



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 I	8420403123		T=3	P=0	ECTS=4.77	1	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																																						
		<table border="1" style="margin: auto;"> <tr> <td style="width: 10%; text-align: center;">P.O</td> <td colspan="6"></td> </tr> </table>						P.O																															
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Short Course Description	Study of basic concepts: Scientific Method, Properties of Matter, Stoichiometry, Atomic Structure, Periodic System of Elements, Chemical Bonding, Energetics, Solutions, as well as appropriate laboratory activities through discussions, assignments and practicum.																																						
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td rowspan="2" style="width: 5%;">P.O</td> <td colspan="16">Week</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td> </tr> </table>							P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																							
References	Main : 1. Tim Kimia Dasar. 2007.Kimia Dasar I .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	Prof. Dr. Harun Nasrudin, M.S. Dr. Maria Monica Sianita Basukiwardojo, M.Si. Dr. Amaria, M.Si. Prof. Dr. Utiya Azizah, M.Pd. Dr. Mitarlis, S.Pd., M.Si. Prof. Dr. Nuniek Herdyastuti, M.Si. Prof. Dr. Sari Edi Cahyaningrum, M.Si. Rusly Hidayah, S.Si., 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	Understanding chemistry as the result of scientific activities that study matter with universal properties	1. Explain the scientific steps 2. Explain extensive and intensive properties 3. Explain the differences in chemical and physical properties of elements, compounds and mixtures	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x 2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Question and answer 3. Learning strategy concept map 3 X 50			0%
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2	Understand the things that underlie stoichiometry, namely: the basic laws of atomic and molecular chemistry, the mole concept and Avogadro's constant, chemical reaction compound formulas as well as molarity and equivalence	1. Explain the basic laws of chemistry 2. Explain the difference between atoms and molecules and the concept of moles 3. Apply Avogadro's constant and compound formulas 4. Apply chemical reactions and balance molarities and equivalents in practice questions	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x 2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Assignments 3. Concept map learning strategies 4. Practicum 3 X 50			0%
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3	Understand the things that underlie stoichiometry, namely: basic laws of chemistry, atoms and molecules, the concept of moles and Avogadro's constant, compound formulas, chemical reactions and molarity and equivalence	1. Explaining the basic laws of chemistry, 2. Explaining the differences between atoms, molecules and mole concepts, 3. Applying Avogadro's constant and compound formulas, 4. Applying chemical reactions and balancing, molarity and equivalence in practice questions	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 value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Assignments 3. Concept map learning strategies 4. Practicum 3 X 50			0%
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4	Understand the things that underlie stoichiometry, namely: basic laws of chemistry, atoms and molecules, the concept of moles and Avogadro's constant, compound formulas, chemical reactions and molarity and equivalence	1. Explaining the basic laws of chemistry, 2. Explaining the differences between atoms, molecules and mole concepts, 3. Applying Avogadro's constant and compound formulas, 4. Applying chemical reactions and balancing, molarity and equivalence in practice questions	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 value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Assignments 3. Concept map learning strategies 4. Practicum 3 X 50			0%
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5	Understand the development of discoveries and basic atomic particles according to Rutherford Bohr, wave mechanics and electron configuration	1. Explain the basic particles that make up atoms 2. Explain the development of atomic theory 3. Determine the electronic configuration of various atoms	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Concept map learning strategy 3. Assignment 3 X 50			0%
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6	Understand the development of discoveries and basic atomic particles according to Rutherford, Bohr, wave mechanics and electron configuration	1. Explain the basic particles that make up atoms 2. Explain the development of atomic theory 3. Determine the electronic configuration of various atoms	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 value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Concept map learning strategy 3. Assignment 3 X 50			0%
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7	Understand the development of the use and basis of the periodic system and its relationship to the electronic configuration of elements and periodic properties	1. Explain the development of the Periodic System of Elements and the relationship between electron configurations. 2. Analyze various periodic properties	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x 2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Question and answer 3. Assignment 3 X 50			0%
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8	Midterm Exam (UTS)	Indicators at meetings 1 to 7	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Test 2 X 50			0%
