



UNIVERSITY OF KARACHI

Self-Assessment Report

**Department of Biotechnology,
University of Karachi**

Ph. D. Programme

Submitted to

**Quality Enhancement Cell
University of Karachi**

ASSESSMENT/PROGRAMME TEAM

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INTRODUCTION

The Department of Biotechnology, University of Karachi is the oldest institution in country for teaching biotechnology at M.Sc. level which established in 1996. Since then the department continues to develop and progress. Today Department of Biotechnology offers B.Sc. (Hons), M.Sc., M.Phil. and Ph.D. degree Programs.

The department is determined to keep the pace of development in the field of biotechnology and offers diversified subjects like Environmental Biotechnology, Food Biotechnology, Agriculture Biotechnology, Protein Bioinformatics, Advances in Genetics Engineering, Stem cell Culture, Tissue Engineering & Therapeutics, Biotransformation, Biotechnology and Health Care and Enzyme Technology. Highly qualified and experienced faculty is engaged in imparting quality education and conducting research. The faculty members have published various research articles in journals of national and international repute and have presented various oral and poster presentations at both national and international levels. The department regularly invites eminent scientists and academicians to deliver seminars on current topics of national importance to apprise the students and faculty members on recent advances related to the field of biotechnology.

To enlighten the overall experience as a university student, department of Biotechnology provides opportunities and encourages its students to get involved in extracurricular activities. Students of this department have been participating in Model United Nations' programs, sports, debate and poetry competitions and art contests. In this regard several bright students have all Karachi, all Sindh and all Pakistan trophies on their credit. Our students have also achieved most prestigious foreign scholarships like SUSI and Fulbright offered under USEFP Programs. Students also take active part in student's week activities and organize different events.

Graduates of this dynamic discipline have a wide variety of career opportunities in teaching and research institutes, pharmaceutical organizations, forensics and clinical laboratories, tissue culture laboratories, agro-based industry, food industry, polymer and textile industry, cosmetic industry, fuel industry, environmental organizations, forestry, fisheries, wildlife department, horticulture department and processing, certifying and patenting companies. Currently many of the graduates hold key positions in various national and multinational organizations as well as serving abroad and are making significant contributions in their field of specialization.

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CRITERION-1

PROGRAMMISSION, OBJECTIVES AND OUTCOMES

Criterion-1: Programme Mission, Objectives and Outcomes

Mission Statement of the Department of Biotechnology

To impart innovative knowledge-based education that established an impregnable foundation for comprehending developments in the rapidly advancing field of biotechnology and to produce graduates with the technical and cognitive skills needed to be competitive in the field locally and globally.

Mission Statement of the Ph.D Program:

To prepare graduates with a Ph.D. degree, who can work independently and with teams, productively as researchers, evaluators, measurement and assessment experts, or policy analysts in government and private universities, government and non-government academic and non-academic, research and development institutions and organizations.

Standard 1-1: The Programme must have documented measurable objectives that support college and Institution mission statements.

Objectives of the Program:

1. To develop skills required to conduct independent research
2. To prepare graduates for writing national & international projects aiming to solve challenges facing industry and society
3. To make students able to communicate effectively, scientifically and professionally
4. To educate students so that they can exploit discoveries and can develop, design and synthesize safe and sustainable processes & products

Standard 1-1: The Programme must have documented measurable objectives that support college and Institution mission statements.

S. No.	Objectives	How Measured	When Measured	Improvement Identified	Improvement Made
1	To develop skills required to conduct independent research	By monitoring bench work	Throughout their studies	—	—
2	To prepare graduates for writing national & international projects aiming to solve challenges facing industry and society	Students are asked to write Research project proposals	At the end of studies	—	—
3	To make students able to communicate effectively, scientifically and professionally	Students deliver research seminars & presentations	Atleast two Seminars in each Semester	Students need more exposure to scientific communications	Students are encouraged to participate in national & international conferences
4	To educate students so that they can exploit discoveries and can develop, design and synthesize safe and sustainable processes & products	By monitoring bench work	Throughout their Ph.D studies	Students need exposure to industrial environment and its demands	Visits to various industries

Standard 1-2: The programme must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the programme objectives and that graduating students are capable of performing these outcomes.

PROGRAMME OUTCOMES

After completion of the Ph.D. in Biotechnology, students will:

1. develop skills required to conduct independent research.
2. be able to write national & international projects aiming to resolve challenges facing industry & society.
3. be able to communicate effectively, scientifically & professionally.
4. be able to exploit discoveries and can develop, design and synthesize safe and sustainable processes & products.

Standard 1-3: The results of programme's assessment and the extent to which they are used improve the programme must be documented.

a) Strengths and Weaknesses of the Programme

i) Strengths:

The emerging field of biotechnology, its potential for innovation and inventions is itself a great strength of the department. Department has well trained highly qualified faculty. Currently 4 faculty members are involved in Ph.D. program and two of them have foreign postdoctoral experience.

ii) Weaknesses

The Department is running in an under constructed building, which when fully constructed would be beneficial to the department's mission. Four functional labs are available for faculty and students. One is designated for research work of M.Phil and Ph.D students.

The department has inadequate equipment for research.

b) Future Development Plans

Establishment of digital library and research laboratories, liaisons with industry and establishment of research collaboration with national and international research institutes.

