Executive Summary
BS in Biotechnology
Cycle: IV (2024-25)

Transitioning to PREE: The BS Biotechnology Program's Assessment Milestone

The Department of Biological Sciences completed its fourth self-assessment (SA) cycle for the BS Biotechnology degree program—its first review under QAA, HEC's newly introduced Program Review for Effectiveness & Enhancement (PREE) framework. This marked a significant milestone, as the department embraced a model that goes beyond compliance and emphasizes effectiveness, enhancement, and continuous improvement. Despite being in its pilot phase of the PREE framework, SA demonstrated VU's strong commitment to quality assurance and alignment with evolving national standards. The PREE framework provided a fresh lens for evaluating academic programs, focusing on how well the program delivers its intended outcomes and how it can be strengthened for the future. For this review, the evaluation panel applied rubric-based scoring—developed by the Directorate of Quality Enhancement (DQE)—to ensure objectivity in interpreting the judgment criteria, even though HEC's official judgment guidelines were unavailable. The assessment concluded with the program being rated "Approved with Recommendations", achieving a normalized rubric score of 69.34 out of 90 (~77%), as specific standards did not apply to this program.

PREE Implementation: Process Overview

The review process unfolded in several structured stages, each reinforcing the PREE framework's emphasis on evidence-based evaluation and enhancement:

- **Initiating the Process:** The chairman of the Institutional Quality Circle (IQC) initiated the cycle by granting anticipatory approval, after which the Program Team (PT) and Assessment Team (AT) (see Table 1) were formally notified and oriented.

- **Data Collection & SAR Development:** The PT prepared a Self-Assessment Report (SAR) addressing PREE's eight standards outlined as Expected Outcome Indicators (EOIs). This report is based on surveys, data analytics, and stakeholder feedback gathered by DQE to provide an evidence-based overview of the program's performance.

- **Panel Review and PREE Judgement:** The external AT critically evaluated the SAR during an exit meeting. Using a rubric calculator, the panel translated qualitative judgments into an objective numeric score, resulting in a panel judgment of **"Approved with Recommendations,"** ensuring consistency in applying the PREE judgment criteria.

- **Continuous Quality Improvement (CQI):** The outcome of the Self-PREE has triggered a CQI cycle by pinpointing critical areas that require enhancement and providing constructive suggestions for targeted improvements. In response, the department head will initiate an implementation plan to address these findings directly. The DQE will oversee the execution of this plan, ensuring that recommendations are translated into measurable progress and continuous program development.

Table 1: Program & Assessment Teams

Member's Name	Designation	Affiliation	Role
Program Team			
Mr. Kamran Abbas	Lecturer	Biological Sciences, VU	PT Lead
Dr. Muhammad Azam Ali	Assistant Professor	Biological Sciences, VU	PT Member
Dr. Muhammad Imran	Lecturer	Biological Sciences, VU	PT Member
Mr. Muhammad Azeem	Manager	DQE, VU	QA Coordinator
Assessment Team			
Dr. Muhammad Zubair Yousaf	Professor	FCCU, Lahore	AT Lead (External Reviewer)
Dr. Ayesha Maqbool	Assistant Professor	Biological Sciences, VU	AT Member (Internal Reviewer)
Ms. Amna Bibi	Lecturer	Computer Sciences, VU	AT Member (Internal Reviewer)

PREE Quality Standards & Implementation

The PT developed the SAR according to the eight (8) PREE criteria:

Standard	Title	Implementation
1.	Mission, Objectives & Outcomes	These five standards are specific to the program. All related content is recorded in SAR and is evaluated by the AT.
2.	Curriculum design & Organization	
3.	Subject-Specific Facilities	
4.	Student Advising & Counselling	
5.	Faculty & Staff	
6.	Institutional Process Control	This standard was not addressed separately for this program, as it pertains to centralized policies and processes that are evaluated and scored uniformly across all academic programs.
7.	Institutional Support & Facilities	This standard is partially addressed in the first five standards and partially in the RIPE (Review of Institutional Performance and Enhancement) process.
8.	Institutional general requirements	This standard applies only to graduate programs, while the program under review is at the undergraduate level.

DQE Role and Support

The DQE was pivotal in facilitating the review by providing the PT with all essential resources, including reference documents, raw data from graduating students, alums, faculty satisfaction surveys, and program enrollment and performance statistics. A critical evaluation exit meeting was convened at Markaz G10 Campus Islamabad, bringing together the AT and PT, the HOD, and DQE representatives to discuss findings and clarify observations. Following this review, the AT submitted its rubric-based evaluation and detailed report to the DQE. These findings were formally shared with HOD to guide the preparation of an Implementation Plan, forming the basis for targeted Improvements under the CQI cycle.

