THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Physics

PHY 305 - Introduction to Use of Computers in Natural Resources

COURSE PARTICULARS

Course Code: PHY 204
Course Title: Waves and Optics
No. of Units: 3
Course Duration: Two hour of theory and one hour of tutorial per week for 15 weeks.
Status: Compulsory
Course Email Address: PHY204@gmail.com
Course Webpage: http://www.fwt.futa.edu.ng/courseschedule.php?coursecode=FWT%20204
Prerequisite: PHY 101, PHY 102

COURSE INSTRUCTORS

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And

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COURSE DESCRIPTION

This course introduces the concept of classical wave theory and optics. It covers the basis of waves including phenomena like acoustic waves, harmonic and damp oscillatory systems. It also covers diffractions of electromagnetic waves and their applications.

COURSE OBJECTIVE

The objectives of this course are to:

- introduce students to applied wave mechanics and optics
- provide students with opportunities to develop basic advanced physics skills necessary for solving real life problems involving waves and optics.

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:
(Knowledge based)

- understand the purpose and use of mathematical tools relating to wave and optics;
- understand the difference between wave equation of motion and the Newtonian mechanics ;
- understand the working principle of optical systems;

(Skills)

- be able to design optical instruments

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Attendance	5%
Assignments	5%
Test(s)	30%
Final Examination	60%
TOTAL	**100%**

GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with any of the instructors, indicating the reason for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

Assignments and Group Work: Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn you zero for that assignment. Only

under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, *etc*.) during lectures. Food and drinks are not permitted in the laboratories.

READING LIST

[1] French, A. P. *Vibrations and Waves*. New York, N.Y.: W.W. Norton & Company, January 1, 1971.

[1] J. Peatross and M. Ware, *Physics of Light and Optics*, 2011c edition.

Legend
1- Available as Personal Collection

COURSE OUTLINE

Week	Topic	Remarks
1	Mechanical vibrations and waves	During this first class, the expectation of the students from the course will also be documented.
2 & 3	Simple harmonic motion • Normal modes • Forced vibrations • Resonance	Tutorial session will be introduced.
4 & 5	Coupled oscillations • Driven coupled oscillators	
6	Energy in wave motion • Longitudinal wave • Standing wave • Superposition of wave	
7 & 8	Group and phase velocity • Doppler effect	MID-SEMESTER TEST
9 & 10	Physical Optics • Spherical waves • Electromagnetic spectrum • Interference	

11 & 12	Young double slit experiment Diffraction phenomena • Frannhofer diffraction • Crystal diffraction • Polarization of waves • holography	
13 & 14	Dispersion and scattering of light rays Image in plane and curves mirrors • Mirror formula • Optical lenses • Spectrum of light	
15	REVISION	This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students' expectations for the course have been met.