

COURSE PORTFOLIO

Qualitative and Quantitative Chemical Analysis Academic Year – 2020/2021

- PLO 1 Able to apply religious attitudes, demonstrate an internalizing academic and human values
- PLO 2 Able to demonstrate excellence, honesty, competitiveness, leadership, and possessing social sensitivity to society and the environment
- PLO 3 Able to demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner
- PLO 4 Able to communicate ideas, scientific research results clearly in oral or written format to scientists and the wider community
- PLO 5 Able to Integrating mathematical and basic concepts of science to solve problems in chemistry
- PLO 6 Able to master the knowledge of chemistry (organic chemistry, inorganic, analytical, physical, and biochemical)
- PLO 7 Able to understand concepts and applications in the field of biosciences and materials chemistry to solve problems in the field of chemistry and its applications
- PLO 8 Able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments
- PLO 9 Able to understand work safety, ethics, environmental issues, and policies related to the chemical field
- PLO 10 Able to carry out laboratory and research work by paying attention to the safety and security of laboratory work and applying responsible scientific behavior.
- PLO 11 Able to obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics.
- PLO 12 Able to solve science and technology problems in chemistry independently based on relevant scientific methodologies and present it as a scientific work.

Course Outcome (CO):

CO 1.	Able to choose a sampling technique according to the characteristics of the sample
CO 2.	Analyze the types of cations and anions in a sample
CO 3.	Analyze the accuracy and precision of a quantitative analysis method based on experimental data
CO 4.	Determining the level/concentration of a substrate in a volumetric sample with an appropriate analytical method
CO 5.	Determining the level/concentration of a substrate in a sample gravimetrically

Lecturers:

1. Dra. Tritiyatma H., M.Si.
2. Dr. Moersilah, M.Si.
3. Prof. Dr. Erdawati, M.Sc.
4. Yussi Pratiwi, M.Sc.

Mapping Course Learning Outcome (CO) and Program Learning Outcome (PLO)

Program Learning Outcome Course Outcome	PLO 3. Able to demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner	PLO 6. Able to master the knowledge of chemistry (organic chemistry, inorganic, analytical, physical, and biochemical)
CO 1. Able to choose a sampling technique according to the characteristics of the sample	• (Assignment)	
CO 2. Analyze the types of cations and anions in a sample		• (Assignment, Midterm Exam)
CO 3. Analyze the accuracy and precision of a quantitative analysis method based on experimental data		• (Project, Midterm Exam)
CO 4. Determining the level/concentration of a substrate in a volumetric sample with an appropriate analytical method		• (Assignment, Final Exam)
CO 5. Determining the level/concentration of a substrate in a sample gravimetrically		• (Project, Final Exam)

Forms of Assessment

Group/Individuals Assignment	= 20%
Project	= 20%
Midterm examination	= 30%
Final examination	= 30%
Total	= 100%

	PLO 3 Critical Thinking	PLO 6 Problem Solving
Assignment	50%	50%
Project	50%	50%
Midterm examination	30%	70%
Final examination	30%	70%

Outcomes Assessment

No	Name	Assignment	Project	Midterm Exam	Final Exam	Final Grade and Score	
1	A	74	75	80	58	71.20	B
2	B	63	65	55	37	53.20	B-
3	C	70	75	70	42	62.60	B-
4	D	67	75	70	48	63.80	B-
5	E	66	75	65	41	60.00	B-
6	F	60	75	70	35	58.50	B-
7	G	75	75	70	65	70.50	B-
8	H	72	75	65	64	68.10	B-
9	I	72	75	85	45	68.40	B-
10	J	68	65	55	46	56.90	B-
11	K	70	75	65	60	66.50	B-
12	L	74	75	65	67	69.40	B-
13	M	63	70	60	46	58.40	B-
14	N	65	75	65	50	62.50	B-
15	O	65	75	70	45	62.50	B-

16	P	63	70	65	41	58.40	B-
17	Q	60	65	55	27	49.60	B-
18	R	73	80	85	55	72.60	B
19	S	65	70	60	44	58.20	B-
20	T	67	75	65	55	64.40	B-
21	U	70	75	65	59	66.20	B-
22	V	70	80	65	69	70.20	B-
23	W	70	80	80	54	70.20	B-
24	X	73	70	70	51	64.90	B-
25	Y	60	65	45	41	50.80	B-
26	Z	67	70	65	44	60.10	B-
27	AA	65	70	80	30	60.00	B-
28	AB	74	75	85	48	69.70	B-
29	AC	60	75	70	32	57.60	B-
30	AD	65	75	50	65	62.50	B-
31	AF	73	75	85	46	68.90	B-

