

**Executive Summary**  
**BS Bioinformatics**  
**Faculty of Science and Technology**  
**Self Assessment Cycle – III (2022-23)**

Virtual University of Pakistan is providing world class ICT-based distance education to the aspiring students in Pakistan and abroad and addressing simultaneously the acute shortage of qualified professors in the country. To fulfill needs of Quality Assurance Agency (QAA) of HEC for ranking the program, Department of Bioinformatics & Computational Biology initiated the Self-Assessment process for the degree program BS Bioinformatics. The current document summarizes the findings of the self-assessment process of BS Bioinformatics. The process includes:

1. **Self-Assessment Report (SAR)** development by Program Team (PT).
2. **Assessment Report (AR)** by Assessment Team (AT) after critical evaluation.
3. **Rectification Plan** administered by the Head of Department.

The tasks were completed according to the set methodology through Program Team and Assessment Team nominated by the Rector on the recommendation of the Department.

### **Methodology**

The department adopted the identical methodology defined by Quality Assurance Agency of HEC. The methodology includes the nomination and notification of PT and AT after approval of the Competent Authority. PT developed the SAR in accordance with eight (8) criteria provided by QAA. Various recommended surveys were also conducted for collecting diverse feedback. A meeting was arranged for critical evaluation of the program in which AT member and staff of Directorate of Quality Enhancement (DQE) were present. After the visit, AT submitted a report and feedback form (Rubric Form) to DQE. Based on the findings of AT, the Head of Bioinformatics & Computational Biology Department was requested to develop a rectification plan.

### **Program Team and Assessment Team Formation**

| <b>Sr.#</b> | <b>Name</b>                | <b>Status</b> | <b>Designation</b>  |
|-------------|----------------------------|---------------|---|
| 1.          | Ms. Saddia Bano            | PT            | Tutor/Instructor, Department of Bioinformatics & Computational Biology    |
| 2.          | Mr. Mirza Jawad ul Hasnain | AT            | Assistant Professor, Department of Bioinformatics & Computational Biology |

### **Key Findings of the SAR**

The AT appreciated the efforts of PT for developing such a comprehensive report of the degree program 'BS Biotechnology'. The AT endorsed the program structure and suggested few improvements like defining course categories as per HEC nomenclature designed by the department and prerequisite courses of the degree program. The infrastructure and support provided by the university to execute the program were also reviewed and considered

compatible with smoothing execution of the program. However, the following few observations were reported by AT in its report:

### **AT Recommendations**

1. The department should update outdated courses or content.
2. The courses Biochemistry I & II and Essential of Genetics theory and practical should be separate like other Bioinformatics and Computer courses.
3. The department should develop a separate bioinformatics lab with advance computing facilities to accommodate research activities.
4. The department should consider hiring Ph.D. faculty to meet program objectives better
5. The university should improve infrastructure of the offices to provide suitable spaces for faculty.
6. Consider faculty promotion on the basis of faculty qualification and experience.
7. The department should encourage alumni to respond to survey to get better understanding of program outcomes.

### **QEC Observations**

1. Faculty should focus on standardized practice of providing reference books for students especially for the fresh students to follow and practice problems rather than just providing lecture notes, PPTs with the video lectures. Currently, the academic departments are not following this standardized practice. Furthermore, a teacher may furnish 'reading a chapter' assignments to students in order to promote the said practice.
2. Faculty should be encouraged to review the current and develop the new program learning objectives and outcomes from the existing content which is the key teaching activity / exercise comparable to any conventional university. Faculty at VU should come forward and take a lead in this area for an open & distance learning technology based universities / institutions.
3. There is need to enhance active learning practices or engagement of students by use of some interactive material like use of pop-up questions during lecture, freezing content would unfreeze only after completing certain activity or viewing video lecture etc.
4. The mapping of program objectives vs. Program outcomes and further program objectives vs. Courses' learning outcomes reported in all of the Self-Assessment Reports (SARs) is neither appropriate nor logical. It is therefore, needed to provide capacity building opportunities to faculty. It needs to be emphasized that Program objectives mapped with

courses' learning outcomes is used to depict how much percentage of courses addresses how much of the objectives and what courses to be added/deleted.

