Electromagnetic

Module Name :	Electromagnetic	
Module Level :	Undergraduate	
Code :	32252012	
Sub-heading, if applicable :		
Classes, if applicable :		
Semester :	4th	
Module coordinator :	Umiatin, M.Si	
Lecturer(s) :	Umiatin, M.Si Riser Fahdiran, M.Si	
Language :	Indonesian	
Classification within the curriculum :	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class Size
Lecture (Expository, discussion, exercise)	200 minutes	40
Workload	Total workload of this course 181,3 hours (6 ECTS) per semester which consist of 53,4 hours (1.76ECTS) classroom activity, 64 hours (2,12 ECTS) structured task, and 64 hours (2,12 ECTS) per semester.	
Credit points :	6 ECTS	
Prerequisite course(s) :	-	
Course Outcomes :	After taking this course the student have ability to : CLO111. Able to apply basic electrical concepts to solve related technology problems. CLO112. Able to apply basic concepts of magnetism to solve related technological problemsFind exact solution of mathematical problems.	
Content :	1. Vector Analysis • Vectors • Gradient • Divergence • Curl • Cylindrical coordinates • Spherical coordinates 2. Electrostatics • Electrostatics: Point charge, Law of Coulomb's Law, Continuous Charge • Electric Field : Electric field by point charge, electric field by continuous charge • Gauss's Law: Flux and flux density electricity, Gauss's Law, Application Gauss's Law	

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Electric Potential and Energy: Potential electric potential of a point charge, electric potential of continuous energy, electric potential and energy, capacitors and capacitance, energy in a capacitor and energy density
Conductors in an electrostatic field

3. Potential Determination Techniques

Shadow Method
Variable Separation Method
Multipole Expansion
Scalar potential of Multipole Expansion
Dipole electric field

4. Electrostatic Field in Materials

Dielectrics and conductors
Continuity equation
Meeting of bound and free charges
Electric field in dielectric materials
Classification of dielectrics
Energy in capacitors with dielectric materials

5. Magnetostatics

Lorentz force
Biot-Savart Law
Divergence and Rotation of B
Ampere's Law
Magnetic Potential Vector

6. Magnetostatic Field in Materials

Magnetization
Magnetic field in magnetized materials magnetized materials linear magnetic materials and non linie Free harmonic oscillation, damped oscillation, forced oscillation and coupled oscillation.

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<tr><td>Study/exam achievements:</td><td>Examination are conducted as unit test, as following
<table>
<tr><th>No</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>Task</td><td>Written test</td><td>10%</td></tr>
<tr><td>2</td><td>Paper</td><td>Presentation</td><td>20%</td></tr>
<tr><td>3</td><td>Midterm Test</td><td>Written test</td><td>30%</td></tr>
<tr><td>4</td><td>Final Test</td><td>Written test</td><td>30%</td></tr>
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<tr><td>Media :</td><td>Laptop/Computer, Epsilon (E-Learning Study Program), Projector, Video Conference Software: Zoom Meeting / MS Team, Reference Books, Office Software.</td></tr>
<tr><td>Literatures :</td><td>1. H.J. Pain (2005) The Physics of Vibrations and Waves (6th edition), Wiley.</td></tr>
</table>

	2. George C. King. (2009). Vibrations and waves, West Sussex: John Wiley and sons. 3. E. Hecht (2002) Optics. 4th edition. Addison Wesley. 4. E. Budi (2013) Gelombang. Remaja Rosdakarya B. 5. A.P. French (1971) Vibration and waves: the MIT introductory physics series. W.W. Norton & Company.inc. New York 6. Hayden, H.W. 1965. The structure and Properties of Material. John Wiley and sons, Inc 7. Tjia May On. (1994). Gelombang. Solo: Dabara Publisher (Jurusan Fisika ITB) 8. Hirose, A., Lonngren, K.E. (1985). Introduction to Wave Phenomena. New York: John Wiley & sons 9. Subrahmanyam, N., Lal, B. (1994). Wave and Oscillation. 2nd ed. New Delhi: Vikas Publishing [6] Pratama, M., Umiatin, Taryudi (2020). Studi Karakteristik Kavitasi Larutan Menggunakan Metode Gelombang Berdiri Ultrasonik, Prosiding Seminar Nasional Fisika (E-Journal) SNF2020