

COURSE PORTFOLIO

Occupational safety and Security Lab 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.	Describe the meaning, function, and benefits of chemical laboratories, chemical laboratory designs, layouts and chemical laboratory facilities
CO 2.	Understand laboratory management based on standard management concepts
CO 3.	Understand laboratory administration and introduction to standardized lab management systems (ISO/SNI: 17025)

CO 4.	Describe Chemicals : based on form/form, purity-impurity), hazards and prevention, assessment of chemicals (level and class of poison, flamability-reactive-explosivability), exposur, physical and biological hazards of chemicals, symbols and information systems (GHS labels, HMIS labels, NFPA labels, Risk & Safety Phrases, MSDS), and their storage
CO 5.	Describe chemical laboratory equipment: equipment (material: glassware-porcelainware-plasticware-metalware-woodware-combined, function: mass measurement-volume measurement-pressure measurement, accuracy: macro-semimicro-micro-smallscale) and instrumentation equipment
CO 6.	Describe Chemical Laboratory Safety and Security Instruments: understanding, purpose and function, types of protection (engineering control & personal protection equipment), regulations (regulations, standard operating procedures/SOP)
CO 7.	Analyzing occupational safety and health in the laboratory (K3L)
CO 8.	Analyzing Chemical Laboratory waste: definition and classification, prevention of waste (17 steps guideline as good practice), identifying and assessing unknown chemicals, waste management measures, hazard reduction, and waste disposal.

Lecturers:

1. Drs. Zulhipri, M.Si
2. Edith Allanas, M.Pd.

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 9. Able to understand work safety, ethics, environmental issues, and policies related to the chemical field
CO 1. Describe the meaning, function, and benefits of chemical laboratories, chemical laboratory designs, layouts and chemical laboratory facilities	• (Project)	
CO 2. Understand laboratory management based on standard management concepts	• (Project)	

CO 3. Understand laboratory administration and introduction to standardized lab management systems (ISO/SNI: 17025)	• (Project)	
CO 4. Describe Chemicals : based on form/form, purity-impurity), hazards and prevention, assessment of chemicals (level and class of poison, flamability-reactive-explosivability), exposur, physical and biological hazards of chemicals, symbols and information systems (GHS labels, HMIS labels, NFPA labels, Risk & Safety Phrases, MSDS), and their storage		• (Final Exam)
CO 5. Describe chemical laboratory equipment: equipment (material: glassware-porcelainware-plasticware-metalware-woodware-combined, function: mass measurement-volume measurement-pressure measurement, accuracy: macro-semimicro-micro-smallscale) and instrumentation equipment	• (Project)	
CO 6. Describe Chemical Laboratory Safety and Security Instruments: understanding, purpose and function, types of protection (engineering control & personal protection equipment), regulations (regulations, standard operating procedures/SOP)	• (Project)	
CO 7. Analyzing occupational safety and health in the laboratory (K3L)	• (Project)	
CO 8. Analyzing Chemical Laboratory waste: definition and classification, prevention of waste (17 steps guideline as good practice), identifying and assessing unknown chemicals, waste management measures, hazard reduction, and waste disposal.		• (Final Exam)

Forms of Assessment

Project	= 60%
Final examination	= 40%
Total	= 100%

	PLO 3 Critical Thinking	PLO 9 Work Safety
Project	20%	80%
Final examination	10%	90%

Outcomes Assessment

No	Name	Project	Final Exam	Final Grade and Score	
1	A	64	74	70	B-
2	B	72	77	75	B
3	C	72	77	75	B
4	D	80	77	78,2	B+
5	E	84	74	78	B+
6	F	68	86	78,8	B+
7	G	72	75	73,8	B
8	H	80	74	76,4	B+
9	I	84	78	80,4	B+
10	J	80	84	82,4	A-
11	K	84	77	79,8	B+
12	L	48	74	63,6	B-
13	M	76	75	75,4	B

14	N	68	84	77,6	B+
15	O	76	78	77,2	B+
16	P	76	75	75,4	B
17	Q	64	70	67,6	B-
18	R	88	75	80,2	B+
19	S	76	87	82,6	A-
20	T	64	75	70,6	B-
21	U	76	74	74,8	B
22	V	68	74	71,6	B
23	W	68	80	75,2	B
24	X	80	84	82,4	A-
25	Y	88	87	87,4	A
26	Z	80	87	84,2	A-
27	AA	84	70	75,6	B
28	AB	76	75	75,4	B
29	AC	68	70	69,2	B-
30	AD	84	74	78	B+
31	AF	76	80	78,4	B+
32	AG	76	74	74,8	B
33	AH	76	75	75,4	B
34	AI	76	74	74,8	B
35	AJ	64	74	70	B-
36	AK	80	84	82,4	A-
37	AL	80	70	74	B
38	AM	56	84	72,8	B
39	AN	76	78	77,2	B+
40	AO	80	73	75,8	B

