



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date																																																																																			
Chemical environment	4720103107	Non-clump	T=3 P=0 ECTS=4.77	4	July 29, 2022																																																																																			
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																																																																				
	Rusmini S.Pd., M.Si.		Prof. Dr. Suyono. M.Pd.	Dr. Amaria, M.Si.																																																																																				
Learning model	Project Based Learning																																																																																							
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																																																							
	Program Objectives (PO)																																																																																							
	PO - 1	Students have knowledge about the sources, reactions, transfers, effects and changes of chemical species in air, water and soil, the reciprocal effects of human activities on all of this,																																																																																						
	PO - 2	Understand how to carry out environmental impact analysis/AMDAL (AMDAL)																																																																																						
	PO - 3	Students are skilled at using tools to conduct experiments on water quality parameters from the environment																																																																																						
	PLO-PO Matrix																																																																																							
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PO Matrix at the end of each learning stage (Sub-PO)																																																																																								
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Short Course Description	Study of 1) sources, reactions, movements, effects and changes in chemical species in air, water and soil, 2) The mutual influence of human activities on all those mentioned in numbers 1 and 3) Analysis of environmental impacts (Amdal) accompanied by supporting laboratory activities so that students are able to master related concepts, are skilled at using tools, are able to work together and can communicate their knowledge and skills scientifically																																																																																							
References	Main :																																																																																							
	1. Manahan, S. E. 1994. Environmental Chemistry . London: Lewis Publishers CRC Pres. Inc4. More,J. W. and More,E. A. ,1976. Environmental Chemistry . New York: Academic Press. 2. Radojevic,Miroslav and Bashkin, Vladimir N, 1999. Practical Environmental Analysis. Cambridge : Royal Society of Chemistry																																																																																							
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Supporting lecturer		Prof. Dr. Suyono, M.Pd. Prof. Dr. Hj. Rudianta Agustini, M.Pd. Dr. Amaria, M.Si. Rusmini, S.Pd., M.Si. Dr. Dina Kartika Maharani, S.Si., M.Sc. Prof. Dr. Nita Kusumawati, S.Si., M.Sc.					
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 environmental chemistry in general Understand the sources of reactions, transfer effects and changes in chemical species in water as well as the reciprocal influence of human activities on the environment, air, water and land	- Understand environmental chemistry in general - Explain the hydrosphere and research related to the water environment - Explain water quality parameters	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Question and answer lecture 3 X 50		Material: scope of environmental chemistry References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i>	5%
2	Understand the sources of reactions, transfer effects and changes in chemical species in water as well as the reciprocal influence of human activities on the air, water and land environments	- Understanding the sources of reactions, transfer of effects and changes in chemical species of lead (Pb) and Mercury (Hg) in water as well as the reciprocal influence of human activities on the air, water and soil environment along with preventive and curative efforts - Practicing water quality parameters	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Practical question and answer discussion presentation 3 X 50		Material: water pollutants References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> Material: water pollution References: <i>Faust, S. D and Aly, OM 1981. Chemistry of Natural Water. London: Ann Arbor Science.</i>	5%

3	Understand the sources of reactions, transfer effects and changes in chemical species in water as well as the reciprocal influence of human activities on the air, water and land environments	- Understand the sources of reactions, transfer effects and changes in chemical species of polyan Cd bacteria in water as well as the reciprocal influence of human activities on the air, water and soil environment along with preventive and curative efforts - Practicing water quality parameters	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Practical question and answer discussion presentation 2 X 50		Material: water pollutants References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> <hr/> Material: water pollution References: <i>Faust, S. D and Aly, OM 1981. Chemistry of Natural Water. London: Ann Arbor Science.</i>	5%
4	Understand the sources of reactions, transfer effects and changes in chemical species in water as well as the reciprocal influence of human activities on the air, water and land environments	- Understanding the sources of reactions, transfer of effects and changes in chemical species from dyes and pesticides in water as well as the reciprocal influence of human activities on the air, water and soil environment along with preventive and curative efforts - Practicing water quality parameters	Criteria: Student answers are included in the participation value Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practices / Performance	Practical question and answer discussion presentation 2 X 50		Material: water pollution References: <i>Faust, S. D and Aly, OM 1981. Chemistry of Natural Water. London: Ann Arbor Science.</i> <hr/> Material: water pollutants References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> <hr/> Material: water analysis methods References: <i>Radojevic, Miroslav and Bashkin, Vladimir N, 1999. Practical Environmental Analysis. Cambridge: Royal Society of Chemistry</i>	7%

5	Understand the sources of reactions, transfer effects and changes in chemical species in the air as well as the reciprocal influence of human activities on the air, water and land environments	Explains the atmosphere and research related to the air environment	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Question and answer lecture 3 X 50		Material: atmosphere and air References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> Material: air pollution References: <i>De, Anil Kumar. 1987. Environmental Chemistry. India: Willey Eastern Limited.</i>	7%
6	Understand the sources of reactions, transfer effects and changes in chemical species in the air as well as the reciprocal influence of human activities on the air, water and land environments	Understanding the sources of reactions, transfer of effects and changes in chemical species from carbon monoxide (CO), particulate mater (PM 10) and Smog in the air as well as the reciprocal influence of human activities on the air, water and soil environment, along with preventive and curative efforts.	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Discussion presentation and question and answer 3 X 50		Material: air pollutants References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> Material: air pollution References: <i>De, Anil Kumar. 1987. Environmental Chemistry. India: Willey Eastern Limited.</i>	7%

