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	Electricity and Magnetism
Module level	Undergraduate
Code	KFI620209
Courses	Electricity and Magnetism
Description	This course discusses an introduction to electrostatics, such as electrostatic forces and fields, electric potential, effort and electrostatic energy; electrostatics in materials, such as polarisation, fields in polarised objects, and dielectrics; magnetostatics, such as Lorentz force, Biot Savart Law, and potential vectors; magnetostatics in materials, such as magnetisation, magnetised field regions, linear and non-linear media; electrodynamics, such as Faraday's Law, Maxwells equations, electrodynamic energy and momentum, and electrodynamic waves, such as the equation of waves, electromagnetic waves in conductors, and plasma physics.
Semester	Odd
Lecturer	Dr. I Wayan Distrik, M.Si
Contact Person	+62 812-7911-904
Language	Indonesian
Relation to curriculum	Undergraduate degree program, Mandatory, 4rd semester
Type of teaching, contact hours	Problem Based Learning (PBL).
Workload	Contact hours: 14 weeks x 100 minutes Structured learning: 14 weeks x 120 minutes Independent study: 14 weeks x 120 minutes Practicum session: 14 week 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 week 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: 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	1. Students are able to explain the properties of electric charge. 2. Students are able to describe the electric field lines generated by electric charges. 3. Students are able to classify the interaction of two electric charges (Coulomb's law) which have the same force and fulfil Newton's third law. 4. Students are able to give examples of the application of static electricity in technology. 5. Students are able to apply Coulomb's law with appropriate problem solving procedures to calculate the electric force caused by two or more electric charges. 6. Students are able to apply the formula for the electric field, electric force and electric potential to calculate the electric field, electric force and electric potential by electric charges. 7. Students are able to explain the nature of polarised materials. 8. Students are able to distinguish between polarised materials and other materials. 9. Students are able to formulate the magnitude of the electrostatic field in polarised materials. 10. Students are able to apply electrostatic fields in polarised materials in real life. 11. Students are able to distinguish between dielectric and non-dielectric materials. 12. Students are able to formulate electrostatic fields in dielectric materials.

	13. Students are able to contribute the magnitudes of the electrostatic field both in polarized materials and in dielectric materials. 14. Students are able to understand, apply and analyze the Lorentz force, Biot Savart's Law, and potential vectors and study technological tools related to the Lorentz force. 15. Students are able to explain technology related to polarization and dielectrics. 16. Students are able to understand and describe the magnetic field in materials, and study its application in technology. 17. Students are able to understand, apply, and analyze electrodynamics and study it in technology. 18. Students are able to understand, analyze, and formulate electromagnetic waves and apply them to technology.
Contents	This course discusses the introduction of electrostatics, such as electrostatic forces and fields, electric potential, work and electrostatic energy; electrostatics in materials, such as polarization, fields on polarized objects, and dielectrics; such as the Lorentz force, Biot Savart's Law, and potential vectors; magnetostatics in materials, such as magnetism, magnetic field areas, linear and non-linear media; electrodynamics, such as Faraday's Law, Maxwell's equations, electrodynamic energy and momentum, and wave electrodynamics, such as the wave equation, electromagnetic waves in a conductor, and plasma physics.
Study and examination requirements and forms of examination	Participants are evaluated based on ; 1. Quizzes (20%) 2. Assessment (30%) 3. Final Semester Exams (25%) 4. Midterm exams (25%)
Media employed	LCD, whiteboard, and online resources
Assessments and Evaluation	Test, Quizzes, and assessment.
Reading list	1. Jackson, John David. 2001. Classical Electrodynamics. New York: John Wiley and Sons. 2. Griffiths, David J. 1999. Introduction to Electrodynamics. New Jersey: Prentice Hall. 3. Greiner, Walter, 1998, Classical Electrodynamics, Springer-Verlag New York

	4. John R. Reitz, Frederick j. Milford, & Robert W. Chrsty. 1993. Dasar Teori Listrik Magnet. Penerbit ITB Bandung.