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9	Decide the relationship between chemical bonds and chemical forces to explain knowledge according to the study program.	1. Explain the role of electrons in chemical bonds 2. Explain examples of ionic bonds, covalent bonds, energy, molecular structure bonds and other chemical bonds (vander Waals, hydrogen bonds, metallic bonds)	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x 2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Concept map learning strategy 3. Assignment 3 X 50			0%
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10	Decide the relationship between chemical bonds and chemical forces to explain knowledge according to the study program.	<ol style="list-style-type: none"> 1. Explain the role of electrons in chemical bonds, 2. Explain examples of ionic bonds, covalent bonds, bond energy, molecular structure and other chemical bonds (van der Waals, hydrogen bonds, metallic bonds) 	<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 value x 2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 	<ol style="list-style-type: none"> 1. Discussion 2. Concept map learning strategy 3. Assignment 3 X 50 		0%
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11	Understand the terms of the laws of thermodynamics and determine the occurrence of reactions thermodynamically	1. Explain the differences between environmental systems, functions, states, adiabatic processes, isotherms, work, heat capacity, etc.). 2. Explain the First Law of Thermodynamics, Hess's Law, Thermochemical Bond Energy, Second Law of Thermodynamics, Entropy, Free Energy.	Criteria: 1. The assessment is carried out on the following aspects: 2.1. Participation during lectures is carried out through observation (weight 2) 3.2. The Mid-Semester Examination (UTS) is carried out by assessing all relevant indicators through a written exam with weighting (2) 4.3. The value of the task of working on questions in 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 weighting (3) 6.5. The final NA is (participation value x 2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Assignment 3. Practicum 3 X 50			0%
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12	Understand the terms, laws of thermodynamics, and determine the occurrence of reactions thermodynamically	1. Explain the differences between system, environment, state function, adiabatic process, isotherm process, work, heat capacity, etc.). 2. Explain the First Law of Thermodynamics, Hess's Law, Bond Energy, Thermochemistry, Second Law of Thermodynamics, Entropy, Free Energy.	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 value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	1. Discussion 2. Assignment 3. Practicum 3 X 50			0%
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13	Understand several aspects of solutions and apply them in quantitative terms	<p>1. Compare the properties of electrolyte and non-electrolyte solutions. 2. Distinguish several colligative properties of solutions. 3. Differentiate acid-base theory. 4. Calculate the pH of the solution. 5. Explain hydrolysis and buffer solutions. 6. Determine the pH indicator path. 7. Carry out acid-base titration</p>	<p>Criteria:</p> <p>1. The assessment is carried out on the following aspects:</p> <p>2.1. Participation during lectures is 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 exam with weighting (2)</p> <p>4.3. The value of the task of working on questions in 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 weighting (3)</p> <p>6.5. The final NA is (participation value x 2) (assignment value x 3) (UTS value x 2) UAS value (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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14	Understand several aspects of solutions and apply them in quantitative terms	<p>1. Compare the properties of electrolyte and non-electrolyte solutions. 2. Distinguish several colligative properties of solutions. 3. Differentiate acid-base theory. 4. Calculate the pH of the solution. 5. Explain hydrolysis and buffer solutions. 6. Determine the pH indicator path. 7. Carry out acid-base titration</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 value x 2) (assignment value x 3) (UTS value x 2) (UAS value x 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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15	Understand several aspects of solutions and apply them in quantitative terms	<p>1. Compare the properties of electrolyte and non-electrolyte solutions. 2. Distinguish several colligative properties of solutions. 3. Differentiate acid-base theory. 4. Calculate the pH of the solution. 5. Explain hydrolysis and buffer solutions. 6. Determine the pH indicator path. 7. Carry out acid-base titration</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 value x 2) (assignment value x 3) (UTS value x 2) UAS value (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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16	Final Semester Examination (UAS)	Indicators at meetings 9 to 15	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 value x2) (assignment value x 3) (UTS value x 2) UAS value (3) divided by 10	Test 2 X 50			0%
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Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

Notes

- 1. 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.
- 2. 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.
- 3. 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.
- 4. 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.
- 5. 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.
- 6. 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.
- 7. Forms of assessment:** test and non-test.
- 8. 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.**

