

COURSE PORTFOLIO

Instrumental 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 evaluate the quality of a method based on experimental data
CO 2.	Able to choose qualitative and quantitative analysis methods based on the characteristics of the sample by instrumentation
CO 3.	Able to determine the structural and molecular formula of a substance based on the results of its spectral analysis

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)	PLO 8. Able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments
CO 1. Able to evaluate the Quality of a method based on experimental data	• (Assignment, Project)		
CO 2. Able to choose qualitative and quantitative analysis methods based on the characteristics of the sample by instrumentation		• (Assignment, Midterm Exam)	
CO 3. Able to determine the structural and molecular formula of a substance based on the results of its spectral analysis			• (Assignment, Final Exam)

Forms of Assessment

Group/Individuals Assignment	= 20%
Project	= 20%
Midterm examination	= 30%

Final examination = 30%
 Total = 100%

Form of Assessment	Weight	Weight per PLO			Total	Total Weight		
		PLO 3	PLO 6	PLO 8		PLO 3	PLO 6	PLO 8
Assignment	0.20	0.20	0.40	0.40	1.00	0.04	0.08	0.08
Project	0.20	0.20	0.40	0.40	1.00	0.04	0.08	0.08
Midterm Exam	0.30	0.00	0.50	0.50	1.00	0.00	0.15	0.15
Final Exam	0.30	0.00	0.50	0.50	1.00	0.00	0.15	0.15
Total	1.00	0.40	1.80	1.80	1.00	0.08	0.46	0.46

Outcomes Assessment

No	Name	Assignment	Project	Midterm Exam	Final Exam	Final Grade and Score	
1	A	85	80	80	79	80.70	B+
2	B	83	85	85	81	83.40	A-
3	C	81	80	78	74	77.80	B+
4	D	80	80	78	71	76.70	B+
5	E	76	80	76	67	74.10	B
6	F	83	80	80	77	79.70	B+
7	G	84	80	86	72	80.20	B+
8	H	87	85	83	90	86.30	A
9	I	79	80	80	68	76.20	B+
10	J	83	85	82	85	83.70	A-
11	K	85	80	80	79	80.70	B+

12	L	81	85	80	82	81.80	A-
13	M	85	85	81	88	84.70	A-
14	N	85	80	80	79	80.70	B+
15	O	81	80	80	72	77.80	B+
16	P	86	80	80	82	81.80	A-
17	Q	75	80	80	60	73.00	B
18	R	85	85	82	88	85.00	A-
19	S	81	80	83	79	80.80	B+
20	T	88	85	83	93	87.40	A
21	U	86	80	80	82	81.80	A-
22	V	81	80	80	72	77.80	B+
23	W	82	85	80	83	82.30	A-
24	X	80	80	81	70	77.30	B+
25	Y	85	85	82	87	84.70	A-
26	Z	76	75	78	64	72.80	B
27	AA	75	75	80	60	72.00	B
28	AB	85	80	80	79	80.70	B+
29	AC	82	85	87	76	82.30	A-
30	AD	85	85	83	87	85.00	A-
31	AF	82	80	82	71	78.30	B+

Calculation of Weight per PLO

Form of Assessment	Weight	Weight per PLO			Total	Total Weight		
		PLO 3	PLO 6	PLO 8		PLO 3	PLO 6	PLO 8
Assignment	0.20	0.20	0.40	0.40	1.00	0.04	0.08	0.08
Project	0.20	0.20	0.40	0.40	1.00	0.04	0.08	0.08

Midterm Exam	0.30	0.00	0.50	0.50	1.00	0.00	0.15	0.15
Final Exam	0.30	0.00	0.50	0.50	1.00	0.00	0.15	0.15
Total	1.00	0.40	1.80	1.80	1.00	0.08	0.46	0.46

Example of PLO Calculation

No	Name	Assignment	Project	Midterm Exam	Final Exam	Final Score and Grade	
1	A	85	80	80	79	80.70	B+

No	Name	PLO 3	PLO 6	PLO 8
1	A	$(85*0.04) + (80*0.04) + (80*0.00) + (79*0.00) / 0.46 = 82.50$	$(85*0.08) + (80*0.08) + (80*0.15) + (79*0.15) / 0.46 = 80.54$	$(85*0.08) + (80*0.08) + (80*0.15) + (79*0.15) / 0.46 = 80.54$