Calculation of Weight per PLO

Form of Assessment	Weight	Weight per PLO		Total	Total Weight	
		PLO 3	PLO 6		PLO 3	PLO 6
Assignment	0.20	0.50	0.50	1.00	0.10	0.10
Project	0.20	0.50	0.50	1.00	0.10	0.10
Midterm Exam	0.30	0.30	0.70	1.00	0.09	0.21
Final Exam	0.30	0.30	0.70	1.00	0.09	0.21
Total	1.00	1.60	2.40	1.00	0.38	0.62

Example of PLO Calculation

No	Name	Assignment	Project	Midterm Exam	Final Exam	Final Score and Grade	
1	A	74	75	80	58	71.20	B

No	Name	PLO 3	PLO 6
1	A	$(74*0.10) + (75*0.10) + (80*0.09) + (58*0.09) / 0.38 = 71.89$	$(74*0.10) + (75*0.10) + (80*0.21) + (58*0.21) / 0.62 = 70.77$

PLO Assessment Rubric

PLO	Performance Criteria	Excellent (E)	Good (G)	Satisfy (S)	Fail (F)
3	Demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner	Students are able to demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner with a score of at least 80.	Students are able to demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner with a score of at least 70 and less than 80.	Students are able to demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner with a score of at least 60 and less than 70.	Students are able to demonstrate performance independently or as part of a team professionally and measurably by applying interdisciplinary knowledge and skill, critical, and creative thinking in the context of being a lifelong learner with a score of less than 60.
6	Able to master the knowledge of chemistry (organic chemistry, inorganic, analytical,	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical,	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical,	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical,	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical,

physical, and biochemical)	and	physical, and biochemical) with a score of at least 80.	physical, and biochemical) with a score a score of at least 70 and less than 80.	physical, and biochemical) with a score of at least 60 and less than 70.	physical, and biochemical) with a score of less than 60.
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Example of PLO Predicates for Each Student

No	Name	PLO 3	PLO 6
1	A	71.89 Good	70.77 Good

PLO Predicates for All Students

No	Name	Assignment	Project	Midterm Exam	Final Exam	Final Grade and Score		PLO 3	PLO 6	PLO 3	PLO 6
1	A	74	75	80	58	71.20	B	71.89	70.77	G	G
2	B	63	65	55	37	53.20	B-	55.47	51.81	F	F
3	C	70	75	70	42	62.60	B-	64.68	61.32	S	S
4	D	67	75	70	48	63.80	B-	65.32	62.87	S	S
5	E	66	75	65	41	60.00	B-	62.21	58.65	S	F
6	F	60	75	70	35	58.50	B-	60.39	57.34	S	F
7	G	75	75	70	65	70.50	B-	71.45	69.92	G	S
8	H	72	75	65	64	68.10	B-	69.24	67.40	S	S
9	I	72	75	85	45	68.40	B-	69.47	67.74	S	S
10	J	68	65	55	46	56.90	B-	58.92	55.66	F	F
11	K	70	75	65	60	66.50	B-	67.76	65.73	S	S
12	L	74	75	65	67	69.40	B-	70.47	68.74	G	S
13	M	63	70	60	46	58.40	B-	60.11	57.35	S	F
14	N	65	75	65	50	62.50	B-	64.08	61.53	S	S

15	O	65	75	70	45	62.50	B-	64.08	61.53	S	S
16	P	63	70	65	41	58.40	B-	60.11	57.35	S	F
17	Q	60	65	55	27	49.60	B-	52.32	47.94	F	F
18	R	73	80	85	55	72.60	B	73.42	72.10	G	G
19	S	65	70	60	44	58.20	B-	60.16	57.00	S	F
20	T	67	75	65	55	64.40	B-	65.79	63.55	S	S
21	U	70	75	65	59	66.20	B-	67.53	65.39	S	S
22	V	70	80	65	69	70.20	B-	71.21	69.58	G	S
23	W	70	80	80	54	70.20	B-	71.21	69.58	G	S
24	X	73	70	70	51	64.90	B-	66.29	64.05	S	S
25	Y	60	65	45	41	50.80	B-	53.26	49.29	F	F
26	Z	67	70	65	44	60.10	B-	61.87	59.02	S	F
27	AA	65	70	80	30	60.00	B-	61.58	59.03	S	F
28	AB	74	75	85	48	69.70	B-	70.71	69.08	G	S
29	AC	60	75	70	32	57.60	B-	59.68	56.32	F	F
30	AD	65	75	50	65	62.50	B-	64.08	61.53	S	S
31	AF	73	75	85	46	68.90	B-	69.97	68.24	S	S

Distribution of PLO Achievements

	Grade	PLO 3	PLO 6
%	E	0	0
%	G	22.58064516 %	6.451612903 %
%	S	61.29032258 %	54.83870968 %
%	F	16.12903226 %	38.70967742 %
Total		100 %	100 %

Achievement Percentage of PLO