UIN SUNAN KALIJAGA YOGYAKARTA
FACULTY OF SCIENCE AND TECHNOLOGY
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Undergraduate Programme in Physics

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MODULE HANDBOOK

Module Name	Quantum Physics II
Module level, if applicable	Bachelor
Code, if applicable	FIS414018
Subtitle, if applicable	-
Courses, if applicable	Quantum Physics II
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Cecilia Yanuarif, M.Si
Lecturer(s)	Cecilia Yanuarif, M.Si
Language	Indonesia
Relation to curriculum	Elective course in the third year (5th 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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	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
Content	a. Hydrogen atom Schrödinger equation b. Solution of the Hydrogen atom Schrödinger equation: Polar and Azimut Parts c. Solution of the Schrödinger equation of the Hydrogen atom: Radial Section d. Distribution of Hydrogen atom's chance density and quantum numbers (principal, orbital and magnetic) e. Definition of angular momentum operator, orbital angular momentum operator, square of angular momentum operator, eigenvalue spectrum of angular momentum operator. f. Definition of escalator up and escalator down operators and their applications. g. Dirac notation of angular momentum operators and matrix representations, spin operators. h. Summation of angular momentum operators. i. Disturbance theory for non-degenerate cases up to second order and examples. j. Solutions based on time-independent perturbation theory for degenerate cases with examples of fine structure of Hydrogen atom and Zeeman effect. k. Time dependent perturbation theory: Basic concepts. l. A ½-spin particle in a weak magnetic field that oscillates-emission and absorption. m. WKB (Wentzel-Kramers-Brillouin) approach: Basic concepts and solutions in the region far from the turning point and near the turning point. n. WKB (Wentzel-Kramers-Brillouin) Approach: Alpha decay of radioactive nuclei
Study and examination requirements and forms of examination	The final mark will be weighted as follows:

NO	Assessment methods (components, activities)	Weight (percentage)
1	Final Examination	40%
2	Mid-Term Examination	30%
3	Class Activities : Quiz, Homework, etc.	30%

The final assessment is expressed in the form of a letter value converted from a number value with the following categories:

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NO	Number Value	Letter Value	NO	Number Value	Letter Value
1	≥ 95	A	7	65-69.99	B/C
2	90-94.99	A-	8	60-64.99	C+
3	85-89.99	A/B	9	55-59.99	C
4	80-84.99	B+	10	50-54.99	C-
5	75-79.99	B	11	55-34.99	D
6	70-74.99	B-	12	<35	E

Media employed	White-board, Lcd Projector, e-learning (https://daring.uin-suka.ac.id/)
Reading list	1. Agus Purwanto, 2006, ***Fisika Kuantum***, Gramedia, Yogyakarta. 2. David J Griffith, 2004, ***Introduction To Quantum Mechanics***, Adison Wisley 3. M.F. Rosyid, 2005, ***Mekanika Kuantum Tinjauan non Realtivistik***, Penerbit IeSYe, Yogyakarta. 4. Sutopo, 2005, ***Pengantar Fisika Kuantum***, UM Press, Malang. 5. Gasiorowicz, S., ***Quantum Physics***, John Wiley and Sons

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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				√				√		
				√					√	