

**Report on the alignment of the
Biochemistry BSc PLO with KSU
graduate attributes
(Direct Assessment of PLO via
measuring CLOs & PLO)**

Feb 2022

Biochemistry BSc Mission:

To provide education and scientific research with high quality to meet the needs of the community through an innovative and stimulating academic and administrative environment, with the optimal use of technology and local and international partnerships in the field of Biochemistry and its applications.

Biochemistry BSc Goals:

- 1) Achieving high quality in education and scientific research in the field of Biochemistry and its applications.
- 2) Developing and implementing an approach to ensure the quality in performance and outcomes in Biochemistry program.
- 3) Optimal use of modern technology in education and scientific research.
- 4) Executing advanced training programs to increase the graduate's skills in the field of Biochemistry and its applications.
- 5) Providing an innovative academic and administrative environment capable of attracting the best faculty, researchers, students, and staff.
- 6) Building effective national and international partnerships with academic institutions and research centers specializing in Biochemistry sciences.

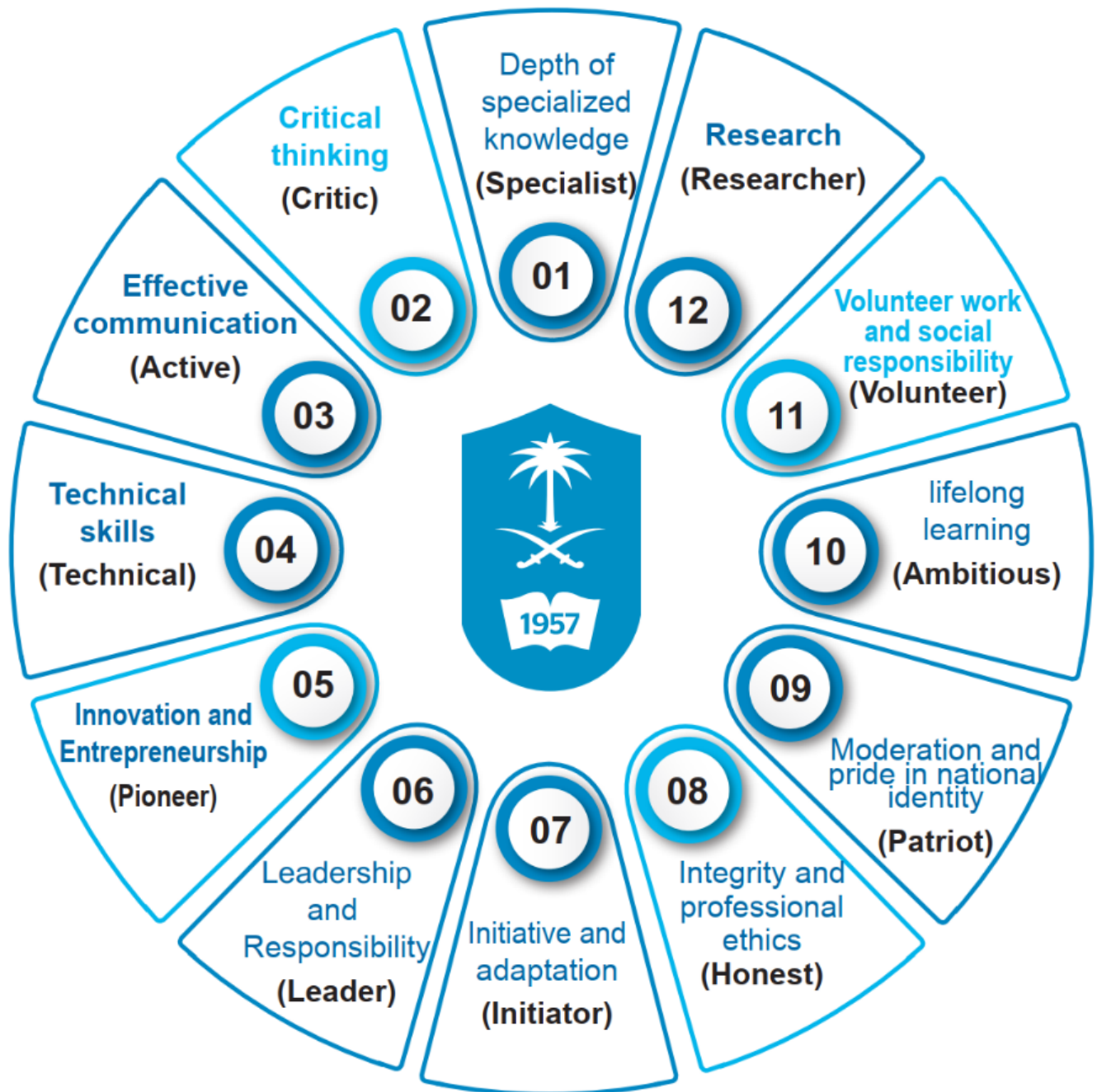
Biochemistry BSc program learning outcomes (PLO):