Key SAR's Findings Snapshot:

Standard	AT Score	Major Strengths
1	10/15	- Measurable program outcomes exists and are aligned with the program objectives. - A fair and transparent assessment model at the course level is in practice. - Positive student feedback.
2	17/20	- The curriculum is quantitatively aligned with the program outcomes. - The new undergraduate policy is adequately implemented. - Comprehensive coverage of biotechnology core areas effectively blends theory with practice.
3	14/15	- Adequate LMS and ICT resources. - State of the art laboratories infrastructure including Mobile and smart labs.
4	8/10	- The program has a well-organized system in place to coordinate course delivery efficiently. - Communication tools like LMS, helpdesk, MDBs, and live sessions are effectively integrated to support learning.
5	12/20	- Qualified faculty with strong academic credentials - Positive faculty feedback.
6	8/10	- All the academic-related processes are digitized. - Admission dashboard available. - Student progress and credentials can be tracked digitally.
7	N/A	N/A
8	N/A	N/A

Thematic Observations & Recommendations:

Program Alignment and Outcome-Focused Curriculum

The BS Biotechnology program aligns closely with the university's mission and its curriculum adequately integrates contemporary content and is designed to equip graduates with the knowledge and skills required to thrive in the biological sciences. This synergy between institutional priorities and curricular delivery reflects a well-thought-out foundation supporting academic standards and market expectations. The panel acknowledged that the program is directionally sound and responsive to evolving higher education and industry needs.

While these elements already exist in practice, they require greater structure and enhancement to maximize their impact. Specifically, the panel recommended:

- Revise PEOs/PLOs, obtain BOS approval, and link them explicitly to the university mission.
- Establish a system to measure PLO attainment at graduation and track alumni career outcomes.
- Introduce an "AI in Biotechnology" course in line with HEC 2024 policy.
- Incorporate virtual-reality lab modules to strengthen practical training.
- Conduct an employer survey and apply the feedback to curriculum improvement.
- Administer stakeholder surveys within the teaching semester and use findings for timely program revisions.

Learning Environment, Resources, and Infrastructure

The program benefits from a robust virtual learning environment supported by a well-functioning Learning Management System (LMS) and ICT resources that facilitate flexible and accessible education for students across diverse locations. The availability of state-of-the-art infrastructure for laboratories, smart and mobile labs provide students with essential exposure to practical components, ensuring that laboratory-based learning outcomes are partially achieved even in a fully online setting.

Nonetheless, the review highlighted several opportunities to strengthen the learning environment and support infrastructure, including:

- Create a benchmarking framework to compare facilities with peer institutions and guide resource planning.
- Embed emerging LMS capabilities—especially generative-AI tools—to enrich pedagogy and learner analytics.

- Offset travel and setup demands for mobile labs by partnering with nearby institutions for local practical sessions.
- Standardize laboratory equipment across all departmental labs to ensure a uniform learning experience.
- Institutionalize routine student- and faculty-driven feedback on computing services to drive continuous improvement.

Student Support, Engagement, and Professional Development

The LMS enables reliable student-faculty communication and ready access to academic guidance; support and engagement would be strengthened by recasting academic advising as an integrated counselling framework that encompasses academic progress, career planning, and personal development.

Faculty Capacity and Scholarly Environment

The program is supported by qualified faculty who contribute positively to teaching quality and curriculum delivery. Their expertise underpins the ability of the degree program to meet academic expectations and provide a sound learning experience for students.

To further strengthen this area, the panel identified opportunities for improvement, such as:

- Strengthen existing workload management practices to create a balanced distribution that allows faculty to contribute to teaching excellence and scholarly activities.
- The department should prepare training and professional development plan for faculty.

Governance, Quality Processes, and Continuous Improvement

The BS Biotechnology program operates under transparent governance structures and leverages LMS-based Dashboards to monitor academic and administrative processes, ensuring consistency and accountability in program delivery. The Self-PREE process further demonstrated the program's commitment to quality by using surveys, data analysis, and stakeholder feedback to identify gaps and initiate enhancements. DQE has supported these efforts through data provision, guidance, and Oversight.

While these mechanisms are already in place, the panel emphasized the need to strengthen and integrate them further to foster a robust culture of continuous improvement. Recommended enhancements include:

- Expanding the use of KPI dashboards to provide deeper insights, analyze trends, and support Data-informed decision-making.
- Refining complaints and query handling procedures to make them more transparent and Time-bound. Evaluate for continuous improvement.
- Update the existing instructor-reflection and student course-evaluation forms into a Course Analytics Framework, pairing data-driven instructor diagnostics with CLO-linked student feedback to yield actionable evidence for targeted course content and teaching improvements.

Conclusion

The review of the BS Biotechnology program reflects a commendable alignment with institutional mission and responsiveness to academic and industry trends. The program has laid a solid foundation with relevant curriculum design, virtual learning infrastructure, qualified faculty, and quality governance mechanisms. However, to maximize the program's effectiveness and impact, structured improvements are necessary across key thematic areas. These include revising and aligning program learning outcomes, adopting emerging technologies, enhancing student support, fostering faculty development, and strengthening governance through data-driven decision-making. Implementing the recommended measures will not only ensure academic excellence but also bolster the program's ability to meet evolving student, industry, and societal needs within a robust quality assurance framework.

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