	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
Analytical Chemistry III: Basics-2 of Chemical Separation	8420403101		T=3	P=0	ECTS=4.77	4	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

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 chemical separation techniques in terms of chemical structure, energetics and chemical analysis including distillation, extraction, chromatography, membrane and electroanalysis techniques followed by supporting laboratory activities so that students are able to master related concepts, are skilled in using tools, are able to work together and be responsible and can communicate their knowledge and skills scientifically.
References	**Main :**

1. Day, Underwood, Ray 2002. Kimia Analisis Kuantitatif (terjemahan). Jakarta: Erlangga
2. Harvey, D.2000. Modern Analytical Chemistry . Int.Ed. Singapore: Mc Graw Hill
3. Pecksok, et al. 1976. Modern Methods of Analytical Chemistry 2nd. New York: John Wiley and Sons
4. Soebagio, Budiasih, E, Ibnu, S, Widarti, H.R, Munzil. 2001. Kimia Analitik II (Common Book). Malang: IMSTEP – JICA FMIPA Universitas Negeri Malang

Supporters:	
Supporting lecturer	Prof. Dr. Pirim Setiarso, M.Si. Dr. Maria Monica Sianita Basukiwardojo, M.Si. Prof. Dr. Utiya Azizah, M.Pd. Rusmini, S.Pd., 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	Understand the purpose, benefits, and basics of separation in general and understand the basic concepts of distillation, single distillation, multilevel (fractional) distillation, and be able to carry out separation by distillation	Mention the objectives, benefits and classify the basics of separation and explain the basic concepts of distillation and single distillation	**Criteria:** attached	Lectures, questions and answers, assignments, 3 X 50			0%
2	Understand the basic concepts of distillation, single distillation, multilevel (fractional) distillation, and be able to carry out separation by distillation	Explain the basic concepts of multistage and steam distillation	**Criteria:** attached	Lectures, questions and answers, assignments, 3 X 50			0%
3	Understand the basic calculations in extraction, successive extraction. Extraction of metal ions by chelation, Craig extraction, and skilled separation by extraction	Explain the basic concepts of extraction, sequential extraction and metal ion extraction	**Criteria:** attached	Lectures, questions and answers, assignments, demonstrations, 3 X 50			0%
4	Understand the basic calculations in extraction, successive extraction. Extraction of metal ions by chelation, Craig extraction, and skillful in carrying out separation by extraction and Understanding the basic concepts of chromatography, chromatographic classification	Explain the basic concepts of Craig extraction and the basic concepts of chromatography	**Criteria:** attached	Lectures, questions and answers, assignments, practice questions 3 X 50			0%
5	Understand the basic concepts of chromatography, chromatography classification, chromatography analysis techniques and be skilled in carrying out separations using chromatography	Explain the classification of chromatography and chromatographic analysis techniques	**Criteria:** attached	Lectures, questions and answers, assignments, practice questions 3 X 50			0%
6	Carry out separation by means of distillation, extraction and chromatography	Skilled in carrying out separations by means of distillation, extraction and chromatography	**Criteria:** attached	Practical work on distillation, extraction and chromatography 6 X 50			0%
7	Carry out separation by means of distillation, extraction and chromatography	Skilled in carrying out separations by means of distillation, extraction and chromatography	**Criteria:** attached	Practical work on distillation, extraction and chromatography 6 X 50			0%
8	UTS	meeting indicators 1-7	**Criteria:** attached	written test 3 X 50			0%
9	Understand the basics of separation by means of electroanalysis, and be skilled in carrying out separations by means of electroanalysis	Explain the basic concepts of electroanalysis	**Criteria:** attached	Lecture, question and answer 3 X 50			0%

10	Understand the basics of separation by means of electroanalysis, and be skilled in carrying out separations by means of electroanalysis	Explain the basic concepts of electrogravimetry	**Criteria:** attached	Lecture, question and answer, assignment 3 X 50			0%
11	Understand the basics of separation by means of electroanalysis, and be skilled in carrying out separations by means of electroanalysis	Skilled in carrying out separations using electroanalysis	**Criteria:** attached	Electrogravimetry practical 3 X 50			0%
12	Understand the basics of membrane separation and be skilled at carrying out membrane separation	Understand the basic concepts of membranes, types of membranes and their applications	**Criteria:** attached	Lectures, discussions, questions and answers 3 X 50			0%
13	Understand the basics of membrane separation and be skilled at carrying out membrane separation	Understand the mechanism of the separation process through the membrane	**Criteria:** attached	Lectures, discussions, questions and answers 3 X 50			0%
14	Understand the basics of membrane separation and be skilled at carrying out membrane separation	Understand synthetic membrane preparation techniques and separation analysis using membranes	**Criteria:** attached	Lectures, discussions, questions and answers 3 X 50			0%
15	Understand the basics of membrane separation and be skilled at carrying out membrane separation	Skilled in preparing synthetic membranes as well as carrying out separation and analysis of separation results using membranes	**Criteria:** attached	practicum 3 X 50			0%
16	UAS	meeting indicators 9-15	**Criteria:** attached	3 X 50 test			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.