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, physical, and biochemical)	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical, physical, and biochemical) with a score of at least 80.	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical, physical, and biochemical) with a score a score of at least 70 and less than 80.	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical, physical, and biochemical) with a score of at least 60 and less than 70.	Students are able to master the knowledge of chemistry (organic chemistry, inorganic, analytical, physical, and biochemical) with a score of less than 60.
8	Able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments	Students are able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments with a score of at least 80.	Students are able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments with a score a score of at least 70 and less than 80.	Able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments with a score of at least 60 and less than 70.	Able to understand operational knowledge about functions, how to operate chemical instruments, and analysis of data and information from these instruments with a score of less than 60.

Example of PLO Predicates for Each Student

No	Name	PLO 3	PLO 6	PLO 8
1	A	82.50 Excellent	80.54 Excellent	80.54 Excellent

PLO Predicates for All Students

No	Name	Assignment	Project	Midterm Exam	Final Exam	Final Grade and Score	PLO 3	PLO 6	PLO 8	PLO 3	PLO 6	PLO 8
1	A	85	80	80	79	80.70 B+	82.50	80.54	80.54	E	E	E
2	B	83	85	85	81	83.40 A-	84.00	83.35	83.35	E	E	E
3	C	81	80	78	74	77.80 B+	80.50	77.57	77.57	E	G	G

4	D	80	80	78	71	76.70	B+	80.00	76.41	76.41	E	G	G
5	E	76	80	76	67	74.10	B	78.00	73.76	73.76	G	G	G
6	F	83	80	80	77	79.70	B+	81.50	79.54	79.54	G	G	G
7	G	84	80	86	72	80.20	B+	82.00	80.04	80.04	E	E	E
8	H	87	85	83	90	86.30	A	86.00	86.33	86.33	E	E	E
9	I	79	80	80	68	76.20	B+	79.50	75.91	75.91	G	G	G
10	J	83	85	82	85	83.70	A-	84.00	83.67	83.67	E	E	E
11	K	85	80	80	79	80.70	B+	82.50	80.54	80.54	E	E	E
12	L	81	85	80	82	81.80	A-	83.00	81.70	81.70	E	E	E
13	M	85	85	81	88	84.70	A-	85.00	84.67	84.67	E	E	E
14	N	85	80	80	79	80.70	B+	82.50	80.54	80.54	E	E	E
15	O	81	80	80	72	77.80	B+	80.50	77.57	77.57	E	G	G
16	P	86	80	80	82	81.80	A-	83.00	81.70	81.70	E	E	E
17	Q	75	80	80	60	73.00	B	77.50	72.61	72.61	G	G	G
18	R	85	85	82	88	85.00	A-	85.00	85.00	85.00	E	E	E
19	S	81	80	83	79	80.80	B+	80.50	80.83	80.83	E	E	E
20	T	88	85	83	93	87.40	A	86.50	87.48	87.48	E	E	E
21	U	86	80	80	82	81.80	A-	83.00	81.70	81.70	E	E	E
22	V	81	80	80	72	77.80	B+	80.50	77.57	77.57	E	G	G
23	W	82	85	80	83	82.30	A-	83.50	82.20	82.20	E	E	E
24	X	80	80	81	70	77.30	B+	80.00	77.07	77.07	E	G	G
25	Y	85	85	82	87	84.70	A-	85.00	84.67	84.67	E	E	E
26	Z	76	75	78	64	72.80	B	75.50	72.57	72.57	G	G	G
27	AA	75	75	80	60	72.00	B	75.00	71.74	71.74	G	G	G
28	AB	85	80	80	79	80.70	B+	82.50	80.54	80.54	E	E	E
29	AC	82	85	87	76	82.30	A-	83.50	82.20	82.20	E	E	E
30	AD	85	85	83	87	85.00	A-	85.00	85.00	85.00	E	E	E
31	AF	82	80	82	71	78.30	B+	81.00	78.07	78.07	E	G	G

sDistribution of PLO Achievements

	Grade	PLO 3	PLO 6	PLO 8
%	E	83.87097%	61.2903 %	61.2903 %
%	G	16.12903 %	38.7097 %	38.7097 %
%	S	0	0	0
%	F	0	0	0
	Total	100 %	100 %	100 %

Achievement Percentage of PLO

