Diponegoro University
Faculty of Science and Mathematics
Undergraduate Program Of Chemistry

Module designation	**Reaction Kinetics (KRX)**
Semester(s) in which the module is taught	5
Person responsible for the module	Dra. Arnellli, MS Yayuk Astuti, S.Si., Ph.D
Language	Indonesian
Relation to curriculum	Compulsory ~~/ elective / specialisation~~
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Face to face : 1 x (3 x 50 min); Structured study: 1 x (3 x 60 min); Self study: 1 x (3 x 60 min)
Credit points	3
Required and recommended prerequisites for joining the module	KD2,MD2, FD2

Module objectives/intended learning outcomes	Graduate Learning Outcomes (GLO) 1. S9 Demonstrates an attitude of being responsible for work in his field of expertise independently. 2. KU1 Able to apply logical, critical, systematic, and innovative thinking in the development or implementation of science and technology that pays attention to and uses humanities values by their field of expertise. 3. KU2 Able to demonstrate independent, quality, and measurable performance. 4. KK2 Able to solve science and technology problems in general and straightforward chemical fields such as identification, analysis, isolation, transformation, and synthesis of micro-molecules through the application of knowledge of structure, properties, kinetics, and energetics of molecules and chemical systems, with analytical methods and synthesis in specific chemical fields, as well as the application of relevant technologies. 5. PP1 Mastering the theoretical concepts of structure, properties, changes, kinetics, and energetics of molecules and chemical systems, identification, separation, characterization, transformation, synthesis of micromolecular chemicals, and their application. Course Learning Outcomes (CLO) 1. MI Able to describe the properties of gas transport, including phenomenal equations and transport parameters 2. M2 "Able to explain the basic principles of coefficient of viscosity, electrical conductivity and ion mobility in a solution system which is summarized in Molecular motion in a liquid." 3. M3 Able to explain the nature of diffusion in a solution, including thermodynamics review and diffusion equations. 4. M4 Able to relate diffusion and chemical reactions and determine the effect of diffusion on reaction rates. 5. M5 Able to determine the rate law of simple reactions, both differential and integral rate laws. 6. M6 Able to determine reaction order and reaction rate constant with various methods 7. M7 Able to write Arrhenius equations, explain the effect of temperature on reaction rates, and calculate Arrhenius parameters. 8. M8 Able to explain elementary reactions and reaction mechanisms including reactions including elementary reactions and polymerization reactions.

Content	1. PB 1. Transport in gas: a. Fomenal equation 2. PB 1. Transport in gas: b. Transport parameters 3. PB 2. The motion of molecules in a liquid: a. Viscosity and diffusion in fluids and electrolyte solutions 4. PB 2. Molecular motion in liquid: b. Ion mobility 5. PB 3. Diffusion: a. Thermodynamics review 6. PB 3. Diffusion: b. Diffusion equation 7. PB4. diffusion and reaction 8. PB 5. The rate law for a simple reaction: a. Differential rate law 9. PB 5. The rate law for a simple reaction: b. Integrated rate law 10. PB 6. Determination of reaction order and reaction rate constant: a. Determination of reaction order 11. PB 6. Determination of reaction order and reaction rate constant: b. Determination of reaction rate constant 12. PB 7. Arrhenius equation: a. Effect of temperature on reaction rate 13. PB 8. Mechanism of reaction: a. Elementary reactions (unimolecular, bimolecular, thermomolecular) 14. PB8. Reaction mechanism b. polymerization reaction
Exams and assessment formats	Mid-Semester Exam and Final Exam
Study and examination requirements	Participatory Activities 20% Project Results 30% Task 10% Quiz 10% Mid-semester 15% Final exams 15%
Reading list	Main : 1. P.W. Atkins, 2014, Physical Chemistry, London, Oxford University Press 2. Daniels, Alberty, 1983, Kimia Fisik, Bandung, Erlangga Support : 1. G.W. Castellan, 1971, Physical Chemistry, New York, Addison-Wesley Publishing Company