Knowledge and understanding	
K1	Demonstrate the biochemical principles of cell metabolism, biological catalysis, and associated control conditions.
K2	Illustrate the inter-relationship among various biochemical macromolecules and their structure-function interplay.
K3	Recognize key cellular mechanisms responsible for both healthy and disease states of cells.
Skills	
S1	Analyze biochemical data using information technology (e.g., software, AI apps, online tools, etc.)
S2	Apply biochemical methods for solving real-life problems.
S3	Interrelate various biochemical topics, leading to the creation of vocational deep expertise.
Values	
V1	Inculcate ethical merits into professional study.
V2	Achieve leadership with responsibility and cooperativity in the biochemical scientific community.

KSU graduate attributes:

An overview of the King Saud University Graduate Attributes (**Annex 1**) are shown in the following figure:

Graduate Attributes of King Saud University



The above 12 attributes are detailed in the following table where the biochemistry PLO align with it.

#	Graduate Attributes	Description	Learning Outcome to be in the program	Biochemistry PLO
1	Depth of specialized knowledge (Specialist)	KSU graduates are distinguished by deep knowledge of concepts, terminology and theories according to academic levels	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Be aware of specialized concepts, terminology and theories and deep as well as accurate knowledge of the field - Recall the concepts and facts related to the specialty. - Understand the concepts and terminology 	K1, K2, K3
2	Critical thinking (Critic)	KSU graduates are distinguished by the ability to apply theories, analyze data related to specialization, interpret, and criticize them scientifically, and employ them in finding solutions to problems and challenges facing development in various development fields	<p>Graduates should be able to</p> <ul style="list-style-type: none"> - Apply specialized theories - Interpret concepts and theories - Compare specialized concepts and theories - Criticize specialized concepts and theories - Analyze and interpret data and information - Rectify specialized concepts and theories - Propose solutions to problems and challenges 	S1, S2, S3
3	Effective communication (active)	KSU graduates are distinguished by the ability to communicate effectively with others in various fields: in the academic field, virtual, or actual work environment.	<p>Graduates should be able to:</p> <p>Effectively communicate in Arabic and one of the modern languages in various fields: in the academic field or the premise of a virtual or actual work environment.</p>	V2
4	Technical skills (Technical)	KSU graduates are distinguished by the ability to optimally employ all kinds of technology in providing specialized and functional skills and investing in technical developments in the digital world: such as artificial intelligence, in various fields.	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Optimally employ all kinds of technology in providing specialized and functional skills - Invest in technical developments in accelerating the digital world in various fields. 	S2
5	Innovation and Entrepreneurship. (Pioneer/Innovator)	KSU graduates are distinguished by innovation, entrepreneurship, project management, and the ability to strive to realize the modernity that contributes to addressing challenges and developing the work system in various fields.	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Create solutions and develop ideas - Entrepreneurship and Project Management - Use everything up to date that contributes to addressing challenges and developing the work system in various fields. - Put forward innovative scientific ideas in their field of specialization. 	S2, V1

6	Leadership and Responsibility (Leader)	The KSU Graduates are distinguished by leadership, responsibility, and taking appropriate decisions in various fields.	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Leadership and responsibility- Managing work teams in various fields - Take appropriate decisions in various fields. - Manage work environments according to international specifications and standards. - Establish realistic and achievable career goals. - Developmental leadership within the work environment. 	S2, V1, V2
7	Initiative and adaptation (Initiator)	KSU graduates are distinguished by the ability to take initiative and adapt to bring about desirable change in diverse environments and to adapt to cultural and social diversity.	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Discuss specialized issues - Work professionally in various fields - Take initiative and adapt to bring about desirable change in diverse environments - Adapt to cultural and social diversity. 	S3, V1
8	Integrity and professional ethics (Honest)	KSU graduates are committed to integrity and professional ethics in various fields.	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Apply standards of integrity, transparency, and ethical behavior in various academic and professional fields. - Self-censorship - Adherence to professional ethics in various fields 	V2
9	Moderation and pride in national identity (Patriot)	KSU graduates are distinguished by moderation and pride in the national identity in word and deed	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Achieve the principles of moderation and fairness. - Pride in national identity and commitment to achieving it in word and deed - Reinforce the values of honest citizenship in daily practices. 	V1, V2
10	Lifelong learning (Ambitious)	KSU graduates are distinguished by lifelong learning	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Self-development and continuous learning continuously responding to personal development - Searching for knowledge in its various sources - Find tools for continuous learning 	V1
11	Volunteer work and social responsibility (Volunteer)	KSU graduates are distinguished by volunteer work and social responsibility.	<p>Graduates should be able to:</p> <ul style="list-style-type: none"> - Participate actively in various community activities - Employ professional and research activities in community service. - Contribute to directing society towards achieving social and development goals - Interact positively with individuals of different cultures within the community. 	S2, V2
12	Research	The KSU	Graduates should be able to:	S1, S2, S3, V1

