UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY
1 Colombo Street Yogyakarta 55281
Phone (0274) 565411, Ext. 1398, Fax (0274)548203
Website: http://kimia.fmipa.uny.ac.id, E-mail: kimia@uny.ac.id

Module name:	Material Chemistry
Module level, if applicable:	Undergraduate
Code:	KMA6228
Sub-heading, if applicable:	-
Classes, if applicable:	-
Semester:	6th
Module coordinator:	Prof. AK Prodjosantoso
Lecturer(s):	Dr Cahyorini Kusumawardani
Language:	English
Classification within the curriculum:	Elective Course
Teaching format / class hours per week during the semester:	Lectures: 100 minutes lectures, 120 structured activities and 120 individual study per week
Workload:	Total workload of the activity is 90,67 hours per semester which consists of 100 minutes lectures, 120 structured activities and 120 individual study per week for 16 weeks
Credit points:	2 SKS (3 ECTS)
Prerequisites course(s):	-
Course Outcomes	After taking this course, the students have ability to: CO1. Able to describe the concept and terminology of material chemistry, history and development of material chemistry, material classification, and material application CO2. Able to explain the material structure, crystallography, bonding, synthesis and processing, thermodynamics, and kinetics CO3. Able to describe metal, metal oxide, alloys, conductor, semiconductor, and isolator CO4. Able to explain ceramics and glasses material CO5. Able to describe polymer materials, advanced polymer materials: synthesis and application CO6. Able to explain composites material and biomaterial CO7. Able to explain liquid crystal materials: thermo trophic, calamite, metal organic, dichotic, and polymer CO8. Able to explain nanostructure and nanoparticle materials, and the related analysis CO9. Able to explain porous and layer materials, and the related analysis CO10. Able to do a search and describe the results of their study using their own language regarding the research in material and its application
Content:	This course discusses various aspect of chemistry in the design and discovery of new as an important role to

<table>
<tr><td></td><td>synthesis future functional materials. It advance understanding how the history of a material influences its structure, properties, and performance. Lecture emphasizes the mastery of lecture material logically and scientifically and the ability to use scientific methods to solve problems faced by students</td></tr>
<tr><td>Study / exam achievements:</td><td>The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td rowspan="5">1</td><td rowspan="5">CO1, CO2, CO3, CO4, CO5, CO6, CO7, CO8, CO9, CO10</td><td>Attitude</td><td>Observation</td><td>20%</td></tr>
<tr><td>Structural assignment: ability to rasionalize and describing</td><td>Assignment</td><td>10%</td></tr>
<tr><td>Structural assignment: ability to applying the formula according to context</td><td>Assignment</td><td>10%</td></tr>
<tr><td>Structural assignment: ability to collaborate, analyze, rasionalize, and communicate</td><td>Assignment</td><td>10%</td></tr>
<tr><td>Individual assignment: skill to collect literacy, understanding, and describing</td><td>Assignment</td><td>10%</td></tr>
<tr><td></td><td></td><td>Mid term exam</td><td>Written test</td><td>20%</td></tr>
<tr><td></td><td></td><td>Final exam</td><td>Written test</td><td>20%</td></tr>
<tr><td colspan="3"></td><td>Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Forms of media:</td><td>Board, LCD Projector, handouts, PPT slides, and stationaries</td></tr>
<tr><td>Reference:</td><td>Hojo, J. (2019). Materials chemistry of ceramics. Singapore: Springer Nature Singapore
Fahlman, B. D. (2011). Maerials chemistry 2nd ed. Mount Pleasant, MI. USA: Springer
Lawrence, HV (1992), Elements of Material Science and Engineering, Pearson Education
Allock, H. R. (2019). Inroduction to materials chemistry 2nd edition. Wiley
Lawrence, HV (1996), Elements of Material Science, Addison-Wesley Longman,
Burns, G.; Glazer, A.M. (1990). Space Groups for Scientists and Engineers (2nd ed.). Boston: Academic Press, Inc
Lee, J.Y., Farha, O.K., Roberts, J., Scheit, K.A., Nguyen, S.T., and Hupp, J.T. (2019), Metal-organic framework materials as catalyst, Chemical Society Reviews, 5, 144-192</td></tr>
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PLO and CO mapping

CO	PLO									
	Attitude	Generic Skills		Knowledge				Specific Skills		
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CO1							✓			
CO2					✓					
CO3					✓					
CO4					✓					
CO5					✓					
CO6					✓					
CO7					✓					
CO8									✓	
CO9									✓	
CO10									✓	