UIN SUNAN KALIJAGA YOGYAKARTA
FACULTY OF SCIENCE AND TECHNOLOGY
Jl. Marsda Adisucipto Yogyakarta 55281, Telp:+62274519739, Fax:+62274540971,
E-mail: fst@uin-suka.ac.id, website: http://saintek.uin-suka.ac.id/

Undergraduate Programme in Physics

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

MODULE HANDBOOK

Module Name	Quantum Physics I
Module level, if applicable	Bachelor
Code, if applicable	FIS414017
Subtitle, if applicable	-
Courses, if applicable	Quantum Physics I
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Cecilia Yanuarif, M.Si
Lecturer(s)	Cecilia Yanuarif, M.Si
Language	Indonesia
Relation to curriculum	Elective course in the second year (4th semester) Bachelor Degree
Type of teaching, contact hours	150 minutes lectures and 120 minutes structured activities per week.
Workload	Total workload is 90.7 hours per semester, which consists of 100 minutes lectures per week for 14 weeks, 120 minutes structured activities per week, 120 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 %
Recommended prerequisites	No prerequisites stated on
Module objectives/intended learning outcomes	After completing this course, the students: CO 1. Mastering the theoretical concepts and main principles of classical physics and modern physics, as well as knowledge of technology based on physics and its application and integrating it with religion

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<table>
<tr><td></td><td>CO 2. Mastering mathematical, computational and instrumentation methods to solve physics problems and apply his knowledge to a broader field.
CO 3. Able to formulate and analyse scientific studies and research related to physics
CO 4. Master the basic principles of experimentation and physics measurement methods to formulate physical phenomena based on observation and data analysis</td></tr>
<tr><td>Content</td><td>a. Blackbody radiation, Photoelectric effect, Compton effect, and Pair production.
b. De Broglie hypothesis, electron diffraction (Davisson-Germer experiment), wave-particle dualism, and Heisenberg uncertainty principle.
c. Bohr's Atomic Model and Wave mechanics
d. Schrodinger equation: interpretation of wave function, continuity equation, expectation value, properties and conditions of wave function.
e. Stationary state and Eigenvalue Equation.
f. Basic postulates of Quantum Mechanics: State functions, operators and eigenvalue problems, degeneracy, measurement and expectation values.
g. Evolution of quantum systems
h. Quantum mechanics-classical mechanics correspondence and Ehrenfest theorem.
i. Solution of the Schrödinger equation: free particles and potential boxes, staircase potentials, potential wells, breakthrough effects, and simple harmonic oscillators.</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>
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>
</table></td></tr>
</table>

	<table><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>
Media employed	White-board, Lcd Projector, e-learning (https://daring.uin-suka.ac.id/)
Reading list	1. Agus Purwanto, 2006, ***Fisika Kuantum***, Gava Media, Yogyakarta. 2. David J Griffith, 2004, ***Introduction To Quantum Mechanics***, Adison Wisley 3. Gasiorowiczs, S., 1980, ***Quantum Physics***, John Wiley and Sons, New York

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				√				√		
				√					√	