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Undergraduate Programme in Physics

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MODULE HANDBOOK

Module Name	Interaction of electromagnetic waves with materials
Module level, if applicable	Bachelor
Code, if applicable	FIS424033
Subtitle, if applicable	-
Courses, if applicable	Interaction of electromagnetic waves with materials
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	Elective course in the third year (4th 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% All assignments submitted Attendance on time
Recommended prerequisites	Electromagnetics II
Module objectives/intended learning outcomes	After completing this course, the students: CO 1. Able to identify the microscopic properties of materials and the fundamental excitations of materials that interact with the fundamental excitations of EM waves CO 2. describe interactions Electromagnetic wave with material through the application of Maxwell's Laws CO 3. determine the dispersion relations occurring in each material, and analyze these interactions
Content	Properties of Electromagnetic Waves, Fundamental Excitations in Materials (phonon, magnon, and plasmon), Equation of Motion in Materials, Susceptibility, Permittivity, and Permeability, Maxwell's Equations and Dispersion Relations for Phonons, Boundary Conditions & Surface Modes, Phonon Dispersion Relations in Film Geometry, Dispersion Relations of Magnetic Materials, Plasmon Polariton Dispersion Relations, Dispersion Relations in Multiferroics, Attenuated Total Reflection

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<table>
<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>
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. Introduction to surface and superlattices excitations, M.G. Cottam & D.R. Tilley, 2005, IOP Publishing.
2. Surface Polaritons: Electromagnetic waves at surfaces and interfaces, V.M. Agranovich & D.L. Mills, 1982, North Holland Publishing company</td></tr>
</table>

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			√						
CO 2			√						
CO 3				√	√				