

Module Descriptions

Module designation	Quantum Chemistry
Semester(s) in which the module is taught	2 nd /first year
Person responsible for the module	Prof. Dr. I Gusti Made Agung Sanjaya
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credits Units (CU) = (4.77 ECTS)
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<ol style="list-style-type: none"> 1. Students are able to think critically and creatively to produce appropriate solutions and visualizations for problems involving quantum chemistry. 2. Students are able to draw accurate quantum-chemistry conclusions about structure and bonding—covering both physical and chemical aspects—when analyzing various materials. 3. Students master the basic concepts and principles of quantum chemistry to describe atomic structure, chemical bonding, molecular structure, molecular symmetry, spectroscopy, and molecular interactions. 4. Students can be entrusted with responsibility to complete quantum-chemistry assignments independently and communicate their results responsibly.
Content	A study of the basic concepts and principles of quantum chemistry and their applications to atomic structure, chemical bonding, molecular structure, molecular symmetry, spectroscopy, and molecular interactions of matter, delivered through theory, laboratory practice, and simple engineering/design activities.
Examination forms	Essay and Oral Presentation

Study and examination requirements	Study and Examination Requirements/Assessment: <ol style="list-style-type: none">1. Individual assignments2. Documentation and presentation of assignments Assessment Recap (Case Study-Oriented): <ol style="list-style-type: none">1. Participatory Activities/Case Study Analysis: 52.5%2. Project Result Assessment / Product Assessment: 17.5%3. Test:30% Total: 100%
Reading list	<ol style="list-style-type: none">1. Atkins, S.P.W. and Paula, J. d. 2018. Physical Chemistry, 11th edition. New York: Oxford University Press.2. David W. Ball, Physical Chemistry, 2nd Edition. Stamford: Cengage Learning.3. Levine, Ira N. 2014. Quantum chemistry, 7th edition. New York: Pearson Education, Inc.4. Mortimer, R.G. 2008, Physical Chemistry, 3th edition, London: Elsevier Inc