7	Understand the sources of reactions, transfer effects and changes in chemical species in the air as well as the reciprocal influence of human activities on the air, water and land environments	Understanding the sources of reactions, transfer of effects and changes in chemical species of sulfur dioxide (SO ₂), organic volatiles (VOC) and hydrogen sulfide (H ₂ S) in the air as well as the reciprocal influence of human activities on the air, water and soil environment, accompanied by preventive and curative	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Discussion presentation and question and answer 3 X 50		Material: atmosphere and air References: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> Material: air pollutants References: <i>De, Anil Kumar. 1987. Environmental Chemistry. India: Willey Eastern Limited.</i>	5%
8	U.S.S	meeting indicators 1-7	Criteria: Student scores are entered as USS scores Form of Assessment : Test	written test 2 X 50			10%
9	Understand the sources of reactions, transfer effects and changes in chemical species in the soil as well as the reciprocal influence of human activities on the air, water and soil environments	Explains the lithosphere and research related to the soil environment	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Question and answer lecture 3 X 50		Material: lithosphere Reference: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i>	7%

10	Understand the sources of reactions, transfer effects and changes in chemical species in the soil as well as the reciprocal influence of human activities on the air, water and soil environments	Understanding the sources of reactions, transfer of effects and changes in chemical species from plastic, glass and metal cans and fertilizers in the soil as well as the reciprocal influence of human activities on the environment, air, water and soil, along with preventive and curative efforts.	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Discussion presentation and question and answer 3 X 50		Material: lithosphere Reference: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> Material: lithosphere References: <i>More, JW and More, EA, 1976. Environmental Chemistry. New York: Academic Press.</i>	0%
11	Understand the sources of reactions, transfer effects and changes in chemical species in the soil as well as the reciprocal influence of human activities on the air, water and soil environments	Understanding the sources of reactions, transfer of effects and changes in chemical species from styrofoam detergent and residual waste in the soil as well as the reciprocal influence of human activities on the air, water and soil environment along with preventive and curative efforts	Criteria: Student answers are included in the participation value Form of Assessment : Participatory Activities	Discussion presentation and question and answer 3 X 50		Material: lithosphere Reference: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i> Material: lithosphere References: <i>More, JW and More, EA, 1976. Environmental Chemistry. New York: Academic Press.</i>	5%

12	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	<p>Criteria: Student answers are included in the participation value</p> <p>Form of Assessment : Participatory Activities</p>	Lecture question and answer assignment 3 X 50		<p>Material: lithosphere Reference: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i></p> <hr/> <p>Material: lithosphere References: <i>More, JW and More, EA, 1976. Environmental Chemistry. New York: Academic Press.</i></p>	5%
13	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	<p>Criteria: The student's answers are included in the presentation participation value and are included in the assignment value</p> <p>Form of Assessment : Participatory Activities</p>	Practice discussion and question and answer 3 X 50		<p>Material: amdal Reference: <i>De, Anil Kumar. 1987. Environmental Chemistry, India:Willey Eastern Limited.</i></p> <hr/> <p>Material: AMDAL Reference: <i>More, JW and More, EA, 1976. Environmental Chemistry. New York: Academic Press.</i></p>	5%
14	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	<p>Criteria: Student answers are included in the participation value and presentations are included in the assignment value</p> <p>Form of Assessment : Participatory Activities</p>	Question and answer discussion presentation 3 X 50		<p>Material: amdal Reference: <i>De, Anil Kumar. 1987. Environmental Chemistry, India:Willey Eastern Limited.</i></p> <hr/> <p>Material: AMDAL Reference: <i>More, JW and More, EA, 1976. Environmental Chemistry. New York: Academic Press.</i></p>	5%

15	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	<p>Criteria: Student answers are included in the participation value and presentations are included in the assignment value</p> <p>Form of Assessment : Participatory Activities, Tests</p>	Question and answer discussion presentation 3 X 50		<p>Material: amdal Reference: <i>De, Anil Kumar. 1987. Environmental Chemistry. India: Willey Eastern Limited.</i></p> <hr/> <p>Material: AMDAL Reference: <i>More, JW and More, EA, 1976. Environmental Chemistry. New York: Academic Press.</i></p>	12%
16	UAS	meeting indicators 9-15	<p>Criteria: Student scores are included in the UAS component</p> <p>Form of Assessment : Test</p>	2 X 50 test		<p>Material: lithosphere, atmosphere, hydrosphere Reference: <i>Manahan, SE 1994. Environmental Chemistry. London: Lewis Publishers CRC Pres. Inc4. More, JW and More, EA , 1976. Environmental Chemistry. New York: Academic Press.</i></p>	10%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	69.33%
2.	Project Results Assessment / Product Assessment	2.33%
3.	Practice / Performance	2.33%
4.	Test	26%
		99.99%

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.

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.