



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences
Master of Science Education Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Chemical Science Study	8410103084		T=3	P=0	ECTS=6.72	2	July 18, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
			Dr. Eko Hariyono, S.Pd., M.Pd.	
Learning model	Case Studies						
Program Learning Outcomes (PLO)	PLO study program that is charged to the course						
	Program Objectives (PO)						
	PLO-PO Matrix						
		P.O					
Short Course Description	Examining the concept of stoichiometry in chemical science, the structure of matter and chemical bonds, solutions and their properties, colloids and their use, chemistry as a science of reactions, thermodynamics and thermochemistry, as well as the basic concepts of organic chemistry and biochemistry which are carried out in lectures through discussions, practicums and presentations.						
	References						
References	Main :						
	1. Petrucci, R. H., <i>et al.</i> 2017. General Chemistry Principles and Modern Applications. Toronto: Pearson Canada Inc. Chang, R. and Overby, J. 2011. General Chemistry the Essential Concepts. New York: McGraw-Hill. Phillips, J.S . 2002. Glenco Chemistry Concepts and Applications. New York: Glencoe McGraw-Hill.						
Supporting lecturer	Supporters:						
	Dr. I Gusti Made Sanjaya, M.Si. Prof. Dr. Tukiran, M.Si.						
Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (offline)	Online (online)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	Communicate the conceptual orientation of chemical science studies and their application in the modern world.	a. Evaluate understanding of chemistry concepts and applications. b. Determine the importance of studying chemistry. c. Predicting future developments in chemical science.	Criteria: Performance assessment criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
2	Analyze the application of the basic laws of chemistry in stoichiometry.	1. Describe the use of stoichiometry in quality control and band quality 2. Analyze the basic laws of chemistry in stoichiometry 3. Apply the basic laws of chemistry in stoichiometric measurements and calculations	Criteria: performance test criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
3	Evaluate the structure of matter	1. Evaluate material classification 2. Analyze atomic structure Determine electron configuration 3. Identify the elements in the periodic table 4. Determine the periodic properties of elements	Criteria: Performance assessment criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
4	Analyzing chemical bonds between/between molecules of compounds and elements	1. Identify ionic bonds in molecules 2. Identify covalent bonds in molecules 3. Evaluate molecular shapes 4. Evaluate material properties based on the presence of metallic bonds, hydrogen bonds, or Van der Waals forces	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
5	Analyze solutions and their colligative properties	1. Make a solution 2. Dilute and concentrate the solution 3. Ensure the concentration of the solution 4. Analyze the colligative properties of solutions 5. Predict changes in colligative properties of solutions	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%

6	Analyze the physico-chemical properties of solutions	<ol style="list-style-type: none"> 1. Identify the electrical properties of solutions 2. Group solutions as acids, bases, or salts 3. Calculate the pH of the solution 4. Create a simple indicator 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
7	Evaluate the concept and properties of colloids	<ol style="list-style-type: none"> 1. Grouping colloids 2. Identify the properties of colloids 3. Describe the use of colloids in industry and in everyday life 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
8	Mastering friendship material 01-07	Received a minimum rating of good	Criteria: Written exam assessment criteria	3 X 50 problem solving			0%
9	Analyze various types of chemical reactions	<ol style="list-style-type: none"> 1. Group chemical reactions based on ordinary chemical reactions and core chemical reactions 2. Identify types of reactions based on addition, elimination and substitution reactions 3. Identify redox reactions 4. Evaluate the stoichiometry of a reaction 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
10	Analyze the rate of chemical reactions	<ol style="list-style-type: none"> 1. Analyze the factors that influence the reaction rate 2. Predict the relationship of reaction rate to concentration, surface area, temperature, and catalyst 3. Predict reaction mechanisms 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%

11	Analyze chemical equilibrium	<ol style="list-style-type: none"> 1. Distinguish between reversible and irreversible reactions 2. Identify reactions at chemical equilibrium 3. Predicting the direction of equilibrium shift 4. Describe the use of equilibrium in various chemical processes in industry and in everyday life 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50		0%
12	Evaluate the direction of the reaction and the energy accompanying the reaction	<ol style="list-style-type: none"> 1. Ensure the continuity of a reaction 2. Identify the types of exothermic and endothermic reactions 3. Determine the change in enthalpy or heat of reaction 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50		0%
13	Evaluate the basic concepts of organic compounds.	<ol style="list-style-type: none"> 1. Describe the hardness of the carbon atom 2. Grouping organic compounds 3. Identify the functional groups and properties of each group of organic compounds 4. Predicting isomers of organic compounds 5. Evaluate the nomenclature of organic compounds 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50		0%
14	Evaluate organic compound reactions	<ol style="list-style-type: none"> 1. Identify organic compound reactions 2. Group the reactions of organic compounds 3. Predict the results of organic compound reactions 4. Estimating the reaction mechanism of organic compounds 	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50		0%

15	Evaluate biochemical concepts and applications	1. Identify biochemical products 2. Describe biochemical processes 3. Describe biochemical concepts and processes in industry and in everyday life	Criteria: performance criteria	Reference studies, assignments, discussions and presentations 3 X 50			0%
16	Mastering friendship material 09-15	Received a minimum rating of good	Criteria: Written exam assessment criteria	3 X 50 problem solving			0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
		0%

Notes

- Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
- The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
- Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
- Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
- Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
- Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
- Forms of assessment:** test and non-test.
- Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
- Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.