



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:	Basic Chemistry
Module level, if applicable:	Undergraduate
Code:	KIM 6401
Sub-heading, if applicable:	-
Classes, if applicable:	2
Semester:	1
Module coordinator:	Sukisman Purtadi, M.Pd
Lecturer(s):	Marfuatun, S.Pd.Si.,M.Si.; Anggiyani Ratnaningtyas Eka Nugraheni, S.Pd.Si.,M.Pd.; Drs. Agus Salim, M.Si.; Erfan Priyambodo, S.Pd.Si.,M.Si.; Dr. Antuni Wiyarsi, S.Pd.Si.,M.Sc.; Drs. Heru Pratomo AI, M.Si
Language:	Bahasa Indonesia and English
Classification within the curriculum:	Compulsory Course
Teaching format / class hours per week during the semester:	<ul style="list-style-type: none"> • Lectures: 150 minutes lectures, 180 minutes structured activities and 180 minutes individual study per week • Laboratory Work: 170 minutes includes the laboratory work and it's report per week.
Workload:	Total workload of the activity is 186 hours per semester which consist of 150 minutes lectures, 180 minutes structured activities, 180 minutes individual study per week, and 170 minutes include laboratory work and it's report.
Credit points:	3SKS (4.92 ECTS) lectures, and 1SKS (1,64 ECTS) laboratory Work
Prerequisites course(s):	-
Course Outcome:	<p>After taking this course, the students are expected to be able to:</p> <p>CO1 be responsible and develop ethical behavior in the laboratory when doing practicum</p> <p>CO2.</p> <ul style="list-style-type: none"> • Students understand the atomic theory, and the relationship between electron configurations and elemental positions in the periodic table of elements • Students understand the chemical bonds and molecular shapes of compounds. • Students understand basic chemical laws, the concept of moles, concentration of solutions and chemical calculations • Students understand the laws of thermodynamics and their application in chemistry • Students understand the reaction kinetics, and the factors that influence it

	<ul style="list-style-type: none"> • Students understand their chemical and applied equilibrium in industry • Students understand the properties of acid-base solutions, acid-base titrations, and their application • Students understand the concepts of oxidation-reduction and electrochemical reactions and their application in technology and everyday life • Students understand the colligative properties of non-electrolyte and electrolyte solutions <p>CO3. be able to work in the laboratory according to the SOP, data collecting, data analysis and write the laboratory reports.</p>
Content:	<p>This course discusses about the atomic theory, periodic table elements, chemical bonds, stoichiometry, introduction to chemical thermodynamics, chemical kinetics, chemical equilibrium, acid-base, colligative properties of solutions, and redox and electrochemical reactions. Lectures also study the application of basic chemical concepts in everyday life, as well as laboratory activities. Learning Materials:</p> <ol style="list-style-type: none"> 1. Atomic Structure and Periodic System Elements (development of atomic theory, atomic structure, SPU, electron configuration and quantum numbers) 2. Chemical Bonds and Molecular Forms (concepts and theories of chemical bonds, types of bonds, molecular geometry) 3. Stoichiometry (basic chemistry law, mole concept, solution concentration, count on chemical reactions) 4. Energitika (reaction enthalpy, entropy and free energy, thermochemistry) 5. Chemical kinetics (the theory of reactions, reaction rates and reaction orders, factors that influence the rate of reaction, reaction mechanisms) 6. Chemical equilibrium (concepts of chemical equilibrium and equilibrium constants, homogeneous and heterogeneous equilibrium, factors that affect chemical equilibrium, chemical equilibrium in industry) 7. Acid base and solubility (acid base theory, acidity, buffer solution, hydrolyzed salt solution, acid base titration, solubility and solubility times) 8. Redox and electrochemistry (development of the concept of redox reactions, equalization of redox reaction coefficients, standard reduction potential, cell potential, Nernst equation, electrochemical cell, electrolytic cell, Faraday's Law) 9. Colligative properties of solution (decrease in vapor pressure of solution, decrease of freezing point of solution, increase in boiling point of solution, osmotic pressure of solution, factor of van't Hoff, colligative nature of electrolyte solution)
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</p>

	<p>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.</p> <p>The final mark will be weight as follow:</p> <table border="1"> <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, CO3.</td> <td>Assignments Mid-term Semester Final Exam Activities: Laboratory Work</td> <td>Presentation / written test</td> <td>25% 20% 20% 15% 20%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CO	Assessment Object	Assessment Technique	Weight	1	CO1, CO2, CO3.	Assignments Mid-term Semester Final Exam Activities: Laboratory Work	Presentation / written test	25% 20% 20% 15% 20%	Total				100%
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Total				100%												
Forms of media:	Board, LCD Projector, Laptop/Computer, Module, Tools and Equipment for Laboratory Work															
References:	<p>Burdge, Julia. (2011). <i>Chemistry 2nd Ed.</i> New York: McGraw-Hill</p> <p>Chang, Raymond. (2010). <i>Chemistry 10th Ed.</i> New York: McGraw-Hill</p> <p>Darrell D. Ebbing/Steven D. Gammon (2017) <i>General Chemistry 11 ed.</i> New York: McGraw-Hill</p> <p>Jespersen, ND and Brady, JE. (2015). <i>Chemistry : The Molecular Nature of Matter 7th Ed.</i> New York : John Wiley and Sons.</p> <p>Oxtoby, David W et.all. (2019). <i>Principles of Modern Chemistry 8th Ed.</i> Belmont: Thomson Brook/Cole.</p>															

PLO and CO mapping

	PLO					
	Attitude		Knowledge	Specific Skill	General Skill	
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CO1					√	√
CO2			√			
CO3				√		