

Module VII: Chemistry

1.1. Module Objectives

On completion of this module, the students will:

- Students will be able to define the basic concept of chemistry in its application to life science and technology
- Students will be able to define and describe basic principles about biomolecular structure and define basic chemical reaction in living cell
- Students will be able to define and apply technique, methods, and procedure qualitative analysis, gravimetry, and titrimetry
- Students will be able to apply analytical problems analysis and able to discover the development of chemical science knowledge
- Students will be able to define the relationship between structure and reactivity of organic compound and describe various basic reaction in organic compound of its application in daily life

1.2. Module Data

Person in charge	Faculty of Natural Science and Mathematics
Total Credits	9
Courses	KI-2051 Organic Chemistry KI-2122 Analytical Chemistry
Modul Examination	Written Test

1.2.1. Sub-module I: Organic Chemistry

Course Name:	Organic Chemistry
Course Level:	Undergraduate
Abbreviation, if applicable:	KI2051
Sub-heading, if applicable:	
Courses included in the module, if applicable:	
Semester/term:	3
Course coordinator(s):	
Lecturer(s):	Dr. Aminudin Sulaeman
Language:	Bahasa Indonesia
Classification within the curriculum:	General Studies / Major Subject / Elective Studies
Teaching format / class hours per week during the semester:	2 hours lectures, 1 hours tutorial
Workload:	2 hours lectures, 1 hours tutorial and structured activities, 2 hours individual study, 2 hours laboratory work per week, 16 weeks per semester, and total 144 hours a semester
Credit Points:	3
Requirements:	-
Learning goals/competencies:	Students will be able to define the relationship between structure and reactivity of organic

	compound and describe various basic reaction in organic compound of its application in daily life
Content:	Main topics of this course are concerning organic nomenclature, chemical bonding including resonance concept and acid-base concept, organic functional groups, and the relationship between structures of molecules, physical properties and chemical properties of organic compounds. The structure topics discuss on chemical bonding, covalent bond properties that related to the static aspect of molecules (including stereochemistry) as well as its dynamic aspect (conformation). The physical properties topic includes the state of materials, solubility, melting point and boiling points; the chemical properties topic includes acid-base properties, oxidation and reduction reaction, electrophylic and nucleophylic addition reaction, electrophylic and nucleophylic substitution reaction, elimination and free-radical reaction especially halogenation reaction. Other topics are concerning the application of organic chemistry knowledge in understanding of the application of organic compounds and reactions in living organism as well as in industrial applications.
Study/exam achievements:	Students are considered to be competent and pass if at least get 50% of maximum mark of the exams, homework, laboratory work, and research based learning.
Forms of Media:	Slides and LCD projectors, blackboards, lab.
Literature:	<ol style="list-style-type: none"> 1. T.W.G. Solomon dan C.B. Fryhle, 2011, <i>Organic Chemistry</i>, 10th edition, John Wiley and Sons (Asia), Wiley International Student version 2. H. Hart, L.E. Craune dan D.J. Hart, 2003, <i>Kimia Organik: Suatu Kuliah Singkat</i>, Edisi ke-11, penterjemah: SS Achmad, Penerbit Erlangga, Jakarta. 3. J Clayden, N Greeves, S Warren dan P Wothers, 2001. <i>Organic Chemistry</i>, Oxford University Press.

1.2.2. Sub-module II: Analytical Chemistry

Course Name:	Analytical Chemistry
Course Level:	Undergraduate
Abbreviation, if applicable:	KI2122
Sub-heading, if applicable:	
Courses included in the module, if applicable:	
Semester/term:	3

Course coordinator(s):	
Lecturer(s):	Dr. Megawati Santoso
Language:	Bahasa Indonesia
Classification within the curriculum:	General Studies / Major Subject / Elective Studies
Teaching format / class hours per week during the semester:	2 hours lectures, 1 hours tutorial
Workload:	2 hours lectures, 1 hours tutorial and structured activities, 2 hours individual study, 3 hours laboratory work per week, 16 weeks per semester, and total 144 hours a semester
Credit Points:	3(1)
Requirements:	-
Learning goals/competencies:	Students will be able to define and apply technique, methods, and procedure qualitative analysis, gravimetry, and titrimetry Students will be able to apply analytical problems analysis and able to discover the development of Chemistry knowledge
Content:	This course includes (1) Basic Analytical Chemistry: process of analysis, evaluation of analytical results, chemical calculations, review of the chemical equilibrium, (2) qualitative analysis includes the identification of chemical compounds in a structured way, (3) the conventional analysis methods include gravimetric and titrimetric; (4) introduction to instrumental analytical methods, that includes colorimetric and potentiometric methods.
Study/exam achievements:	Students are considered to be competent and pass if at least get 50% of maximum mark of the exams, homework, laboratory work, and research based learning.
Forms of Media:	Slides and LCD projectors, blackboards, lab.
Literature:	1. Harvey D., <i>Modern Analytical Chemistry</i> , Mc Graw Hill, 2000 2. Skoog, D.A., <i>et al</i> , ' <i>Fundamentals of Analytical Chemistry</i> ' 8 th ed., Saunders College Publisher, 2004
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