UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS EDUCATION
PHYSICS STUDY PROGRAM
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Bachelor of Physics **MODULE HANDBOOK**

Module name:	Quantum Physics
Module level, if applicable:	Bachelor Programme
Code:	FSK6324
Sub-heading, if applicable:	-
Classes, if applicable:	-
Semester:	3rd
Module coordinator:	Dr. R. Yosi Aprian Sari, M.Si
Lecturer(s):	Dr. R. Yosi Aprian Sari, M.Si , Dr. Wipsar Sunu Bram Dwandaru, M.Sc., Dr. Rida SN Mahmudah, M.Si.
Language:	Bahasa Indonesia
Classification within the curriculum:	Compulsory Course
Teaching format / class hours per week during the semester:	150 minutes lectures and 180 minutes structured activities per week.
Workload:	Total workload is 136 hours per semester which consists of 150 minutes lectures, 180 minutes structured activities, and 180 minutes individual study per week for 16 weeks.
Credit points:	3
Prerequisites course(s):	
Course Outcomes	After taking this course the students have ability to: CO1. Demonstrate collaborative attitude and independence in carrying out individual tasks and group assignments CO2. Know the history of the development of quantum physics and its correspondence with classical physics CO3. Mastering and understanding the basic concepts of mathematics and postulates in quantum physics CO4. Solving quantum physics problems in 1D and 3D
Content:	This course discusses the basic concepts of quantum physics. The materials studied include: Particle aspect of radiation (black body radiation, photoelectric effect, Compton effect, pair production, Bremsstrahlung), Wave aspect of particle (de Broglie hypothesis, Davisson-Germer experiment, classical vs quantum view of particles and waves, wave-particle dualism), Heisenberg uncertainty principle, probabilistic interpretation, quantization

<table>
<tr><td></td><td>rules, wave packets, Schrodinger equation (waves at boundaries, particles in potential wells, simple harmonic oscillators, energy barriers), Mathematical tools of quantum mechanics: vector spaces and Hilbert spaces, Dirac notation, operators, representation of discrete and continuous bases , matrix vs wave mechanics, Postulates of quantum mechanics, 1D quantum mechanics: potential wells and resistance, harmonic oscillators, 3D quantum mechanics: problems in Cartesan coordinates, problems in spherical coordinates, Stationary state approximation method: time independent perturbation theory.</td></tr>
<tr><td>Study / exam achievements:</td><td>Attitude assessment is carried out at each meeting by observation and / or self-assessment techniques using the assumption that basically every student has a good attitude. The student is given a value of very good or not good attitude if they show it significantly compared to other students in general. The result of attitude assessment is not a component of the final grades, but as one of the requirements to pass the course. Students will pass from this course if at least have a good attitude.

The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO2,
CO3
and
CO4</td><td>a. Assignment
b. Quiz
c. Mid
d. Final Exam</td><td>Presentation
/ written test</td><td>30%
15%
25%
30%</td></tr>
<tr><td colspan="3"></td><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Forms of media:</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Literature:</td><td>A. Zettili, N., 2009, Quantum Mechanics: Concepts and Applications 2nd edition, Wiley.
B. Griffiths, D. J., 1995, Introduction to Quantum Physics, Prentice Hall Inc,</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CO1	✔							
CO2		✔						
CO3			✔		✔			
CO4					✔	✔		