



**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:	<b>High School Chemistry</b>
Module level, if applicable:	Undergraduate
Code:	MPK 6307
Sub-heading, if applicable:	-
Classes, if applicable:	2
Semester:	6 <sup>th</sup>
Module coordinator:	Dr. Das Salirawati
Lecturer(s):	Drs. Heru Pratomo Al, M.Si.; Dr. Antuni Wiyarsi, S.Pd.Si.,M.Sc. <b>Sukisman Purtadi, M.Pd</b>
Language:	English, Indonesia
Classification within the curriculum:	Compulsory Subject
Teaching format / class hours per week during the semester:	150 minutes lectures, 180 minutes structured activities, and 180 minutes individual study per week.
Workload:	Total workload is 136 hours per semester which consist of 150 minutes lectures, 180 minutes structured activities, and 180 minutes individual study per week for 16 weeks.
Credit points:	3 SKS (4.92 ETCS)
Prerequisites course(s):	Basic Chemistry
Course outcomes:	After taking this course, the students are expected to be able to: CO1 Students are able to evaluate the concept structure in the chemistry curriculum that applies at the high school level CO2 Students are able to analyze the structure of chemical concepts in high school and their learning is based on the nature of science CO3 Students are able to analyze difficult concepts and misconceptions in learning chemical concepts in high school CO4 Students are able to arrange written ideas to teach chemistry in high school based on the analysis of chemical concepts in high school
Content:	This course gives experience to students to analyze chemical concepts learned at the high school / MA level in accordance with the applicable curriculum. The course material is focused on content analysis in the curriculum, learning strategies that emphasize the nature of chemistry as part of Nature of Science (NOS), difficulties, mistakes (and misconceptions), and other problems that often occur in learning these concepts, and the latest developments on learning chemical concepts in high school / MA. Lectures are carried out with discussions, demonstrations, assignments, and other

	<p>strategies that can provide students with experience in learning chemistry at the high school level.</p> <ol style="list-style-type: none"> <li>1. Chemistry in the curriculum in high school / MA</li> <li>2. Basic particles</li> <li>3. Chemical and Stoichiometric Changes</li> <li>4. Chemical bonds</li> <li>5. Energy, reaction rate, and chemical equilibrium</li> <li>6. Acids and bases</li> <li>7. Redox and electrochemistry</li> <li>8. Chemical Elements and their Abundance</li> <li>9. Organic chemistry and natural ingredients</li> <li>10. Misconceptions and Reductions</li> <li>11. Ideas for Choice Concepts</li> </ol>															
<p>Study / exam achievements:</p>	<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="628 958 1444 1234"> <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, CO4.</td> <td>Assignment Midterm Examination Final Examination Participation</td> <td>Field Practice, Written Test</td> <td>40% 20% 20% 20%</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, CO3, CO4.	Assignment Midterm Examination Final Examination Participation	Field Practice, Written Test	40% 20% 20% 20%	Total				100%
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1	CO1, CO2, CO3, CO4.	Assignment Midterm Examination Final Examination Participation	Field Practice, Written Test	40% 20% 20% 20%												
Total				100%												
<p>Forms of media:</p>	<p>File video, Power Pont</p>															
<p>References:</p>	<p><b>Books</b></p> <p>Barke , H.D., Harsch, G., &amp; Schmid, S. 2012. Essentials of Chemical Education (Translated by Hannah Gerda). Springer</p> <p>Barke, H-D., Hazari, A.,&amp; Yitbarek, S. 2009. Misconceptions in Chemistry: Addressing Perceptions in Chemical Education. Springer.</p> <p>Burdge, J. (2020). Chemistry. 5th Edition. McGraw-Hill Education</p> <p>Fahlman, B.D., Purvis-Roberts, K.L., Kirk, J.S., Bentley, A.K., Daubenmire, P.L., Ellis, J.P., &amp; Mury, M.T. 2018. Chemistry in context : applying chemistry to society. 9th Ed. McGraw-Hill Education</p> <p>Kurikulum Kimia di SMA yang berlaku (Lampiran 09 Permendikbud Tahun 2016 Nomor 024 tentang Kompetensi Inti dan Kompetensi Dasar Pelajaran pada Kurikulum 2013 pada Pendidikan Dasar dan Pendidikan Menengah)</p> <p>Taber, K.S., 2012. <i>Teaching Secondary Chemistry</i>, 2nd Ed. Association for Science Education</p>															

	<p><b>International Journal Articles</b></p> <p>Cheung, D., Ma, H. &amp; Yang, J.(2009). Teachers' misconceptions about the effects of addition of more reactants or products on chemical equilibrium. <i>Int J of Sci and Math Educ</i> 7, 1111–1133 (2009).  <a href="https://doi.org/10.1007/s10763-009-9151-5">https://doi.org/10.1007/s10763-009-9151-5</a></p> <p>Su, K. (2016). Strengthening Strategic Applications Of Problem-Solving Skills For Taiwan Students' Chemistry Understanding. <i>Journal of Baltic Science Education</i>; 15(6): 662–679.</p> <p>Karpudewan, M., Treagust, D.F., Mocerino, M., Won, M., &amp; Chandrasegaran, A. L.. (2015). Investigating High School Students' Understanding of Chemical Equilibrium Concepts. <i>International Journal of Environmental and Science Education</i>, 10(6): 845-863. DOI: 10.12973/ijese.2015.280a</p>
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**PLO and CO mapping**

	PLO					
	Attitude		Knowledge	Specific Skill	General Skill	
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CO1			√			
CO2			√			
CO3				√		
CO4		√			√	