	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
Instrument Analysis Practicum	4720101155	Compulsory Study Program Subjects	T=1	P=0	ECTS=1.59	6	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	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)
	PLO-PO Matrix

	P.O

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	SEMESTER LEARNING PLAN (RPS) Faculty: FMIPA Unesa Study Program: Chemistry Course Name / Weight: Instrument Analysis Practicum / 1 Course Code: Prerequisite Course: Have taken Analytical Chemistry IV and V Lecturer: Prof. Dr. Titik Taufikurohmah, M.Si Dr. Pirim Setiarso, M.Si Dr. Nita Kusumawati, M.Sc Description: Study of chemical analysis qualitatively and quantitatively in terms of chemical structure, energetics and analysis based on the working principles of several Chromatography and Electrochemistry Spectrophotometer instruments accompanied by supporting laboratory activities so that students are able to master related concepts, are skilled in using tools, able to work together and communicate knowledge and skills scientifically. Reference: Ewing GW, 1981, Instrumental Methods Of Chemical Analysis, International Student Edition, Tokyo: McGraw-Hill Kogakusha Ltd Harvey,D. 2000. Modern Analytical Chemistry. Int. Ed. Singapore: Mc. Graw Hill
References	**Main :**
	1. Referensi : Ewing G.W, 1981, *Instrumental Methods Of Chemical Analysis,* International Student Edition, Tokyo: McGraw-Hill Kogakusha Ltd Harvey,D. 2000. *Modern Analytical Chemistry.* Int. Ed. Singapore: Mc.Graw Hill
	Supporters:
Supporting lecturer	Prof. Dr. Pirim Setiarso, M.Si. Dr. Maria Monica Sianita Basukiwardojo, M.Si. Prof. Dr. Titik Taufikurohmah, S.Si., M.Si. 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	Analysis of metal compounds using UV-Vis instruments	1. Can prepare metal samples for UV-Vis instruments 2. Can analyze the concentration of a metal using UV-Vis instruments Can operate UV-Vis instruments	**Criteria:** 3xAssignments 2 Participation 3 UAS 2 UTS/10 **Form of Assessment** : Participatory Activities	Practicum, presentation 3 X 50			0%
2	Analysis of metal compounds using UV-Vis instruments	1. Can prepare metal samples for UV-Vis instruments 2. Can analyze the concentration of a metal using UV-Vis instruments Can operate UV-Vis instruments	**Criteria:** 3xAssignments 2 Participation 3 UAS 2 UTS/10 **Form of Assessment** : Participatory Activities	Practicum, presentation 3 X 50			0%
3	Analysis of metal compounds using AAS instruments	1. Can prepare metal samples for AAS instruments 2. Can analyze the concentration of a metal using AAS instruments 3. Can operate AAS instruments	**Criteria:** 3xuts 2x participation 2x assignments 3%2UAS/10	Practicum, presentation 3 X 50			0%
4	Analysis of metal compounds using AAS instruments	1. Can prepare metal samples for AAS instruments 2. Can analyze the concentration of a metal using AAS instruments 3. Can operate AAS instruments	**Criteria:** 2x UAS 2x participation 3x assignment 3 UAS/10 **Form of Assessment** : Practical Assessment	Practicum, presentation 3 X 50			0%
5	Quantitative analysis of acids/bases using potentiometric titration	1. Can prepare acid/base samples for potentiometric instruments 2. Can analyze the concentration of an acid/base using potentiometric instruments 3. Can operate potentiometric instruments	**Criteria:** 2x participation 3x assignments 2x midterms 3x exams **Form of Assessment** : Practical Assessment	Practicum, presentation 3 X 50			0%
6	Quantitative analysis of acids/bases using potentiometric titration	1. Can prepare acid/base samples for potentiometric instruments 2. Can analyze the concentration of an acid/base using potentiometric instruments 3. Can operate potentiometric instruments	**Criteria:** 2x participation 3x assignments 2x midterms 3x exams **Form of Assessment** : Practical Assessment	Practicum, presentation 3 X 50		**Material:** Potentiometric titration **Bibliography:** *References: Ewing GW, 1981, Instrumental Methods Of Chemical Analysis, International Student Edition, Tokyo: McGraw-Hill Kogakusha Ltd Harvey,D. 2000. Modern Analytical Chemistry. Int. Ed. Singapore: Mc. Graw Hill*	0%

7	Analysis of metal compounds using conductometric instruments	1. Can prepare metal samples for conductometric instruments 2. Can analyze the concentration of a metal using conductometric instruments 3. Can operate conductometer instruments	**Criteria:** 2x participation 3%2 assignments 2%2 uts 3x uas/10	Practicum, presentation 3 X 50			0%
8	UTS	UV Practicum, AAS, Potentiometry	**Criteria:** 2x participation 3x tgs 2x Uts 3xuas/10 **Form of Assessment** : Test	written test, practical 1 X 50		**Material:** UTS **Bibliography:** *References: Ewing GW, 1981, Instrumental Methods Of Chemical Analysis, International Student Edition, Tokyo: McGraw-Hill Kogakusha Ltd Harvey,D. 2000. Modern Analytical Chemistry. Int. Ed. Singapore: Mc. Graw Hill*	0%
9	Analysis of metal compounds using conductometric instruments	1. Can prepare metal samples for conductometric instruments 2. Can analyze the concentration of a metal using conductometric instruments 3. Can operate conductometric instruments	**Criteria:** 2x participation 3x tgs 2xuts 3x uas/10	Practicum, presentation 3 X 50			0%
10	Analysis of metal compounds using voltammetric instruments	1. Can prepare metal samples for voltammetric instruments 2. Can analyze the concentration of a metal using voltammetric instruments 3. Can operate voltammetric instruments	**Criteria:** 2x participation 2xuts 3x tgs 3xuas/10	Practicum, presentation 3 X 50			0%
11	Analysis of metal compounds using voltammetric instruments	1. Can prepare metal samples for voltammetric instruments 2. Can analyze the concentration of a metal using voltammetric instruments 3. Can operate voltammetric instruments	**Criteria:** 2xparticipation 2xuts 3x tgs 3x uas/10	Practicum, presentation 3 X 50			0%
12	Analysis of organic compounds using IR	Can prepare organic samples for IR. Can analyze organic compounds using IR instruments. Can operate IR instruments	**Criteria:** (2xparticipation 3xassignments 2xUTS 3xUAS)/10	Practicum, presentation 3 X 50			0%

13	Analysis of organic compounds using IR	Can prepare organic samples for IR. Can analyze organic compounds using IR instruments. Can operate IR instruments	**Criteria:** (2xparticipation 3xassignments 2xUTS 3xUAS)/10	Practicum, presentation 3 X 50			0%
14	Analysis of organic compounds by HPLC	Can prepare organic samples for HPLC. Can analyze organic compounds using HPLC instruments. Can operate HPLC instruments	**Criteria:** (2xparticipation 3xassignments 2xUTS 3xUAS)/10	Practical, Presentation 3 X 50			0%
15	Analysis of organic compounds by HPLC	1. Can prepare organic samples for HPLC 2. Can analyze organic compounds using HPLC instruments 3. Can operate HPLC instruments	**Criteria:** 3x Tgs 2x P 2xuts 3x uas/10	Practicum, presentation 3 X 50			0%
16	UAS (HPLC, IR, Voltammetry)	Can analyze HPLC, IR, Voltammetry	**Criteria:** 3x tgs 2x p 3x uas 2x uts/10	Practicum, written test 3 X 50			0%

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.