



Diponegoro University
Faculty of Science and Mathematics
Undergraduate Program Of Chemistry

Module designation	Chemical Structure and Bonding (SIK)
Semester(s) in which the module is taught	3
Person responsible for the module	Dr. Parsaoran Siahaan, MS Dr. Dwi Hudyanti, MSc. Tri Windarti, M.Si
Language	Indonesian
Relation to curriculum	Compulsory /elective/ specialisation
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Face to face : 1 x (3 x 50 min); Structured study: 1 x (3 x 60 min); Self study: 1 x (3 x 60 min)
Credit points	3
Required and recommended prerequisites for joining the module	KD1, KD2, MD2
Module objectives/intended learning outcomes	<ol style="list-style-type: none">1. S9 Demonstrates an attitude of being responsible for work in his field of expertise independently.2. PP1 Mastering the theoretical concepts of structure, properties, changes, kinetics, and energetics of molecules and chemical systems, identification, separation, characterization, transformation, synthesis of micromolecular chemicals, and their application.3. PP3 Mastering the basic principles of software for analysis, synthesis, and molecular modeling in general or more specific chemical fields.4. KU1 Able to apply logical, critical, systematic, and innovative thinking in the development or implementation of science and technology that pays attention to and uses humanities values by their field of expertise.5. KK3 Able to analyze several alternative solutions in identification, analysis, isolation, transformation, and synthesis of available chemicals and present analysis conclusions for appropriate decision making.

Content	<ol style="list-style-type: none"> 1. Introduction and principles of quantum theory <ol style="list-style-type: none"> a. the origins of quantum mechanics b. Microscopic system dynamics 2. c. Principles of quantum theory 3. Quantum theory on the motion of matter <ol style="list-style-type: none"> a. translational motion 4. b. Vibration motion 5. c. Rotation motion 6. Atomic structure and spectra <ol style="list-style-type: none"> a. hydrogen atom 7. b. atom with many electrons 8. c. Hydrogen atomic spectra 9. Molecular structure <ol style="list-style-type: none"> a. Valence bond theory 10. b. Molecular orbital theory 11. c. Homonuclear diatom molecules 12. d. Heteronuclear diatom molecules 13. e. Polyatomic molecule
Exams and assessment formats	Mid-Semester Exam and Final Exam
Study and examination requirements	Participatory Activities 20% Project Results 30% Task 10% Quiz 10% Mid-semester 15% Final exams 15%
Reading list	Main <ol style="list-style-type: none"> 1. Atkins and de Paula, 2010, Physical Chemistry, W. H. Freeman and Company, New York Supporter <ol style="list-style-type: none"> 1. Relevant textbooks and articles