

COURSE PORTFOLIO

Biotechnology 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 various biotechnology concepts from conventional to modern
CO 2.	Understand the concept of PCR and its role in biotechnology

CO 3.	Understand how to use databases at the genomic, proteomics, and metabolomics levels, such as genebank, Sanger Center, NCBI, Protein Databased (PDB), and related databases
CO 4.	Applying the dnastar, NCBI, Net-primer programs to primary design, and nucleotide homology analysis from various databases sources

Lecturers:

1. Prof. Dr. Muktiningsih Nurjayadi, M.Si.
2. Irma Ratna Kartika, M.Sc.Tech.

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. Understand various biotechnology concepts from conventional to modern	• (Assignment, Project)	
	CO 2. Understand the concept of PCR and its role in biotechnology		• (Assignment, Midterm Exam)
	CO 3. Understand how to use databases at the genomic, proteomics, and metabolomics levels, such as genebank, Sanger Center, NCBI, Protein Databased (PDB), and related databases		• (Assignment, Midterm Exam)
	CO 4. Applying the dnastar, NCBI, Net-primer programs to primary design, and nucleotide homology analysis from various databases sources		• (Assignment, Final Exam)

Forms of Assessment

Assignment	= 25%
Midterm examination	= 35%
Final examination	= 40%
Total	= 100%

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

Outcomes Assessment

No	Name	Assignment			Midterm Exam	Final Exam	Final Score	
		1	2	Average				
1	A	85	80	82.5	85	85	84.38	A-
2	B	85	84	84.5	83	85.0	84.18	A-
3	C	85	85	85	85	86	85.40	A-
4	D	85	84	84.5	83	85	84.18	A-
5	E	85	82	83.5	85	86	85.03	A-
6	F	85	75	80	82	85	82.70	A-
7	G	85	80	82.5	85	85.0	84.38	A-
8	H	85	82	83.5	87	87.0	86.13	A
9	I	85	82	83.5	85	86.0	85.03	A-
10	J	85	82	83.5	87	87	86.13	A
11	K	85	85	85	85	86	85.40	A-

12	L	85	82	83.5	82	85	83.58	A-
13	M	85	75	80	82	85	82.70	A-
14	N	85	85	85	85	86.0	85.40	A-
15	O	85	82	83.5	82	85	83.58	A-
16	P	85	82	83.5	86	86	85.38	A-
17	Q	85	82	83.5	86	86	85.38	A-
18	R	85	85	85	85	86.0	85.40	A-
19	S	85	84	84.5	83	85	84.18	A-

Calculation of Weight per PLO

Form Assessment	Weight	Weight per PLO		Total	Total Weight	
		PLO 3	PLO 6		PLO 3	PLO 6
Assignment	0.25	0.50	0.50	1.00	0.13	0.13
Midterm Exam	0.35	0.30	0.70	1.00	0.11	0.25
Final Exam	0.40	0.30	0.70	1.00	0.12	0.28
Total	1.00	1.10	1.90	0.00	0.35	0.65

Example of PLO Calculation

No	Name	Assignment			Midterm Exam	Final Exam	Final Score	
		1	2	Average				
1	A	85	80	82.5	85	85	84.38	A-

No	Name	PLO 3	PLO 6
1	A	$(82.5 \times 0.13) + (85 \times 0.11) + (85 \times 0.12) / 0.35 = 86.50$	$(82.5 \times 0.13) + (85 \times 0.25) + (85 \times 0.28) / 0.65 = 85.81$

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 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.

Example of PLO Predicates for Each Student

No	Name	PLO 3	PLO 6
1	A	86.50 Excellent	85.81 Excellent

PLO Predicates for All Students

No	Name	Assignment			Midterm Exam	Final Exam	Final Grade and Score		PLO 3	PLO 6	PLO 3	PLO 6
		1	2	Average								
1	A	85	80	82.5	85	85	84.38	A-	86.50	85.81	E	E
2	B	85	84	84.5	83	85.0	84.18	A-	86.61	85.44	E	E
3	C	85	85	85	85	86	85.40	A-	87.77	86.74	E	E
4	D	85	84	84.5	83	85	84.18	A-	86.61	85.44	E	E
5	E	85	82	83.5	85	86	85.03	A-	87.21	86.44	E	E
6	F	85	75	80	82	85	82.70	A-	84.63	84.15	E	E
7	G	85	80	82.5	85	85.0	84.38	A-	86.50	85.81	E	E
8	H	85	82	83.5	87	87.0	86.13	A	88.19	87.64	E	E
9	I	85	82	83.5	85	86.0	85.03	A-	87.21	86.44	E	E
10	J	85	82	83.5	87	87	86.13	A	88.19	87.64	E	E
11	K	85	85	85	85	86	85.40	A-	87.77	86.74	E	E
12	L	85	82	83.5	82	85	83.58	A-	85.93	84.85	E	E
13	M	85	75	80	82	85	82.70	A-	84.63	84.15	E	E
14	N	85	85	85	85	86.0	85.40	A-	87.77	86.74	E	E
15	O	85	82	83.5	82	85	83.58	A-	85.93	84.85	E	E
16	P	85	82	83.5	86	86	85.38	A-	87.53	86.82	E	E
17	Q	85	82	83.5	86	86	85.38	A-	87.53	86.82	E	E
18	R	85	85	85	85	86.0	85.40	A-	87.77	86.74	E	E
19	S	85	84	84.5	83	85	84.18	A-	86.61	85.44	E	E