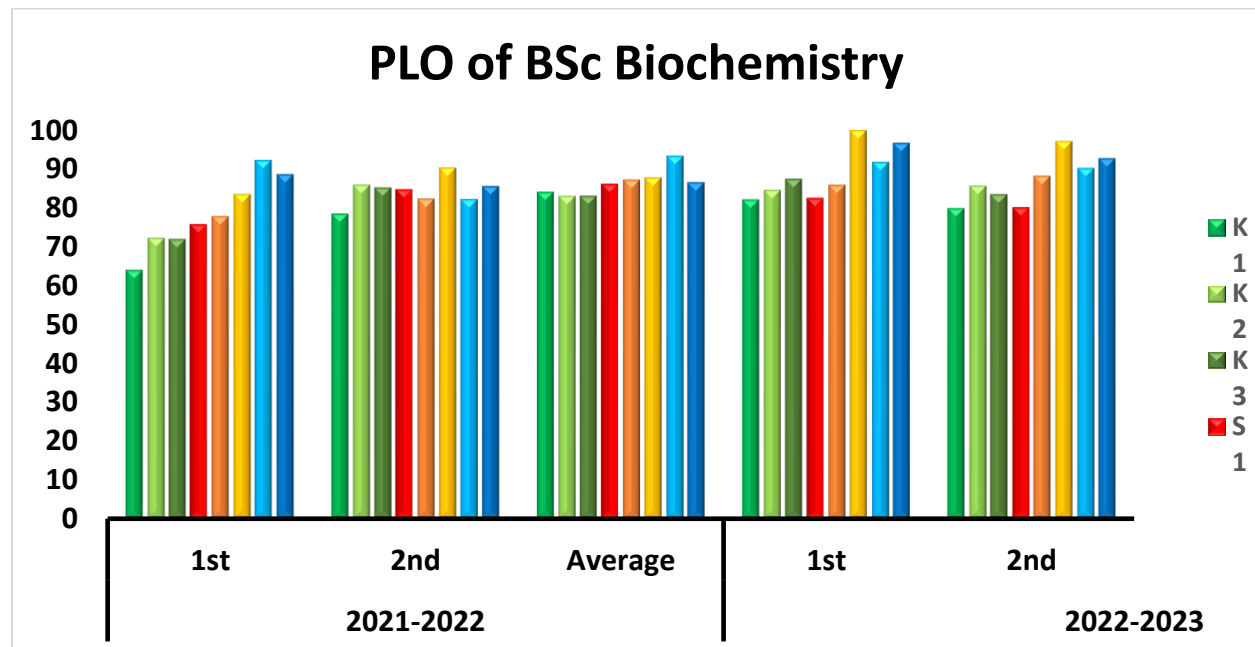
	(Researcher)	graduates are distinguished by their ability to apply the original scientific research procedure in order to achieve the knowledge economy.	<ul style="list-style-type: none"> - Follow the scientific method in research work. - Apply the basics of scientific research. - Conduct original and distinguished scientific research in the field of specialization in accordance with the directions of the Kingdom. - Participate in research projects in the field of specialization. - Produce scientific research and publish it in approved publications. 	
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Aligning program objectives with program mission

Alignment		Program Mission To provide education and scientific research with high quality to meet the needs of the community through an innovative and stimulating academic and administrative environment, with the optimal use of technology and local and international partnerships in the field of Biochemistry and its applications.			
Program Objectives	Objective 1 Achieving high quality in education and scientific research in the field of Biochemistry and its applications.	Education	Scientific	Biochemistry	Applications
	Objective2 Developing and implementing an approach to ensure the quality in performance and outcomes in Biochemistry program.			Biochemistry	Quality
	Objective 3 Optimal use of modern technology in education and scientific research.	Technology	Scientific	Research	
	Objective 4 Executing advanced training programs to increase the graduate's skills in the field of Biochemistry and its applications	Field	Biochemistry	Applications	
	Objective5 Providing an innovative academic and administrative environment capable of attracting the best faculty, researchers, students and staff.	Innovative	Academic	Administrative	Environment
	Objective 6 Building effective national and international partnerships with academic institutions	International			

