UNIVERSITY OF LAMPUNG
FACULTY OF TEACHER TRAINING AND EDUCATION
Department of Physics Education
Jl. Prof. Dr. Soemantri Brodjonegoro No. 1 Bandar Lampung 35145

MODULE HANDBOOK

Bachelor in Physics education

Module name	Fundamentals of Waves and Electrodynamics
Module level	Undergraduate
Code	KFI620104
Courses	Fundamentals of Waves and Electrodynamics
Description	This course is a prerequisite for the Expertise group of the study programme. After attending this lecture, students are expected to be able to explain the basic knowledge of vibrations and waves, electricity, magnetism, and be able to develop and apply them to learn higher physics knowledge, and apply them to study higher physics knowledge. This lecture discusses harmonic vibrations, symptoms of waves, sound waves, optical geometry, waves, sound waves, geometric optics, physical optics, charge and electric field, Gauss' law, electric potential and potential energy,resistance and direct current, direct current (DC) circuits, magnetism, electromagnetic induction, and alternating current (AC) circuits.
Semester	Odd
Lecturer	Dr. Kartini Herlina, M.Si.
Contact Person	+62 815-4657-4647
Language	Indonesian
Relation to curriculum	Undergraduate degree program, Mandatory, 2rd semester
Type of teaching, contact hours	Lecture, Experiment and Discussion
Workload	Contact hours: 14 weeks x 100 minutes Structured learning: 14 weeks x 120 minutes Independent study: 14 weeks x 120 minutes Practicum sessions: 14 weeks x 170 minutes

Credit points	3 (2-1) CP or 4.8 (ECTS) ((14 weeks x 100 minutes) + (14 weeks x 120 minutes) + (14 weeks x 120 minutes) + (14 weeks x 170 minutes) : 60 minutes/hour = 119 hours : 25 hours of study/ ECTS = 4.8 (ECTS)
Requirements according to the Examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.
Learning outcomes (course outcomes) and their corresponding PLOs	After completing this module, a student is expected to: After completing this module, a student is expected to: 1. KNO 1 : Demonstrate knowledge of classical physics (mechanics, electrodynamics, thermodynamics, oscillations, waves and optics) and are familiar with the fundamentals of quantum, atomic and molecular, nuclear, elementary particle and solid state physics. 2. KNO 2 : Formulate physical systems using mathematics to solve physics problems.
Competencies/ Course Learning Outcomes	Students are able to analyse the relationship between force and vibration in everyday life. 1. Students are able to determine transverse waves with longitudinal waves, and formulates the equation of running waves. 2. Students are able to analyse the magnitude in sound waves related to the equations of intensity, energy, and power, and analyse the Doppler effect and sound resonance. 3. Students are able to analyse the phenomenon of reflection and refraction of light graphically and mathematically. 4. Students are able to explain the working principle of various optical devices: lup, microscope, and binoculars. 5. Students are able to determine Coulomb force, electric field strength, electric potential, and electric potential energy at point charges. 6. Students are able to analyse the application of field strength to capacitors, the value of series and parallel circuit capacitance in capacitors, revealing the characteristics of capacitors at unidirectional tolerance, and the decrease in capacitor energy. 7. Students are able to analyse the strong quantities of current and voltage in series and parallel electrical circuits using the concepts of Ohm's Law and Kirchoff.

	8. Students are able to explain the concept of magnetic field strength and the concept of the occurrence of Lorentz force on straight conductors in the magnetic field and its application. 9. Students are able to explain the concept of electromagnetic induction emf and its application to AC generators. 10. Students are able to do experiments a simple harmonic motion experiment (GHS) Determining the factors affecting the oscillation period in GHS
Contents	Harmonious motion on pendulum and mass spring systems Complex numbers 1. Wave symptoms 2. Geometric optics 3. Optical tools 4. Static electricity 5. Capacitor 6. Dynamic Electricity 7. Magnetic 8. Electromagnetic induction
Study and examination requirements and forms of examination	Participants evaluated based on ; 1. Participation Activities (5%) 2. Quizzes (25%) 3. Assignment (20%) 4. Final Semester Exam (25%) 5. Midterm exams (25%) Performance in practicum (100%): 1. Practicum exam (30%) 2. Pre-test or post-test (10%) 3. Experiment reports (40%) 4. Laboratory Skills (20%)
Media employed	LCD, whiteboard, and online resources
Assessments and Evaluation	Written tests, assignments and quizzes.
Reading list	Basic Physics Team II. 2014. Basic Physics Teaching Materials II. Bandar Lampung: Unila. 1. Giancoli, Douglas C. 2014. Physics (translation 7th ed.) . Jakarta: Erlangga. 2. Halliday and Resnick. 2010. Fundamental Physics.