	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
Fundamentals of Analytical Chemistry	4720103180	Compulsory Study Program Subjects	T=3	P=0	ECTS=4.77	2	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Case Studies**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	Program Objectives (PO)	
	PO - 1	explains the basic principles of analysis which include qualitative and quantitative analysis processes
	PO - 2	understand cation anion analysis
	PO - 3	Understand the principles of neutralization, complexing, precipitation and redox titration in calculating the levels of a substance
	PLO-PO Matrix	

P.O
PO-1
PO-2
PO-3

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
PO-1																
PO-2																
PO-3																

Short Course Description	Study of the basic theory of qualitative and quantitative analysis that supports the process, as well as evaluation of results; qualitative analysis which includes systematic identification of cations and anions; quantitative analysis including gravimetry and volumemetry (acid-base, precipitation, complexing, redox). Followed by supporting lab activities. so that students are able to master related concepts, are able to collaborate and be responsible and can communicate their knowledge and skills scientifically

References

Main :

1. Svehla, G, 1979. Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed. London: Longman Group Limited
2. Day, Jr, R.A., dan Underwood, A.L., 2002. Quantitative Analysis. Sixth Ed. (Alih bahasa: Sopyan, I.). Jakarta: Penerbit Erlangga.
3. Poedjiastoeti, S., Monica, M., Sukarmin, dan Rusmini. 2016. Kimia Analisis Kualitatif. Surabaya: Unipress
4. Basset,J.,et.al.1991. Vogel: Texbook of Quantitative Inorganic Analysis Including Elementary Instrumental Analysis. London: Longman Group Limited
5. Briggs, J. G. R. 2000.Chemistry for GCE 'O' Level Practical Workbook. Singapore: Pearson Education Asia Pte Ltd
6. Sawyer, Heineman, and Beebe.1984. Chemistry Experiments for Instrumental Methods. New York: John Wiley & Sons

Supporters:

Supporting lecturer	Prof. Dr. Pirim Setiarso, M.Si. Dr. Maria Monica Sianita Basukiwardojo, M.Si. Prof. Dr. Utiya Azizah, M.Pd. Dr. Sukarmin, M.Pd. Prof. Dr. Titik Taufikurohmah, S.Si., M.Si. 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	Understanding Supporting Theories	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	lecture, question and answer		**Material:** qualitative analysis **References:** *Svehla, G, 1979. Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed. London: Longman Group Limited*	5%
2	Understanding the Supporting Theory of quantitative analysis	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	lecture, question and answer		**Material:** quantitative analysis **Bibliography:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	5%
3	Understand and be skilled in carrying out qualitative and quantitative analysis experimental techniques	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	lectures, questions and answers, demonstrations		**Material:** principles of quantitative analysis **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.* **Material:** qualitative analysis **References:** *Poedjiastoeti, S., Monica, M., Sukarmin, and Rusmini. 2016. Qualitative Analytical Chemistry. Surabaya: Unipress*	5%

4	general preliminary analysis and group 1	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	question and answer lecture		**Material:** qualitative analysis **References:** *Svehla, G, 1979. Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed. London: Longman Group Limited*	2%
5	analysis of group II and III cations	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	question and answer lecture			2%
6	analysis of group IV and V cations	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities, Practical Assessment	lectures, questions and answers, presentations, practicums		**Material:** qualitative analysis **References:** *Svehla, G, 1979. Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed. London: Longman Group Limited*	8%
7	anion analysis	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities, Practical Assessment	lecture, question and answer, practicum		**Material:** anion analysis **References:** *Svehla, G, 1979. Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed. London: Longman Group Limited* **Material:** anion analysis **References:** *Poedjiastoeti, S., Monica, M., Sukarmin, and Rusmini. 2016. Qualitative Analytical Chemistry. Surabaya: Unipress*	10%

8	cation and anion analysis	complete if more than 70	**Criteria:** attached **Form of Assessment** : Test	writing test		**Material:** qualitative analysis **References:** *Svehla, G, 1979. Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed. London: Longman Group Limited* **Material:** qualitative analysis **Bibliography:** *Sawyer, Heineman, and Beebe.1984. Chemistry Experiments for Instrumental Methods. New York: John Wiley & Sons* **Material:** qualitative analysis **References:** *Poedjiastoeti, S., Monica, M., Sukarmin, and Rusmini. 2016. Qualitative Analytical Chemistry. Surabaya: Unipress*	10%
9		asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	lectures, questions and answers,		**Material:** neutralization titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	5%
10	polyprotic acid-base neutralization titration	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities, Practical Assessment	lecture, question and answer, practicum		**Material:** neutralization titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	10%

11	Understand the principles of precipitation titration in calculating the concentration of a substance	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	lecture, question and answer		**Material:** precipitation titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	5%
12	Understand the principles of precipitation titration in calculating the concentration of a substance	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities	lecture, question and answer		**Material:** precipitation titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	5%
13	complexing titration	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Participatory Activities, Practical Assessment	practical question and answer lecture		**Material:** complexing titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	10%
14	Redox titration and its applications	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached	lecture and question and answer		**Material:** redox titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	5%
15	Redox titration and its applications	asking/answering questions/proposing opinions/rebutting	**Criteria:** attached **Form of Assessment** : Practical Assessment	lecture, question and answer, practicum		**Material:** redox titration **References:** *Day, Jr, RA, and Underwood, AL, 2002. Quantitative Analysis. Sixth Ed. (Translation: Sopyan, I.). Jakarta: Erlangga Publishers.*	8%
16	quantitative analysis	complete if more than 70	**Criteria:** attached **Form of Assessment** : Test	writing test			10%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	53%

2.	Practical Assessment	27%
3.	Test	20%
		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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.