Module Handbook

Module Name:	Electromagnetic Fields
Module Level:	Bachelor
Abbreviation, if applicable:	FI2202
Sub-heading, if applicable:	
Courses included in the module, if applicable:	
Semester/term:	Second year
Module coordinator(s):	
Lecturer(s):	
Language:	Bahasa Indonesia
Classification within the curriculum:	General Studies / ~~Major Subject~~ / ~~Elective Studies~~
Teaching format / class hours per week during the semester:	4 hours lectures, 2 hours tutorial
Workload:	4 hours lectures, 3 hours tutorial and structured activities, 3 hours individual study, 16 weeks per semester, and total 160 hours a semester
Credit Points:	4
Requirements:	1. FI1101 Elementary Physics IA 2. FI1201 Elementary Physics IIA 3. FI2102 Mathematical Physics 1 4. FI2102 Mathematical Physics 2
Learning goals/competencies:	Knowledge: – Demonstrate understanding of the basic concept of electrostatics phenomenon thorough Coulomb interaction, electric fields and electric potentials (including in matter). – Demonstrate understanding of the basic concept of magnetostatics phenomenon thorough Lorentz interaction, magnetic fields, and magnetic vector potential (including in matter). – Demonstrate understanding of the basic concept of electrodynamics induction thorough Faraday law. Skills: – Ability to calculate static electric fields and potentials for any kind of electrical charge distribution – Ability to calculate static magnetic fields and vector potentials for any kind of electrical current distribution – Ability to calculate electrodynamics fields and potentials for any kind of non static sources. Competence: – Ability for re-explaining of the basic concept of electrostatics and its application. – Ability for re-explaining of the basic concept of magnetostatics and its application. – Ability for re-explaining of the basic concept of electrodynamics induction and the consequence of Maxwell equation, especially for electromagnetic waves.

Content:	This course is a continuation and deepening study of the physical phenomena of classical electricity and magnetism that have been introduced in the first year Basic Physics course. The purpose of this course is to introduce an integrated vector field formulation of electricity and magnetism as one of the basic interactions in nature. The main topics to be discussed are as follows. Electrostatic: Divergence and Curl of Electrostatic Field, Electrostatic Potential, Electrostatic Boundary Condition, Work and Energy in Electrostatic, Special Techniques of Solving Electrostatic Potential, Electrostatic Field in Matter; Magnetostatic: Magnetic Force and Magnetic Field, Curl and Divergence of Magnetostatic Field, Magnetostatic Vector Potential, Magnetostatic Boundary Condition, Magnetostatic Field in Matter; Electrodynamics: Electromotive Force and Potential, Electromagnetic Induction, Maxwell's Equation, Electromagnetic Energy and Poynting Vector, Consequences of Maxwell's Equations and Electromagnetic Waves; Introduction to Relativitic Formulation of Maxwell's Equations.
Study/exam achievements:	Students are considered to be competent and pass if at least get 50% of maximum mark of the mid-term test, final examination, quizzes and home work.
Forms of Media:	Slides and LCD projectors, blackboards, lab.
Literature:	1. David J. Griffiths, Introduction to Electrodynamics, , Pearson, 2013 2. Minoru Fujimoto, Physics of Classical Electromagnetism, , Springer Science+Business Media, LLC, New York, 2007 3. Minoru Fujimoto, Classical Electromagnetism, , Dover Publications, Inc., New Y, 2017 4. Jack Vanderlinde, Classical Electromagnetic Theory, 2nd, Kluwer Academic Publishers, Dordrecht,, 2004 5. Gerald L. Pollack and Daniel R. Stump, Electromagnetism, , Pearson Education, Inc., San Franscisco,, 2002 6. Walter Greiner, Classical Electrodynamics, , Springer-Verlag, New York, 1998
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