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

Course Title: Mechanics, Thermal Physics & Waves **Course Code:** PHY 131 **Credit Unit:**3

Course Staff

Lecturer: Abdullahi Mikailu, Lawan Musa Yalwa and A.A. Magama Room No.
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Laboratory Instructor: Mal. Musa Idriss

Course Prerequisites:
Lecture Period: Thursday 09:00 am – 12:00 pm

Lecture Venue: Hall C

Reference Texts:

1. Electromagnetic Field and Waves , 2nd ed, 1970, Freeman, *Lorrain and Corson*
2. Electromagnetic Field and Waves, National Broadcasting Comission, 2000, *Ikata Eghuanoye*
3. Theory and Problems of Electromagnetics, 2nd Ed, 2003, The McGraw-Hill, Joseph A. Edminister
4. Schaum's Theory and Problems of Vector Analysis (Outline Series and an introduction to Tensor Analysis) Paperback – 1959 by Murray R Spiegel
5. Engineering Electromagnetics, Williams H, 8th edition, Mc Graw Hill

Lecture Notes: Lecture guides will be given to the class representative at least a day before each lecture. The lecture guides are not for sale.

Course Objectives:
The objectives of the course are as follows:

1. to apply the principles of Coulombs Law and the Superposition Principle to electric fields in the Cartesian, cylindrical and spherical coordinate systems.
2. to determine the electric field intensity resulting from various configurations of charge distributions..
3. to determine the electric potential and its relation to electric field intensity
4. to have an in depth understanding of electric fields in dielectric and semiconducting materials.
5. to have an in depth study of electrostatic boundary-value problems by application of Poisson's and Laplace's equations.
6. To understand time-varying electromagnetic field as governed by Maxwell's equations.

7. An in depth understanding of plane wave reflection and transmission at the boundaries.
8. Basic understanding of AC Circuits

Measurement of Course Outcome:

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

1. formulate potential problems within electrostatics, magnetostatics and stationary current distributions in linear, isotropic media.
2. define and derive expressions for the energy both for the electrostatic and magnetostatic fields, and derive Poyntings theorem from Maxwells equations and interpret the terms in the theorem physically
3. describe and make calculations of

Course Grading:

1. Homework / Project:**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. Homework will be given in the form of problem sets. A total of five problem sets will be handed out, the last of which will be a class project.Solutionshave to be turned in by 12 midnight of submission date. Late submissions will be penalized.
3. The continuous assessment tests will be conducted in the weeks five and ten of the semester; thereafter, lecture commence for the week..
4. 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 theirexamination schedule.
5. Students are encouraged to meet with course staff to sort out any administrative and academic issues they may have relating to the course.
6. Students will be expected to fill out an online course assessment form,midway through the semester to get a feedback of what their lecture and laboratory experiences have been.
7. Students are encouraged to collaborate on assignments but every student must do the assignment on their own. It is important for student to note that cheatingor any kind of academic dishonesty will not be tolerated and will be met with harsh punishment by the university administration if discovered (Please refer to student handbook).

Lecture Schedule

Lect. No.	Date	Topic
1	Week 1	Space and Time
2	Week 2	Units, Measurements and Dimension Analysis
3	Week 3	Linear Motion
4	Week 4	Newton's Laws
5	Week 5	Work, Energy and Power
6	Week 6	Elasticity; Hooke's Law, Young's shear and Bulk moduli,
7	Week 7	Buoyancy and Archimedes' Principles
8	Week 8	Surface tension; adhesion, cohesion, capillarity, drops and bubbles
9	Week 9	Temperature, Heat and gas laws
10	Week 10	Laws of Thermodynamics
11	Week 11	Kinetic theory of gasses
12	Week 12	Sound and its Applications
13	Week 13	General Course Revision

Problem Sets

P.S No.	Topic	Date Assigned	Duration
1	Vector Calculus	**Week 2**	**1 Week**
2	Divergence and Divergence theorem	Week 3	1 week
2	Maxwell's Equations and Boundary Conditions	Week 8	1 Week
4	Dielectrics and Electromagnetic Materials	Week 9	1 week
5	A.C Circuits	Week 10	1 week