MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS
Ketintang Campus, Jalan Ketintang, C3 Building, Surabaya 60231
Website: http://s1-fisika.fmipa.unesa.ac.id/, email: s1-fisika@unesa.ac.id

Module Name :	*Listrik Magnet* Electromagnetism
Module level :	Bachelor degree/Undergraduate Programme
Course Code :	4520103114
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	4/Second Year
Module coordinator(s)	Dr. Rudy Kustijono, M.S
Lecturer(s):	Drs. Imam Sucahyo, M.Si Dr. Frida Ulfa Ermawati, M.Sc Diah Hari Kusumawati, M.Si. Abd. Kholiq, S.Pd, M.T.
Language:	*Bahasa Indonesia*
Classification within the curriculum:	Compulsory/ ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or sks*)
Workload :	a. Lecture: 2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79.33 total hours per semester ~ 3.18 ECTS b. Lab activity: 1x170 minutes lab activity, 14 weeks per semester 39.67 total hours of lab activity per semester ~ 1.59 ECTS Total of lecture and lab activity= 119 total hours per semester ~ 4.77 ECTS**
Credit Point:	3 sks (4.77 ECTS)

Requirements:	Basic Physics II Mathematics Physics I Mathematical Physics II
Learning goals/competencies:	1. Have the ability to think critically and use appropriate concepts to analyze qualitatively problems or situations involving physics in this case electricity and magnetism. 2. Demonstrate a responsible attitude towards work in their field of expertise independently 3. Have the ability to use physics concepts and appropriate mathematical/computing methods to get solutions to quantitative problems in solving electric-magnetic problems. 4. Mastering the material, structure, and concepts of physics and their application in technology in the field of Magnetic Electricity. 5. Implement high-order thinking processes (critical, creative, logical, and problem solving) in studying physical processes and phenomena, especially magnetism, both inductively and deductively. 6. Using symbolic and numerical language creatively in describing processes and phenomena of electricity and magnetism qualitatively and quantitatively.
Content	Magnetic Electricity courses cover vector analysis, gradient, divergence, curl, Stokes' theorem, electric field, Coulomb's law, electric field, Gauss's law, electric potential, Electric dipole, electric energy multipole, field energy density, Laplace equation and Poisson equation, terms - boundary conditions, shadow methods, variable separation methods. dielectric material: polarization vector, polarizing charge, displacement vector D, Gauss's law for D. Electric Current: flow of electric charge, continuity equation. Magnetic field: Lorentz force, Biot-Savart law, vector potential, Ampere's law, magnetic dipole moment, switch potential, magnetization, magnetic poles, Ampere's law for H, magnetic materials, hysteresis. Magnetic effect, displacement current, Maxwell's equations.
Attribute Soft skill:	Scientific report, public speaking, and team work

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<tr><td>Study/exam achievements:</td><td>Students are considered to complete the course and pass if they obtain at least 40% of maximum final grade. The final grade (NA) is calculated based on the following ratio:
<table>
<tr><th>Assessment Components</th><th>Percentage of contribution</th></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
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<tr><td>Learning Methods :</td><td>1. Student-centered approach,
2. Lecture and discussion,
3. Laboratorium activity
4. Presentations</td></tr>
<tr><td>Form of Media:</td><td>Power Point slides, e-book file, and multimedia.</td></tr>
<tr><td>Literature (primary references):</td><td>1. David J Griffiths, 1999, “ Introduction to Electrodynamics”, second edition, Prentice hall, International edition.
2. Reitz, JR. & Milford, FJ. 1990. Foundations of Elektromagnetic Theory. Third Edition Addison-Wesley Publishing Company Reading Masschusetts MenloPark. California.
3. Mahmud Zaki, 2000, “Medan Elektromagnetik (bagian I)”, Jurusan Fisika, FMIPA, ITS.</td></tr>
<tr><td>Notes:</td><td>*1 sks in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td></td><td>**1 sks = 1,59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/Un38/Hk/Ak/2019</td></tr>
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