



UNIVERSITAS NEGERI YOGYAKARTA
 FACULTY OF MATHEMATICS AND NATURAL SCIENCES
 DEPARTMENT OF CHEMISTRY EDUCATION
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Bachelor of Education in Chemistry

MODULE HANDBOOK

Module name:	Introduction to Quantum Chemistry
Module level, if applicable:	Undergraduate
Code:	KIP 6201
Sub-heading, if applicable:	-
Classes, if applicable:	2
Semester:	5 th
Module coordinator:	Prof. Dr. Endang Widjajanti LFX
Lecturer(s):	Dr. Drs. Crys Fajar Partana, M.Si.; Dr. Suwardi, S.Si.,M.Si.; Dr. Agus Salim, M.Si.
Language:	Bahasa Indonesia and English
Classification within the curriculum:	Compulsory
Teaching format / class hours per week during the semester:	100 minutes lectures, 120 minutes structured activities, and 120 minutes individual study.
Workload:	Total workload is 90.67 hours per semester which consists of 100 minutes lectures, 120 minutes structured activities, and 120 minutes individual study per week for 16 weeks.
Credit points:	2 SKS (3 ETCS)
Prerequisites course(s):	- Chemical Mathematics - Chemical equilibrium - Molecular Dynamics
COurse outcomes:	After taking this course, the students are expected to be able to: CO1 describe and apply mathematical theories and concepts in chemistry, classical mechanics, and quantum mechanics. CO2 compose written ideas to teach quantum chemistry in high school based on the results of analysis of chemical concepts in high school
Content:	This course includes theories covering background, coordinate systems, differentials and integrals, determinants, vectors, operators, complex numbers, and eigenvalue equations; conservative system, Langrange motion equation, Hamilton motion equation, internal coordinates and center mass movements, and basic assumptions of classical mechanics; atomic spectra, black matter radiation, photoelectric effects, the formulation and postulates of quantum mechanics; application of postulates of quantum mechanics, orthonormal and orthogonal properties of hybrid wave functions, and perturbation theory.

Study / exam achievements:	<p>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 marked very good or not good attitude if they show it significantly compared to other students in general. The result of attitude assessment is not taken into account in 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:</p> <table border="1" data-bbox="630 526 1444 795"> <thead> <tr> <th>No</th> <th>CO</th> <th>Assessment Object</th> <th>Assessment Technique</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CO1, CO2.</td> <td>Participation Assignment Mid-term exam Final Exam</td> <td>Presentation / written test</td> <td>10% 30% 25% 30%</td> </tr> <tr> <td colspan="4" style="text-align: right;">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CO	Assessment Object	Assessment Technique	Weight	1	CO1, CO2.	Participation Assignment Mid-term exam Final Exam	Presentation / written test	10% 30% 25% 30%	Total				100%
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1	CO1, CO2.	Participation Assignment Mid-term exam Final Exam	Presentation / written test	10% 30% 25% 30%												
Total				100%												
Forms of media:	Board, LCD Projector, Laptop/Computer.															
References:	<ul style="list-style-type: none"> • McQuarries, D.A. D.D. 2008. <i>Quantum Chemistry</i>: University of California. • Gupta, V.P. 2016. <i>Principles and Application of Quantum Chemistry</i>: Elsevier Inc. • Levina, I. N. 2009. <i>Quantum Chemistry</i>: Pearson Prentice Hall. • Fitts. 2002. <i>Principles of Quantum Mechanics: as Applied to Chemistry and Chemical Physics</i>. Cambridge: Cambridge University Press. • I.R. Levine. 2000. <i>Quantum Chemistry</i>. New Jersey: Prentice Hall. • M.W. Hanna. 1966. <i>Quantum Mechanics in Chemistry</i>. New York: W.A. Benyamin. • D.A. McQuarrie. 1983. <i>Quantum Chemistry</i>. Oxford: Oxford University Press. • A.K. Chandra. 1983. <i>Introductory Quantum Chemistry</i>. New Delhi: Tata McGraw-Hill Publishing Co, Ltd 															

PLO and CO mapping

	PLO					
	Attitude		Knowledge	Specific Skill	General Skill	
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CO1			√			
CO2				√		