

COURSE PORTFOLIO

Secondary Metabolite Chemistry 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.	Understand the concept of primary and secondary metabolites
CO 2.	Identify and explain the characteristics of secondary metabolites from plants in terms of structure, biogenesis pathway, and characteristics of spectroscopic data

CO 3.	Explain phytochemical screening methods and isolation techniques and test the bioactivity of secondary metabolites from plants
CO 4.	Analyze journals and present their content related to Natural Material Chemistry research

Lecturers:

Dr. Fera Kurniadewi, M.Si.

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

Course Outcome \ Program Learning 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 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 11. Able to obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics
CO 1. Understand the concept of primary and secondary metabolites	• (Assignment)		
CO 2. Identify and explain the characteristics of secondary metabolites from plants in terms of structure, biogenesis pathway, and characteristics of spectroscopic data	• (Assignment)		
CO 3. Explain phytochemical screening methods and isolation techniques and test the bioactivity of secondary metabolites from plants		• (Exam)	
CO 4. Analyze journals and present their content related to Natural Material Chemistry research			• (Exam)

Forms of Assessment

Assignment	= 60%
Examination	= 40%
Total	= 100%

	PLO 3 Critical Thinking	PLO 7 Problem Solving	PLO 11 Critical Thinking
Assignment	10%	80%	10%
Midterm examination	15%	70%	15%
Final examination	25%	150%	25%

Outcomes Assessment

No	Name	Examination	Assignment	Final Grade and Score	
1	A	85	90	88.00	A
2	B	85	90	88.00	A
3	C	75	80	78.00	B+
4	D	90	90	90.00	A
5	E	80	75	77.00	B+
6	F	85	85	85.00	A-
7	G	77	85	81.80	A-
8	H	78	84	81.60	A-
9	I	83	83	83.00	A-
10	J	88	90	89.20	A
11	K	78	78	78.00	B+
12	L	80	80	80.00	B+
13	M	87	90	88.80	A

14	N	78	78	78.00	B+
15	O	88	90	89.20	A
16	P	87	90	88.80	A
17	Q	88	90	89.20	A
18	R	86	90	88.40	A
19	S	84	84	84.00	A-
20	T	84	84	84.00	A-
21	U	87	90	88.80	A
22	V	86	90	88.40	A
23	W	88	90	89.20	A
24	X	89	90	89.60	A
25	Y	89	90	89.60	A
26	Z	88	90	89.20	A
27	AA	87	90	88.80	A
28	AB	88	89	88.60	A
29	AC	87	90	88.80	A

Calculation of Weight per PLO

Form of Assessment	Weight	Weight per PLO			Total	Total Weight		
		PLO 3	PLO 7	PLO 11		PLO 3	PLO 6	PLO 11
Exam	40%	10%	80%	10%	100%	4%	32%	4%
Assignment	60%	15%	70%	15%	100%	9%	42%	9%
Total	100%	25%	150%	25%	0	13%	74%	13%

Example of PLO Calculation

No	Name	Exam	Assignment	Final Score and Grade	
1	A	85	90	88	A

No	Name	PLO 3	PLO 7	PLO 11
1	A	$(85*0.10) + (90*0.15) / 0.25 = 88.46$	$(85*0.80) + (90*0.70) / 1.50 = 87.84$	$(85*0.10) + (90*0.15) / 0.25 = 88.46$

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.
7	Understand concepts and applications in the field of biosciences and materials chemistry to solve problems in the field of chemistry and its applications	Students are 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 with a score of at least 80	Students are 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	Students are 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	Students are 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 with a score of less than 60

			with a score of at least 70 and less than 80	with a score of at least 60 and less than 70	
11	Obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics	Students are able to obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics with a score of at least 80	Students are able to obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics with a score of at least 70 and less than 80	Students are able to obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics with a score of at least 60 and less than 70	Students are able to obtain, process, interpret, and evaluate scientific data and produce conclusions by considering scientific and technological aspects and scientific ethics with a score of less than 60

Example of PLO Predicates for Each Student

No	Name	PLO 3	PLO 7	PLO 11
1	A	88.46 Excellent	87.84 Excellent	88.46 Excellent

PLO Predicates for All Students

No	Name	Examination	Assignment	Final Grade and Score		PLO 3	PLO 7	PLO 11	PLO 3	PLO 7	PLO 11
1	A	85	90	88.00	A	88.46	87.84	88.46	E	E	E
2	B	85	90	88.00	A	88.46	87.84	88.46	E	E	E
3	C	75	80	78.00	B+	78.46	77.84	78.46	G	G	G
4	D	90	90	90.00	A	90.00	90.00	90.00	E	E	E
5	E	80	75	77.00	B+	76.54	77.16	76.54	G	G	G
6	F	85	85	85.00	A-	85.00	85.00	85.00	E	E	E

7	G	77	85	81.80	A-	82.54	81.54	82.54	E	E	E
8	H	78	84	81.60	A-	82.15	81.41	82.15	E	E	E
9	I	83	83	83.00	A-	83.00	83.00	83.00	E	E	E
10	J	88	90	89.20	A	89.38	89.14	89.38	E	E	E
11	K	78	78	78.00	B+	78.00	78.00	78.00	G	G	G
12	L	80	80	80.00	B+	80.00	80.00	80.00	E	E	E
13	M	87	90	88.80	A	89.08	88.70	89.08	E	E	E
14	N	78	78	78.00	B+	78.00	78.00	78.00	G	G	G
15	O	88	90	89.20	A	89.38	89.14	89.38	E	E	E
16	P	87	90	88.80	A	89.08	88.70	89.08	E	E	E
17	Q	88	90	89.20	A	89.38	89.14	89.38	E	E	E
18	R	86	90	88.40	A	88.77	88.27	88.77	E	E	E
19	S	84	84	84.00	A-	84.00	84.00	84.00	E	E	E
20	T	84	84	84.00	A-	84.00	84.00	84.00	E	E	E
21	U	87	90	88.80	A	89.08	88.70	89.08	E	E	E
22	V	86	90	88.40	A	88.77	88.27	88.77	E	E	E
23	W	88	90	89.20	A	89.38	89.14	89.38	E	E	E
24	X	89	90	89.60	A	89.69	89.57	89.69	E	E	E
25	Y	89	90	89.60	A	89.69	89.57	89.69	E	E	E
26	Z	88	90	89.20	A	89.38	89.14	89.38	E	E	E
27	AA	87	90	88.80	A	89.08	88.70	89.08	E	E	E
28	AB	88	89	88.60	A	88.69	88.57	88.69	E	E	E
29	AC	87	90	88.80	A	89.08	88.70	89.08	E	E	E

Distribution of PLO Achievements**Achievement Percentage of PLO**

Grade	PLO 3	PLO 7	PLO 11
E	4.545454545	109.091	4.54545
G	10.52631579	10.5263	10.5263
S	0	0	0
F	0	0	0