41	AP	82	80	80,8	B+
42	AQ	50	80	68	B-

Calculation of Weight per PLO

Form of Assessment	Weight	Weight per PLO		Total	Total Weight	
		PLO 3	PLO 9		PLO 3	PLO 9
Midterm Exam	0,40	0,20	0,80	1,00	0,08	0,32
Final Exam	0,60	0,10	0,90	1,00	0,06	0,54
Total	1,00	0,30	1,70	4,00	0,14	0,86

Example of PLO Calculation

No	Name	Assignment	Final Exam	Final Score and Grade	
1	A	64	74	70	B-

No	Name	PLO 3	PLO 9
1	Muhammad Rafli	$((64*0.08)+(71*0.06)) / 0.14 = 68.29$	$((64*0.32)+(74*0.54))/0.86 = 70.28$

PLO Assessment Rubric

PLO	Performance Criteria	Excellent (E)	Good (G)	Satisfy (S)	Fail (F)
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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, at 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 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 less than 60.
9	Understand work safety, ethics, environmental issues, and policies related to the chemical field	Students are able to understand work safety, ethics, environmental issues, and policies related to the chemical field at with a score of at least 80.	Students are able to understand work safety, ethics, environmental issues, and policies related to the chemical field with a score of at least 70 and less than 80.	Students are able to understand work safety, ethics, environmental issues, and policies related to the chemical field with a score of at least 70 and less than 80.	Students are able to understand work safety, ethics, environmental issues, and policies related to the chemical field with a score of less than 60.

Example of PLO Predicates for Each Student

No	Name	PLO 3	PLO 9
1	A	68,29 Satisfy	70,28 Good

PLO Predicates for All Students

No.	Name	Assignment	Final Exam	Final Grade and Score		PLO 3	PLO 9	PLO 3	PLO 9
1	A	64	74	70	B-	68,29	70,28	S	G

2	B	72	77	75	B	74,14	75,14	G	G
3	C	72	77	75	B	74,14	75,14	G	G
4	D	80	77	78,2	B+	78,71	78,12	G	G
5	E	84	74	78	B+	79,71	77,72	G	G
6	F	68	86	78,8	B+	75,71	79,30	G	G
7	G	72	75	73,8	B	73,29	73,88	G	G
8	H	80	74	76,4	B+	77,43	76,23	G	G
9	I	84	78	80,4	B+	81,43	80,23	E	E
10	J	80	84	82,4	A-	81,71	82,51	E	E
11	K	84	77	79,8	B+	81,00	79,60	E	G
12	L	48	74	63,6	B-	59,14	64,33	F	S
13	M	76	75	75,4	B	75,57	75,37	G	G
14	N	68	84	77,6	B+	74,86	78,05	G	G
15	O	76	78	77,2	B+	76,86	77,26	G	G
16	P	76	75	75,4	B	75,57	75,37	G	G
17	Q	64	70	67,6	B-	66,57	67,77	S	S
18	R	88	75	80,2	B+	82,43	79,84	E	G
19	S	76	87	82,6	A-	80,71	82,91	E	E
20	T	64	75	70,6	B-	68,71	70,91	S	G
21	U	76	74	74,8	B	75,14	74,74	G	G
22	V	68	74	71,6	B	70,57	71,77	G	G
23	W	68	80	75,2	B	73,14	75,53	G	G
24	X	80	84	82,4	A-	81,71	82,51	E	E
25	Y	88	87	87,4	A	87,57	87,37	E	E
26	Z	80	87	84,2	A-	83,00	84,40	E	E
27	AA	84	70	75,6	B	78,00	75,21	G	G
28	AB	76	75	75,4	B	75,57	75,37	G	G

29	AC	68	70	69,2	B-	68,86	69,26	S	S
30	AD	84	74	78	B+	79,71	77,72	G	G
31	AF	76	80	78,4	B+	77,71	78,51	G	G
32	AG	76	74	74,8	B	75,14	74,74	G	G
33	AH	76	75	75,4	B	75,57	75,37	G	G
34	AI	76	74	74,8	B	75,14	74,74	G	G
35	AJ	64	74	70	B-	68,29	70,28	S	G
36	AK	80	84	82,4	A-	81,71	82,51	E	E
37	AL	80	70	74	B	75,71	73,72	G	G
38	AM	56	84	72,8	B	68,00	73,58	S	G
39	AN	76	78	77,2	B+	76,86	77,26	G	G
40	AO	80	73	75,8	B	77,00	75,60	G	G
41	AP	82	80	80,8	B+	81,14	80,74	E	E
42	AQ	50	80	68	B-	62,86	68,84	S	S

Distribution of PLO Achievements

		PLO 3	PLO 9
%	E	23,8%	19,1%
%	G	57,1%	71,4%
%	S	16,7%	9,5%
%	F	2,4%	0%
		100%	100%

Achievement Percentage of PLO

