KEMENTERIAN PENDIDIKAN TINGGI,
SAINS, DAN TEKNOLOGI
UNIVERSITAS LAMPUNG
FAKULTAS KEGURUAN DAN ILMU PENDIDIKAN
Jalan Prof. Dr. Sumantri Brojonegoro No.1 Gedong Meneng - Bandar Lampung 35145
Telp./Fax: (0721) 704624 *e-mail*: fkip@unila.ac.id,
laman: http://fkip.unila.ac.id

Module Name	Fundamentals of Waves and Electrodynamics
Module Level, if Applicable	Bachelor
Code	KFI620104
Sub-Heading, (*if Applicable)	-
Classes, (*if Applicable)	-
Description	This course is a prerequisite for the expertise group of the study program. After attending this lecture, students are expected to explain the basic knowledge of vibrations and waves, electricity, and magnetism, and to develop and apply this knowledge to understand higher-level physics. The lecture covers topics such as harmonic vibrations, wave phenomena, sound waves, geometric optics, physical optics, electric charge and fields, Gauss's law, electric potential and potential energy, resistance and direct current (DC) circuits, magnetism, electromagnetic induction, and alternating current (AC) circuits. The course incorporates Social Science Issues (SSI) by exploring the role of physics in technological advancements, such as the development of renewable energy technologies and their impact on society. TPACK (Technological Pedagogical Content Knowledge) is applied through the use of simulation software and interactive learning platforms, which enhance student engagement and understanding of complex physics concepts. Additionally, the Nature of Science (NOS) is emphasized by encouraging students to engage in scientific inquiry and experimentation, promoting a deeper appreciation for the scientific process and the evolution of scientific knowledge.
Semester	2th
Module Coordinator	Dr. Kartini Herlina, M.Si.
Lecturers	Team Teaching of Fundamentals of Waves and Electrodynamics

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Language	Indonesian/English
Classification With in the Curriculum	Study Program Compulsory Course
Teaching Format/Class Hours Per Week During the Semester	Learning activity can be carried out in the form of lecture or students' response: Learning activity can be carried out in the form of : 1. Lecture or students' response a. Face to face : 50 minutes/SKS b. Structured activity : 60 minutes/SKS c. Independent activity : 60 minutes/SKS 2. Laboratory activity: 170 minutes/SKS
Teaching methods	In class activity: Case Method and team based project Structured activity: Group Discussion Independent activity: Individual task
Workload	1 CU (SKS) for bachelor degree equal to 3 work hours per week or 170 minutes for lecture or students' response. 2x50 minutes face to face, 2x60 minutes structured tasks, 2x60 minutes independent learning. 1 CU (SKS) for bachelor degree equal to 1 work hours per week or 170 for laboratory activity. for 16 weeks (including mid and final exam), a total of 136 hours/semester. One CU equals to 1.51 ECTS
Credit Points	3 (2-1) CU (SKS) = 3 x 1.51 = 4.53 ECTS
Prerequisites Courses	-
Course Outcomes (CO)	1. PLO 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.

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	2. PLO 2 : Formulate physical systems using mathematics to solve physics problems. 3. CO1: Students are able to determine transverse waves with longitudinal waves, and formulates the equation of running waves. 4. CO2: 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. 5. CO3: Students are able to analyse the phenomenon of reflection and refraction of light graphically and mathematically. 6. CO4: Students are able to explain the working principle of various optical devices: lup, microscope, and binoculars. 7. CO5: Students are able to determine Coulomb force, electric field strength, electric potential, and electric potential energy at point charges. 8. CO6: 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. 9. CO7: 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. 10. CO8: 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. 11. CO9: Students are able to explain the concept of electromagnetic induction emf and its application to AC generators.

	12. CO10: Students are able to do experiments a simple harmonic motion experiment (GHS) Determining the factors affecting the oscillation period in GHS.
Content	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/Exam Achievements	Participants are evaluated based on ; 1. Midterm Exam 25% 2. Final Exam 25% 3. Practicum exam 20% 4. Project Assignment 20% 5. Assignment 10% The initial cut - off points for grades A, B+, B, C+ ,C, and D should not be less than 85%, 80%, 75%, 70%, 65%, 60%, 55%, 50%, and 40%, respectively.
Examination Methods	1. Midterm Exam (UTS) • UTS is held at the 8th meeting • UTS is a written test in the form of objective and essay, and carried out in the classroom with an implementation time of 120 minutes according to the module schedule

- UTS is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Fundamentals of Waves and Electrodynamics module

2. Final Exam (UAS)
   - UAS is held at the 16th meeting
   - UAS is a written test in the form of objective and essay, and carried out in the classroom with an implementation time of 120 minutes which follows the UAS implementation schedule of the department
   - UAS is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Fundamentals of Waves and Electrodynamics module.

3. Practicum Exam
   - Practicum exam is held once in one semester after all the topic of practicum done
   - Practicum exam is used to assess student skills in using tools and reporting measurement results according to scientific rules
   - Practicum exam is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Fundamentals of Waves and Electrodynamics module.

4. Project Assignment
   - Project assignment is given as group task
   - Project assignment is carried out for one semester and presented at the end of semester

	• Project assignment is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Fundamentals of Waves and Electrodynamics module. 5. Assignments • Assignments are given as exercise in each meeting in the form of worksheet and independent task • Assignments are about analyzing simple problems in physics and solving them with the concept of Mechanics • Assignments are given as individual tasks or group tasks and submitted in a limited time • The assignments are carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Fundamentals of Waves and Electrodynamics module
Forms of Media	E-learning, e-book, video, computer, LCD, whiteboard, and online resources
Literature	1. Basic Physics Team II. 2014. Basic Physics Teaching Materials II. Bandar Lampung: Unila. 2. Giancoli, Douglas C. 2014. Physics (translation 7th ed.) . Jakarta: Erlangga. 3. Halliday and Resnick. 2010. Fundamental Physics.

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PLO and CO Mappimg

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
CO 1	√										
CO 2	√										
CO 3		√									
CO 4	√										
CO 5	√										
CO 6		√									
CO 7		√									
CO 8	√										
CO 9	√										
CO 10	√										