



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences
Undergraduate Chemistry Education Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date																																
Basic Chemistry 2	8420403122		T=3 P=0 ECTS=4.77	2	July 18, 2024																																
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																	
	Prof. Dr. Utiya Azizah, M.Pd.																																	
Learning model	Project Based Learning																																				
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																				
	Program Objectives (PO)																																				
	PLO-PO Matrix																																				
		P.O																																			
Short Course Description	PO Matrix at the end of each learning stage (Sub-PO)																																				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="width: 5%; text-align: center;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 3%;">1</td> <td style="width: 3%;">2</td> <td style="width: 3%;">3</td> <td style="width: 3%;">4</td> <td style="width: 3%;">5</td> <td style="width: 3%;">6</td> <td style="width: 3%;">7</td> <td style="width: 3%;">8</td> <td style="width: 3%;">9</td> <td style="width: 3%;">10</td> <td style="width: 3%;">11</td> <td style="width: 3%;">12</td> <td style="width: 3%;">13</td> <td style="width: 3%;">14</td> <td style="width: 3%;">15</td> <td style="width: 3%;">16</td> </tr> </table>				P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P.O	Week																																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																					
Short Course Description	Study of basic concepts: Reaction Rates, Chemical Equilibrium, Colloidal Systems, Redox and Electrochemistry, Core Chemistry and Radiochemistry, Elemental Chemistry, and Chemicals in Everyday Life, as well as appropriate laboratory activities through discussions, assignments, and practicums																																				
References	Main :																																				
	<ol style="list-style-type: none"> 1. Tim Kimia Dasar. 2007. Kimia Dasar II . Surabaya: Jurusan Kimia FMIPA Unesa. 2. Brady and Humiston. 2004. General Chemistry, Principles and Structures . New York: John Willey and Sons. 3. Chang, Raymond. 2005. General Chemistry The Essential Concepts Third Edition. USA: McGraw Hill. 																																				
	Supporters:																																				
Supporting lecturer	Dr. Maria Monica Sianita Basukiwardojo, M.Si. Prof. Dr. Utiya Azizah, M.Pd. Dr. Sukarmin, M.Pd. Dr. Muchlis, S.Pd., M.Pd. Rusly Hidayah, S.Si., M.Pd. Dr. Dina Kartika Maharani, S.Si., M.Sc. Findiyani Ernawati Asih, S.Pd., M.Pd.																																				
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	Understand the concepts underlying the kinetics of a chemical reaction, namely rate, order and reaction mechanism	1. Explain the rate law 2. Explain the factors that influence the reaction rate, 3. Explain the activation energy, reaction order, collision theory, and chemical reaction mechanisms.	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Assignment 3. Practicum 3 X 50			0%
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2	Understand the concepts underlying the kinetics of a chemical reaction, namely rate, order and reaction mechanism	1. Explain the rate law 2. Explain the factors that influence the reaction rate, 3. Explain the activation energy, reaction order, collision theory, and chemical reaction mechanisms.	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Assignment 3. Practicum 3 X 50			0%
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3	Understand the concepts underlying the kinetics of a chemical reaction, namely rate, order and reaction mechanism	1. Explain the rate law 2. Explain the factors that influence the reaction rate, 3. Explain the activation energy, reaction order, collision theory, and chemical reaction mechanisms.	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Assignment 3. Practicum 3 X 50			0%
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4	Understand the laws of chemical equilibrium, Le Chatelier's principle and the use of equilibrium principles in industry	1. Explain the occurrence of equilibrium reactions 2. Derive the equilibrium constant 3. Explain the relationship between ΔG_o and K_p and K_c 4. Explain the existence of equilibrium disturbances 5. Explain the application of the principle of equilibrium in industry	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 4. Practicum 3 X 50			0%
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5	Understand the laws of chemical equilibrium, Le Chatelier's principle and the use of equilibrium principles in industry	<p>1. Explain the occurrence of equilibrium reactions 2. Derive the equilibrium constant 3. Explain the relationship between ΔG_o and K_p and K_c 4. Explain the existence of equilibrium disturbances 5. Explain the application of the principle of equilibrium in industry</p>	<p>Criteria:</p> <p>1. The assessment is carried out on the following aspects:</p> <p>2.1. Participation during lectures, carried out through observation (weight 2)</p> <p>3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2)</p> <p>4.3. Assignment value for working on questions, writing papers and practical work (weight 2)</p> <p>5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3)</p> <p>6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10</p>	<p>1. Discussion 2. Question and answer 3. Practice questions 4. Practicum 3 X 50</p>			0%
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6	Understand the role of reduction and oxidation in electrochemical events	1. Compare several redox concepts. 2. Explain Galvanic/Voltaic cells 3. Explain electrolysis 4. Predict the spontaneity of redox reactions 5. Do practical work	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 4. Practicum 3 X 50			0%
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7	Understand the role of reduction and oxidation in electrochemical events	1. Compare several redox concepts. 2. Explain Galvanic/Voltaic cells 3. Explain electrolysis 4. Predict the spontaneity of redox reactions 5. Do practical work	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 4. Practicum 3 X 50			0%
8	UTS	Meeting Indicators 1 - 7	Criteria: Student scores are included in UTS scores	3 X 50 test			0%

