

a. Fundamentals of Physics, 8th edition, by Halliday-Resnick-Walker.
b. College Physics, 9th edition, by Serway -Vuille.
c. Advance level Physics 10th edition by M. Nelkon and P. Parker