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:	**Molecular Dinamics**
Module level, if applicable:	Undergraduate
Code:	KIM 6406
Sub-heading, if applicable:	-
Classes, if applicable:	2
Semester:	4th
Module coordinator:	Prof. Dr. Endang Widjajanti
Lecturer(s):	Jaslin Ikhsan, Ph.D Dr. Eli Rohaeti
Language:	Bahasa Indonesia
Classification within the curriculum:	Compulsory Course
Teaching format / class hours per week during the semester:	200 minutes lectures, 240 minutes structured activities, and 240 minutes individual study.
Workload:	Total workload is 181.34 hours per semester which consists of 200 minutes lectures, 240 minutes structured activities, and 240 minutes individual study per week for 16 weeks.
Credit points:	4 SKS (6.57 ETCS)
Prerequisites course(s):	-
COurse outcomes:	After taking this course, the students are expected to be able to: CO1. be able to solve problems related to the theory of gas kinetics, moving molecules, reaction rates, and complicated kinetics through discussion, reference studies etc. CO2. • Calculating the velocity of a gas molecule • Decreasing the formula for the velocity of gas molecules using the Maxwell-Boltzmann distribution • Understanding collisions between gas molecules, which include (a) frequency, (b) density / speed, and (c) free paths on average, • Understanding gas molecular collisions with surfaces / walls and the rate of gas effusion • Determine the nature of the gas transport, the reaction rate, the rate law, and the factors that influence it • Understanding Determining the reaction rate formulation of the reaction mechanism using steady state approaches and pre-equilibrium reactions, understanding the

<table>
<tr><td></td><td>mechanism of enzyme reactions, consecutive reaction rates, determining the rate of reaction.
• Explaining the definition of conductance, conductivity, and molar conductivity of a solution, ion movement, transport number, diffusion

CO3. be able to analyze the results of the lab data and explain based on the appropriate theory.</td></tr>
<tr><td>Content:</td><td>This course studies about the molecular dynamics, which include the theory of gas kinetics, moving molecules (including gases and solutions), the rate of chemical reactions (including: empirical chemical kinetics and explanation of the law of speed), and complicated reaction kinetics. This course also learn about the theory and practicum in the laboratory.
Learning Materials:
1. The Gas Kinetics Theory
2. Reaction Rate
3. Moving Molecules
4. Conductance and Conductivity
5. Ostwald dilution law
6. pKa relationship with the results of conductivity measurements
7. IPN Mobility
8. Transport numbers
9. Measurement of transport numbers
10. Relationship of ion conductivity and transport numbers
11. Calculating thermodynamic forces
12. Infusion and Einstein's relationship
13. Diffusion and Nerst-Einstein equations
14. Stokes-Einstein's diffusions and equations</td></tr>
<tr><td>Study / exam achievements:</td><td>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:

<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1,
CO2,
CO3.</td><td>Assignments
Mid-term Exam
Final Exam
Activities</td><td>Presentation / written test</td><td>20%
30%
40%
10%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
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</td></tr>
<tr><td>Forms of media:</td><td>Board, LCD Projector, Laptop/Computer, Module</td></tr>
<tr><td>References:</td><td>Atkins, P & Paula, J. 2010. Atkins' Physical Chemistry 9th Ed: Oxford University Press
Atkins, P & Paula, J. 2014. Atkins' Physical Chemistry 10th Ed: Oxford University Press
Ira N. Levine. 2009. Physical Chemistry: McGraw-Hill</td></tr>
</table>

	Keith J. Laidler. 2013. *Reaction Kinetics*: HarperCollins Publishers.

PLO and CO mapping

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