	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
Chemical environment	8420403154	Study Program Elective Courses	**T=3**	**P=0**	**ECTS=4.77**	7	April 27, 2023

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Rusmini S.Pd., M.Si.	Prof. Dr. Suyono, M.Pd.	Prof. Dr. Utiya Azizah, M.Pd.

Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-6	Able to adapt to various developments in chemical science, continue to develop and learn throughout life to continue education, both formal and informal (CPL 8)
	PLO-9	Mastering the principles of K3 (Work Safety and Security), managing the laboratory and using its equipment as well as how to operate chemical instruments (CPL 3)
	PLO-11	Able to demonstrate knowledge related to theoretical concepts about structure, dynamics and energy, as well as basic principles of separation, analysis, synthesis and characterization of chemicals (CPL 1)
	Program Objectives (PO)	
	PLO-PO Matrix	

P.O	PLO-6	PLO-9	PLO-11

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	Study of 1) sources, reactions, transfer, effects and changes in chemical species in air, water and soil, 2) Mutual influence of human activities on all those mentioned in number 1 and 3) Analysis of environmental impacts (Amdal) accompanied by supporting laboratory activities so that students are able to master related concepts, are skilled in using tools, are able to work together and can communicate their knowledge and skills scientifically.	
References	**Main :**	

1. De, anil Kumar. 1987.EnvironmentalChemistry. India:Willey Eastern Limited.
2. Faust, S. D and Aly, O. M. 1981.Chemistry of Natural Water.London: Ann Arbor Science.
3. Manahan, S. E. 1994.EnvironmentalChemistry. London: Lewis Publishers CRC Pres. Inc4. More,J. W. and More,E. A. ,1976.Environmental Chemistry. New York: Academic Press.
4. Radojevic,Miroslav and Bashkin, Vladimir N, 1999,PracticalEnvironmental Analysis, Cambridge : Royal Society of Chemistry

Supporters:

1. artikel-artikel jurnal penelitian yang relevan

Supporting lecturer	Prof. Dr. Suyono, M.Pd. Prof. Dr. Hj. Rudiana Agustini, M.Pd. Dr. Amaria, M.Si. Rusmini, S.Pd., 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	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			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 **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment	Practical question and answer discussion presentation 3 X 50			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 polytan 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 Assessment	Practical question and answer discussion presentation 2 X 50			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 **Form of Assessment** : Participatory Activities, Practical Assessment	Practical question and answer discussion presentation 2 X 50			5%
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			5%
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			5%
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 (SO2), organic volatiles (VOC) and hydrogen sulfide (H2S) 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			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			5%
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			5%
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			5%
12	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	**Criteria:** Student answers are included in the participation value **Form of Assessment** : Participatory Activities	Lecture question and answer assignment 3 X 50			5%

13	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	**Criteria:** The student's answers are included in the presentation participation value and are included in the assignment value **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Practice discussion and question and answer 3 X 50			10%
14	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	**Criteria:** Student answers are included in the participation value and presentations are included in the assignment value **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Question and answer discussion presentation 3 X 50			5%
15	Understand how to carry out environmental impact analysis (AMDAL)	Explains ways to carry out environmental impact analysis (AMDAL) and applicable legislation	**Criteria:** Student answers are included in the participation value and presentations are included in the assignment value **Form of Assessment** : Participatory Activities	Question and answer discussion presentation 3 X 50			5%
16	UAS	meeting indicators 9-15	**Criteria:** results of entrance scores for UAS components **Form of Assessment** : Test	2 X 50 test			15%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	59.17%
2.	Project Results Assessment / Product Assessment	9.17%
3.	Practical Assessment	6.67%
4.	Test	25%
		100%

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.