MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
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Master Program of Science Education **Module Handbook**

Module Name :	*Kajian Sains Kimia IV/* *Study of Chemical Science IV*)*
Module level :	*Master Program of Science Education*
Course Code :	*8410103073*
Abbreviation, if applicable:	*-*
Courses included in the module, if applicable:	*Not Applicable*
Semester/Term	*1st /Second Year*
Module coordinator(s)	*Dr. I. Gusti Made Sanjaya, M.Si.*
Lecturer(s):	*Dr. I. Gusti Made Sanjaya, M.Si.*
Language:	*Indonesian Language*
Classification within the curriculum:	*Compulsory/ ~~Elective~~*
Teaching format/class hours per week during the semester:	*3 contact hours of lectures (Indonesia credit semester or CU*)*
Workload :	*3 x 50 minutes lectures, 3 x 90 minutes structured activity, 3 x 100 minutes individual activity, 14 weeks per semester, 168 total hours per semester ~ 6.72 ECTS***
Credit Point:	*3 CU (6.72 ECTS)*
Requirements:	
Learning goals/competencies:	**Knowledge (KNO-2)** *CLO-1* *Mastering the concepts and principles of science in studying the characteristics and behavior of the discussion of Chemical Science Studies IV.* *CLO-2* *Mastering knowledge and technology carry out digital and non-digital literacy for the Study of Chemical Science IV.* **Competency (COM-3)** *CLO-3* *Designing producing appropriate solutions to problems related to Chemical Science Studies IV.* *CLO-4* *Creating responsibility in carrying out the tasks of Chemical Science Study IV independently or in groups and responsible for communicating the results.*
Content	*This course provide of the dynamics of development from the field, findings, and learning of Physical Chemistry which includes the discussion of structure, composition, dynamics of change, and*

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<tr><td></td><td>energy that underlies the stability of matter and its changes through chemical reactions discussed with quantum chemistry, spectroscopy, surface chemistry, solids chemistry, electrical chemistry, chemical kinetics, reaction dynamics, chemical thermodynamics for systems in equilibrium, statistical mechanics for systems that are beyond equilibrium, and modern and futuristic materials.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Scientific report, public speaking, and team work</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 70. Final score is calculated as follows: 20% Participation + 30% Assignment + 20% Middle Exam (UTS) + 30% Final Exam (UAS)
Final index is defined as follow:
<table>
<tr><th>Index</th><th>Converted Score</th><th>Score Range</th></tr>
<tr><td>A</td><td>4.00</td><td>85 ≤ A ≤ 100</td></tr>
<tr><td>A-</td><td>3.75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3.50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3.00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2.75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2.50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2.00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1.00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0.00</td><td>0 ≤ E < 40</td></tr>
</table></td></tr>
<tr><td>Learning Methods :</td><td>Case Method, Discussion, and Article Review</td></tr>
<tr><td>Form of Media:</td><td>Power Point slides, e-book file, and multimedia.</td></tr>
<tr><td>Literature (primary references):</td><td>1. Andreas Hofmann. 2018. Physical Chemistry Essentials. Switzerland; Springer
2. Andrew Cooksy. 2014. Physical chemistry : quantum chemistry and molecular interactions. USA: Pearson Education, Inc
3. Donald W. Rogers. 2011. Concise physical chemistry. Canada: John Wiley & Sons, Inc
4. Evgenij Barsoukov dan J. Ross Macdonald. 2018. Impedance spectroscopy: theory, experiment, and applications. USA: John Wiley & Sons, Inc
5. A. K. Haghi, Cristo´bal Noe´ Aguilar, Sabu Thomas, dan Praveen K. M. 2018. Physical chemistry for engineering and applied sciences : theoretical and methodological implication. USA: Apple Academic Press, Inc
6. Alexandr A. Berlin, Roman Joswik, dan Nikolai I. Vatin. 2016. THE CHEMISTRY AND PHYSICS OF ENGINEERING MATERIALS. Canada: Apple Academic Press, Inc</td></tr>
<tr><td>Notes:</td><td>*1 CU in learning process = three periods consist of: (a) scheduled instruction in a classroom (50 minutes); (b) structured activity (90 minutes); and (c) individual activity (100 minutes) according to according to Rector Decree of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2020</td></tr>
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	***1 CU = 2.24 ECTS according to Rector Decree of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2020*
	Total ECTS = (total hours workload/ 60 min) / 25 hours* **Each ECTS is equals with 25 hours
Last Amendment	*5 January 2023*