9	Understand the principles underlying colloid systems and relate them to everyday symptoms	<ol style="list-style-type: none"> 1. Explain dispersion systems 2. Differentiate types of colloids 3. Differentiate the preparation of colloids 4. Describe the uses of colloids 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. The assessment is carried out on the following aspects: <ol style="list-style-type: none"> 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade" (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10 	<ol style="list-style-type: none"> 1. Discussion 2. Question and answer 3. Practice questions 4. Practicum 3 X 50 			0%
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10	Understand the stability of the nucleus, radioactive decay and the reactions that occur in the nucleus	<ol style="list-style-type: none"> 1. Compare stable and unstable nuclei 2. Calculate binding energy 3. Write the nuclear reaction equation. 4. Determine the kinetics of decay 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. The assessment is carried out on the following aspects: <ol style="list-style-type: none"> 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade" (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10 	<ol style="list-style-type: none"> 1. Discussion 2. Question and answer 3. Practice questions 3 X 50 			0%
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11	Understand the stability of the nucleus, radioactive decay and the reactions that occur in the nucleus	<ol style="list-style-type: none"> 1. Compare stable and unstable nuclei 2. Calculate binding energy 3. Write the nuclear reaction equation. 4. Determine the kinetics of decay 	<p>Criteria:</p> <ol style="list-style-type: none"> 1. The assessment is carried out on the following aspects: <ol style="list-style-type: none"> 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade" (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10 	<ol style="list-style-type: none"> 1. Discussion 2. Question and answer 3. Practice questions <p>3 X 50</p>			0%
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12	Understand the properties and manufacture of non-metal and metal elements and their compounds	1. Explain the properties and preparation of several non-metal elements and their compounds. 2. Explain the properties and preparation of several metal elements and their compounds.	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 3 X 50			0%
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13	Understand the properties and manufacture of non-metal and metal elements and their compounds	1. Explain the properties and preparation of several non-metal elements and their compounds. 2. Explain the properties and preparation of several metal elements and their compounds.	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 3 X 50			0%
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14	Understand the principles that support green chemistry. Understand everyday chemicals so that you can make decisions regarding their relationship to knowledge according to your study program.	1. Explain the principles that support green chemistry 2. Analyze examples of the application of green chemistry which can be accessed via the internet 3. Analyze the characteristics of household chemicals. 4. Analyze the characteristics of chemicals in food. 5. Explain addictive and psychotropic substances	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 3 X 50			0%
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15	Understand the principles that support green chemistry. Understand everyday chemicals so that you can make decisions regarding their relationship to knowledge according to your study program.	1. Explain the principles that support green chemistry 2. Analyze examples of the application of green chemistry which can be accessed via the internet 3. Analyze the characteristics of household chemicals. 4. Analyze the characteristics of chemicals in food. 5. Explain addictive and psychotropic substances	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures, carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written examination, with a weight of (2) 4.3. Assignment value for working on questions, writing papers and practical work (weight 2) 5.4. The Final Semester Examination (UAS) is carried out by assessing all relevant indicators through a written examination, with a weight of (3) 6.5. The final NA is (participation grade") (assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10	1. Discussion 2. Question and answer 3. Practice questions 3 X 50			0%
16	UAS	Indicators 9-15	Criteria: Student scores are included in UAS scores	3 X 50 test			0%

Evaluation Percentage Recap: Project Based Learning

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.

9. **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.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **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%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.