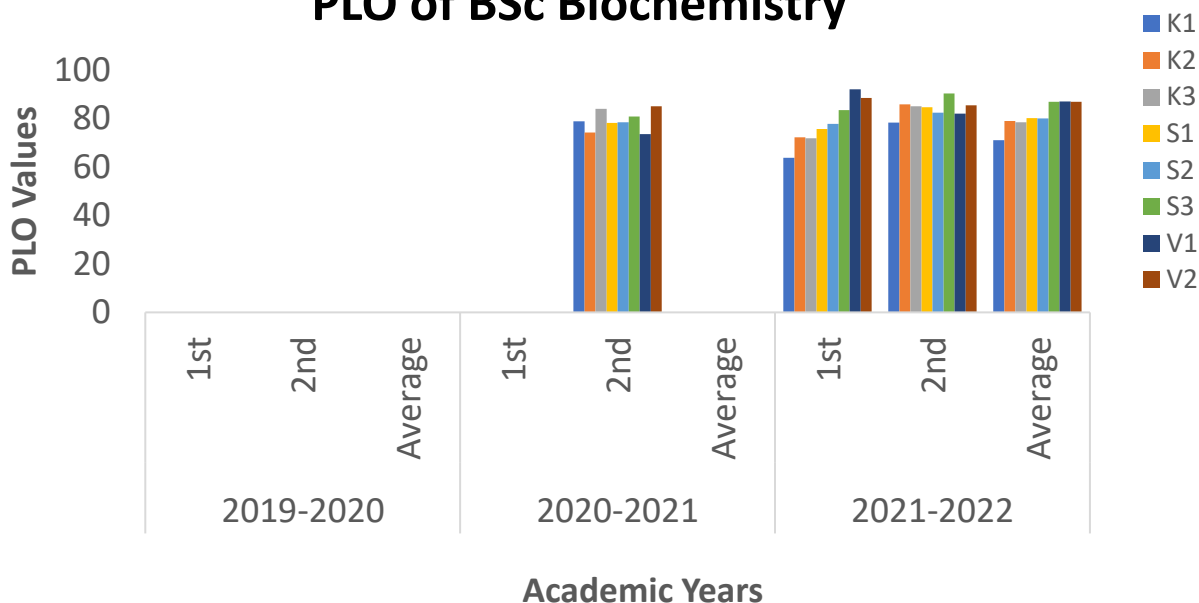
Calculated PLO of the Biochemistry BSc program

The attached excel file contains the raw data of the figure shown here where we calculate the PLO for three successive semesters. Only courses that have level of the learning outcomes to be P= practiced or M= mastered are calculated and as given to us by the College of Science ([Annex 2](#), in Arabic).



	2021-2022			2022-2023			
	1st	2nd	Average	1st	2nd	3rd	Average
K1	64	78	71	84	82	80	83
K2	72	86	79	83	85	86	84
K3	72	85	79	83	87	83	85
S1	76	85	80	86	82	80	84
S2	78	82	80	87	86	88	87
S3	84	90	87	88	100	97	94
V1	92	82	87	93	92	90	92
V2	89	85	87	87	97	93	92

PLO of BSc Biochemistry



Although overall our graduates performed well on the three domains of outcomes, yet accurate and specific documentation of these PLO still need a lot of work. There is one academic year missing in this trend and affects the deduction of a more accurate conclusion. On the other hand, it appears from the measured PLO over the past three semesters that a mere consistent level was achieved over this short time, despite the external effect of the COVID-19 pandemic on all sectors of the education. Notably that PLO are somehow reduced in the start of the academic year compared to its end (for example, compare overall K1 in the 1st and 2nd semester of 2021-2022; the same is true for rest of the PLO except for the value domains). This implies the good cooperative atmosphere that the program provides for its students together with a helpful teaching and administrative personals. On average, the graduates performed well first in the values domain, then the skills and finally on knowledge although the difference between these calculated outcomes is not significant.

Strength:

1. Biochemistry BSc PLOs run parallel and in alignment with KSU graduate attributes.
2. The PLOs are covered by the core courses as well as the elective ones.
3. The existence of defined system to record and calculate the course learning outcomes and aligned it with the Biochemistry BSc program learning outcomes.

Area needs improvements:

1. Still not all the courses (either core or elective ones) are missing their CLOs.
2. Still missing CLOs for some semesters and therefore academic years.
3. The CLOs need to be meticulously reviewed and agreed upon by faculties.
4. The CLOs of the practical courses are missing.

Action plan:

The program needs to focus on resolving these issues by holding meetings with all sectors of beneficiaries and revise the CLOs to better serve the community.

Also, a robust and efficient system of documenting and recording these CLOs properly will result in more accurate conclusion about the Biochemistry BSc PLOs.