UIN SUNAN KALIJAGA YOGYAKARTA
FACULTY OF SCIENCE AND TECHNOLOGY
*Jl. Marsda Adisucipto Yogyakarta 55281, Telp:+62274519739, Fax:+62274540971,*
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**Undergraduate Programme in** Physics

Telp : +62274 519739
Email : fisika@uin-suka.ac.id
Website : http://fisika.uin-suka.ac.id/

**MODULE HANDBOOK**

| | |
|---|---|
| Module Name | Electromagnetics II |
| Module level, if applicable | Bachelor |
| Code, if applicable | FIS414020 |
| Subtitle, if applicable | - |
| Courses, if applicable | Electromagnetics II |
| Semester(s) in which the module is taught | 5th (fifth) |
| Person responsible for the module | Dr. Widayanti, M.Si |
| Lecturer(s) | Dr. Widayanti, M.Si |
| Language | Indonesia |
| Relation to curriculum | Compulsory course in the third year (5th semester) Bachelor Degree |
| Type of teaching, contact hours | 150 minutes lectures and 180 minutes structured activities per week. |
| Workload | Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam |
| Credit points | 3 |
| Requirements according to the examination regulations | Minimum attendance 75%<br>All assignments submitted<br>Attendance on time |
| Recommended prerequisites | Electromagnetics I |
| Module objectives/intended learning outcomes | After completing this course, the students:<br>CO 1. Students are able to explain magnetostatic concepts<br>CO 2. Students are able to calculate electrical quantities using laws in magnetostatics.<br>CO 3. Students are able to formulate physics problems related to the distribution of current sources and develop hypotheses about the methods that will be used to determine the magnetic field.<br>CO 4. Students are able to distinguish magnetostatic problems involving charge sources in a vacuum as well as in a medium |
| Content | 1. Steady Current Magnetic Fields<br>2. Lorentz Force, Magnetic Dipole Moment<br>3. Biot-Savart Law, Magnetic Field in Straight and Curved Wires<br>4. Ampere's Law in Magnetic Fields |

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<table>
<tr><td></td><td>5. Magnetic Materials: Magnetic Properties of Materials with a Microscopic Ring Current Model, Magnetic Polarization Field/Magnetization, Magnetic Field Intensity, Magnetic Susceptibility and Relative Permeability of Magnetic Materials, Diamagnetic, Paramagnetic, Ferromagnetic, and Ferrite, Boundary Conditions of Two Different Magnetic Materials<br><br>6. Electromagnetic Induction: Faraday's Differential Law, Electromagnetic Induction, Self-Inductance and Mutual Inductance<br><br>7. Magnetic Energy: Magnetic Energy of Circuit Pairs, Energy Density in Magnetic Fields, Force and Torque on Solid Circuits<br><br>8. Maxwell's Equations: Ampere's Law and the Continuity Equation for Electric Current, Maxwell's Equations, Electromagnetic Energy, Electromagnetic Wave Equations, Boundary Conditions for Fields<br><br>9. Electromagnetic Radiation: Electric and Magnetic Fields in the Form of Vector and Scalar Potentials, Vector and Scalar Potential Wave Equations, Poynting Vector in the Calculation of Radiation Power of Dipoles and Half-Wave Antennas<br><br>.</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>The final mark will be weighted as follows:
<table>
<tr><th>NO</th><th>Assessment methods (components, activities)</th><th>Weight (percentage)</th></tr>
<tr><td>1</td><td>Final Examination</td><td>40%</td></tr>
<tr><td>2</td><td>Mid-Term Examination</td><td>30%</td></tr>
<tr><td>3</td><td>Class Activities : Quiz, Homework, etc.</td><td>30%</td></tr>
</table>
<br>The final assessment is expressed in the form of a letter value converted from a number value with the following categories:
<table>
<tr><th>NO</th><th>Number Value</th><th>Letter Value</th><th>NO</th><th>Number Value</th><th>Letter Value</th></tr>
<tr><td>1</td><td>≥ 95</td><td>A</td><td>7</td><td>65-69.99</td><td>B/C</td></tr>
<tr><td>2</td><td>90-94.99</td><td>A-</td><td>8</td><td>60-64.99</td><td>C+</td></tr>
<tr><td>3</td><td>85-89.99</td><td>A/B</td><td>9</td><td>55-59.99</td><td>C</td></tr>
<tr><td>4</td><td>80-84.99</td><td>B+</td><td>10</td><td>50-54.99</td><td>C-</td></tr>
<tr><td>5</td><td>75-79.99</td><td>B</td><td>11</td><td>55-34.99</td><td>D</td></tr>
<tr><td>6</td><td>70-74.99</td><td>B-</td><td>12</td><td><35</td><td>E</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>White-board, Lcd Projector, e-learning (https://daring.uin-suka.ac.id/)</td></tr>
<tr><td>Reading list</td><td>1. R.K. Wangness, Electromagnetic Field, 2nd Ed., John Wiley and Sons, 1986.<br>2. Griffith, J. Introduction to Electrodynamics, Prentice-Hall Inc., 1989.</td></tr>
</table>

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**PLO and CO Mapping**

| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 | PLO 7 | PLO 8 | PLO 9 | PLO 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | | √ | √ | | | | | | | |
| **CO 2** | | √ | √ | | | | | | | |
| **CO 3** | | √ | √ | | | | √ | | | |
| **CO 4** | | √ | √ | | | | √ | | | |