5. Student performance which is an important aspect of programs' self-assessment has not been taken into account. Moreover, the data for student's performance measures (in terms of numbers of student enrollment, passout, drop out, inactive, freeze and in-process students) arranged semester wise need to be readily accessible to faculty in VIS so that it can be analyzed to draw meaningful inferences.

6. It was also highlighted that Alumni participation is very low across all degree programs at VU. It needs to improve in order to improve our degree programs in a true sense.

7. The department should form a departmental Committee including PT, AT and focal person for DQE to discuss the SAR, Assessment Report, other QEC reports, matters related to the curriculum, students affairs/complaints etc.

8. The Head of the department/Incharge was suggested to develop a mechanism to quantify the regular or real time activities of the faculty in hours by observing the average completion time of particular activity. This quantified data will provide the basis for decision making regarding workload.

9. There is a need to elaborate the overall Exam Process in the SAR. Paper preparation and conduct of exam are two different areas of this process. IT department controls the process of 'presenting questions' to the students from QB during exam and faculty is not involved in it. There is also not fixed percentage regarding allocation of questions from particular areas of the chapter or course syllabus. Furthermore, there is not clarity in defining this process among relevant departments at VU.

10. It was discussed that external faculty member / researcher should be called upon for the Viva Voce of students who have submitted theses to maintain some standard rather than conducting it with the internal member.

11. Detailed analysis needs to be performed on exams data to analyse students' performance with the purpose to identify weaknesses in question bank and incorporate improvements accordingly. Students' performance against every question can be tracked and the data such obtained can be used easily to determine and improve the quality of questions in the question bank.

## **DQE Suggestions**

1. The approved mission statement of the department and degree program should be published on its specific web pages.
2. To separate the theory and practical courses of BIO202 (Biochemistry - I), BIO303 (Biochemistry - II), and BIO301 (Essentials of Genetics).
3. To develop a separate bioinformatics lab with advance computing facilities to accommodate research activities.
4. Program objectives and its outcomes should be reflected in the SAR in terms of percentage that how much a course learning outcomes meets program objectives.
5. To form a departmental review committee to:
  - a. Go through the degree programs interms of scheme of studies, course content etc. And report to relevent bodies;
  - b. Coordinate with the program and assessment teams for self assessment process and with departmental focal person and for Self IPE review;
  - c. Correspond with other matters related to faculty.
6. The categorization of courses in program website is Required and Elective need to be revised which is not as per HEC nomenclature such as foundation, compulsory, major & elective.
7. To revisit existing course content or revamp the specific instructional material or create supplementary material like tutorials, for better understanding of the students.
8. There is a need for a dashboard that enables the monitoring of students' progress, ensuring timely completion of degree programs, and measuring the performance of academic departments in this regard.
9. To hire at-least one more Ph.D. faculty member.
10. To provide access to faculty with the latest version of softwares like STAT etc. to facilitate them in their research activities. Furthermore, WPS with limited version and less user friendly should be replaced with the MS Office 365.
11. To improve infrastructure of the offices and provide suitable spaces to faculty for research environment.

## **Conclusion and Recommendations**

Analysis of the Criteria Referenced Self-Assessment reveals that performance of the department is good to excellent in most of the areas, however, fair performance has been observed in only one of the areas i.e. criterion 8 (Institutional Support). The program has

secured overall 'Good to excellent performance in all areas' with assessment score (78.74/100) reported by the AT.

The areas that need corrective actions identified during the self-assessment process have been reported to the Head of Bioinformatics & Computational Biology department for rectification. DQE will follow-up the rectification plan as per specific timeframe to track continuous improvement.

**Prepared by:**

A handwritten signature in blue ink, appearing to be 'Muhammad Azeem', written in a cursive style.

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Muhammad Azeem  
Manager QA