



MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS

Ketintang Campus, Jalan Ketintang, C3 Building, Surabaya 60231
 Website: <http://s1-fisika.fmipa.unesa.ac.id/>, email: s1-fisika@unesa.ac.id

Undergraduate Programme In Physics

Module Handbook

Module Name :	<i>Fisika Kuantum</i> Quantum Physics
Module level :	Bachelor degree/Undergraduate Programme
Course Code :	4520104065
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	5/Third Year
Module coordinator(s)	Dr. Z. A. Imam Supardi, M.Si
Lecturer(s):	Tjipto Prastowo, Ph.D Endah Rahmawati, S.T.,M.Si Utama Alan Deta, M.Pd., M.Si
Language:	<i>Bahasa Indonesia</i> (Indonesian Language)
Classification within the curriculum:	Compulsory/ Elective
Teaching format/class hours per week during the semester:	4 contact hours of lectures (sks or credit unit*)
Workload :	4 x 50 minutes lectures, 4 x 60 minutes structured activity, 4 x 60 minutes individual activity per week, 14 weeks per semester, 158,67 total hours per semester ~ 6.36 ECTS**
Credit Point:	4 sks (6.36 ECTS)
Requirements:	
Learning goals/competencies:	1. Demonstrate their knowledge of classical and modern physics by identifying the physical properties of a physical system 2. Have the ability to increase their knowledge and be able to continue their studies 3. Formulate a standard physical system into a physical model using mathematics 4. Solve standard physical system problems comprehensively using mathematics and computational tools Kemampuan Umum: 5. Analyze physical systems by applying mathematics and computing / ICT tools
Content	This course examines: 1. The scope of the study of Quantum Physics, 2. The study of quantum concepts (reviews from physical phenomena to theoretical approaches),



MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS

Ketintang Campus, Jalan Ketintang, C3 Building, Surabaya 60231
 Website: <http://s1-fisika.fmipa.unesa.ac.id/>, email: s1-fisika@unesa.ac.id

	3. Formulation of Schrodinger wave mechanics to solve the problem of microscopic particle physics without and in the presence of simple potential fields (anharmonics and harmonics), 4. An overview of the theory of the hydrogen atom related to the complete solution of the Schrodinger equation of radial components and spherical harmonics, 5. Orbital, electron transition, and Pauli's rule 6. Zeeman effect and Stark effect 7. The role of spin-orbit interactions in fine and super fine structure phenomena, Lectures are carried out with the "Student Centered Learning Method" assisted by references, ICT, and academic services. The assessment emphasizes the use of "Performance Assessment and Projects".										
Attribute Soft skill:	Scientific report, public speaking, and team work										
Study/exam achievements:	Students are considered to complete the course and pass if they obtain at least 40% of maximum final grade. The final grade (NA) is calculated based on the following ratio: <table border="1"> <thead> <tr> <th>Assessment Components</th><th>Percentage of contribution</th></tr> </thead> <tbody> <tr> <td>Participation</td><td>20%</td></tr> <tr> <td>Assignment</td><td>30%</td></tr> <tr> <td>Mid-semester test</td><td>20%</td></tr> <tr> <td>Final semester test</td><td>30%</td></tr> </tbody> </table>	Assessment Components	Percentage of contribution	Participation	20%	Assignment	30%	Mid-semester test	20%	Final semester test	30%
Assessment Components	Percentage of contribution										
Participation	20%										
Assignment	30%										
Mid-semester test	20%										
Final semester test	30%										
Learning Methods :	Student-centered approach, lecture and discussion, and presentations (structured activities)										
Form of Media:	Power Point slides, e-book file, and multimedia.										
Literature (primary references):	- Prastowo, T. and Rahmawati, E. Lecture Notes on Quantum Physics. Unpublished work, 2014 - Malcom Longair, Quantum Concepts in Physics an Alternative Approach to the Understanding of Quantum Mechanics, Cambridge University Press, 2014 - Eric D'Hoker, Quantum Physics, Department of Physics and Astronomy, University of California, Los Angeles, CA 90095, USA, 2012										



MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS
Ketintang Campus, Jalan Ketintang, C3 Building, Surabaya 60231
Website: <http://s1-fisika.fmipa.unesa.ac.id/>, email: s1-fisika@unesa.ac.id

Notes:	*1 credit unit or <i>sks</i> in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**1 credit unit or <i>sks</i> = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019