



**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>Materials Development on Chemistry</b>
Module level, if applicable:	Undergraduate
Code:	MPK 6215
Sub-heading, if applicable:	-
Classes, if applicable:	1
Semester:	Even
Module coordinator:	Dr. Das Salirawati
Lecturer(s):	<b>Marfuatun, S.Pd.Si.,M.Si.</b>
Language:	Bahasa Indonesia
Classification within the curriculum:	Elective Course
Teaching format / class hours per week during the semester:	100 minutes lectures, 120 minutes structured activities, and 120 minutes individual per week.
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:	2SKS (3.28ECTS)
Prerequisites course(s):	-
Course Outcomes	After taking this course the students have ability to: CO1. implement procedures in developing teaching materials CO2. explain the concept of teaching materials in chemistry learning CO3. understand the procedures for developing teaching materials CO4. compile teaching materials according to the concept of developing correct teaching materials
Content:	This course is an elective course with the aim of students being able to develop chemical teaching materials with current and up-to-date sources. This course includes material on the preparation of design, development, management and evaluation of teaching materials. The lecture implementation uses an active learning model with lecture, question and answer, discussion, and project learning methods.
Study / exam achievements:	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 given a value of very good or not good attitude if they show it significantly compared to other students in general. The result of attitude assessment is not a component of 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:

No	CO	Assessment Object	Assessment Technique	Weight
1	CO1	Activities	Presentation	10%
	CO2	Assignments	/ written test	40%
	CO3	Mid-term exam		25%
	CO4.	Final Exam		25%
Total				100%
Forms of media:	Board, LCD Projector, Laptop/Computer			
Literature:	<p>Pannen, P, &amp; Purwanto.,(2001), <i>Penulisan Bahan Ajar</i>. Jakarta: Pusat Antaruniversitas untuk Peningkatan dan Pengembangan Aktivitas Intruksional Direktorat Jenderal Perguruan Tinggi</p> <p>Alan Januszewski, Michael Molenda, (2008) <i>Educational Technology: The Development of a Concept</i>, New York: Lawrence Erlbaum Associates</p> <p>Valérie Camel, Marie-Noëlle Maillard, Jonathan Piard, Cécile Dumas, Mathieu Cladière, Gérôme Fitoussi, Emilie Brun, Isabelle Billault, and Cécile Sicard-Roselli, (2020), CHIMACTIV: An Open-Access Website for Student-Centered Learning in Analytical Chemistry, <i>J. Chem. Educ.</i> 2020, 97, 8, 2319–2326.</p> <p>Adam C. Mater &amp; Michelle L. Coote, (2019), <i>Deep Chemistry, J.Chem. Inf. Model</i>, 59, 6, 2545–2559</p> <p>Dipendra Jha, Logan Ward , Arindam Paul, Wei-keng Liao, Alok Choudhary, Chris Wolverton &amp; Ankit Agrawal, (2018), ElemNet: Deep Learning the Chemistry of Materials From Only Elemental Composition, <a href="http://www.nature.com/scientificreports">www.nature.com/scientificreports</a>.</p> <p>Situmorang, Manihar and Sinaga, Marudut and Purba, Jamalum and Daulay, Sapnita Idamarna and Simorangkir, Murniaty and Sitorus, Marham and Sudrajat, Ajat, (2018), Implementation Of Innovative Chemistry Learning Material With Guided Tasks To Improve Students' Competence, <i>Journal of Baltic Science Education</i>, 17 (04). pp. 535-550. ISSN 1648-3898</p> <p>Melanie M. Cooper and Ryan L. Stowe, (2018), Chemistry Education Research—From Personal Empiricism to Evidence, Theory, and Informed Practice, <i>Chem. Rev.</i> 2018, 118, 12, 6053–6087</p> <p>Fiona Affeldt, Daniel Meinhart, Ingo Eilks, (2018), The Use of Comics in Experimental Instructions in a Non-formal Chemistry Learning Context, <i>International Journal of Education in Mathematics, Science and Technology (IJEMST)</i>, 6(1), 93-104. DOI:10.18404/ijemst.380620.</p> <p>I Helsy, Maryamah, I Farida and M A Ramdhani, (2017), Volta-Based Cells Materials Chemical Multiple Representation to Improve Ability of Student Representation, <i>Journal of Physics: Conference Series</i>, Volume 895, International Conference on Mathematics and Science Education (ICMSce) 24 May 2017, Bandung, Indonesia</p> <p>I Fatimah, S Hendayana and A Supriatna, (2017), Didactical design based on sharing and jumping tasks for senior high school chemistry learning, <i>Journal of Physics: Conference</i></p>			

	<p>Series, Volume 1013, 4th International Seminar of Mathematics, Science and Computer Science Education 14 October 2017, Bandung, Indonesia</p> <p>Zahidah Abd Kadir, Shanti Balraj Baboo, Nurul Shuhadah Rosni, Zaidatul Husna Abd Rahman, Nurulain Abu Bakar, (2017), Design &amp; development of digital learning resource (BMT): blended learning approach, IMCOM '17: Proceedings of the 11th International Conference on Ubiquitous Information Management and Communication</p> <p>Fitriah, (2015), <i>Teaching Materials</i>, Itqan, Vol. VI, No. 2</p> <p>Allen A. Espinosa, (2014), Strategic Intervention Material-Based Instruction, Learning Approach and Students' Performance in Chemistry, International Journal of Learning, Teaching and Educational Research Vol. 2 No.1.</p>
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**PLO and CO mapping**

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