Standard 1-4: The department must assess its overall performance periodically.

a) Student Enrolment

S. No	Year	Degree
1	2015	0
2	2016	0
3	2017	1

b) Student/Faculty Ratio : 3:1

c) i) Time for Bachelors NA

ii) Time for M.S NA

iii) Time for Ph.D 3-4 year

d) The average student grade point (CGPA)

NA

e) Student/Faculty Satisfaction

The facilities and capacity of the Department is gradually being upgraded and both faculty and students are satisfied with its progress.

CRITERION-2

CURRICULUM DESIGN AND ORGANIZATION

Criterion-2 Curriculum Design and Organization

Programme of Studies offered

Year / Semester wise Scheme of Studies of Ph.D. Programme

S. No	Course Code	Course Title
1	801	Research Seminars
2	802	Seminars on Current Advances in the
3	803	Thesis and Manuscript Writing Skills
4	804-A	Development of Research Proposal for Funding Agencies-I
5	804-B	Development of Research Proposal for Funding Agencies-II

Research work

Three to four years of the research work for every student is imperative leading to the writing of dissertation.

Standard 2-2: Theoretical background, problem analysis and solution design must be stressed within the programme's core material.

The following table indicates the elements covered in core courses:

Elements	Courses
i) Theoretical Background	All courses offered by the Department
ii) Problem Analysis	All courses of the Department Thesis/Dissertation
iii) Solution Design	All courses of the Department Thesis/Dissertation

Note: Theoretical background and problem analysis are covered during the extensive discussions with the students while presenting various seminars in front of faculty members and colleagues.

Standard 2-3: The curriculum must satisfy the core requirements for the programme, as specified by the respective accreditation body.

&

Standard 2-4: The curriculum must satisfy the major requirements for the programme, as specified by the respective accreditation body/council.

The curriculum has been approved by statutory bodies of the University of Karachi and is according to the HEC guidelines.

2-5: The curriculum must satisfy the general education, arts and other discipline requirements for the Programme as specified by the accreditation body.

Not applicable for Ph.D. Program

Standard 2-6: Information technology component of the curriculum must be integrated throughout the programme.

Not applicable for Ph.D. Program

Standard 2-7: Oral and written communication skills of the student must be developed and applied in the programme.

Students deliver seminars and presentation which help them to improve their communication skills.

CRITERION-3

LABORATORY AND COMPUTING FACILITIES

CITERION-3: Laboratory and Computing Facilities

Laboratory Facilities

The department of biotechnology has 04 functional laboratories for students and faculty. There is no separate laboratory for Ph.D students..

Computer Facilities

The department of biotechnology has only four Core 2duo refurbished computers for academic labs and available for students, faculty and administrative office. Currently, we are in dire need of at least 15-20 up-to-date computers to fulfill the curriculum requirement.

Internet Facility

Karachi University Main Communication Network (LAN)

Karachi University WIFI

Standard 3-1: Laboratory manuals/ documentation instruction for experiments must be available and readily accessible to faculty and students

Laboratory manuals and supporting protocols are available to the students when needed.

Standard 3-2: There must be adequate support personnel for instruction and maintaining the laboratories.

Supporting staff / personnel for instruction and maintaining the laboratories are not sufficient.

Standard 3-3: The University computing infrastructure and facilities must be adequate to support programme's objectives

- i) **Computing Facilities**
Inadequate
- ii) **Multimedia**
One
- iii) **Website**
- iv) **Internet**

CRITERION-4

STUDENT SUPPORT AND ADVISING

Criterion-4 Student Support and Advising

Student advisor has been appointed for students' support and guidance. Also students are encouraged to interact with teachers to get advice relevant to their issues.

Standard 4-1: Courses must have been offered with sufficient frequency and number for students to complete the programme in a timely manner.

Programme	Classes per Week	Practical Classes per Week	Research Guidance
Ph.D	Not applicable	Not applicable	Available when needed

Standard 4-2: Course in the major must be structured to ensure effective interaction between students, faculty and teaching assistants.

Not applicable.

Standard 4-3: Guidance on how to complete the programme must be available to all students and access to academic advising must be available to make course decisions and career choices

The student advisor and chairperson help students by providing information regarding career opportunities available for them. Moreover information regarding internships, job opportunities, seminars and workshops are placed on the notice board by the chairperson of the Department.

CRITERION-5

PROCESS CONTROL

Criterion-5: Process Control

Standard 5-1: The process by which students are admitted to the programme must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

Students are inducted in the program by giving written test of subject and English. They have to write a research proposal to be evaluated by Departmental Research Committee. Interviews are held for final selection of the candidates.

Standard 5-2: The process by which students are registered in the programme and monitoring of students progress to ensure timely completion of the programme must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

Meetings of Department Research Committee held regularly to monitor students progress.

Standard 5-3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institutional mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives.

**Faculty Recruitment / Retaining Policy
Appointments / Promotions Procedure:**

It is as per University Code Book.

Basic Pay Scale (BPS)

BPS	18
BPS	19
BPS	20
BPS	21

a. Lecturer (BPS- 18):

B.S or M.Sc. in Biotechnology with First Division.

b. Assistant Professor (BPS- 19):

Minimum Qualification

Ph.D in Biotechnology

Or

MS in Biotechnology with 4 years of relevant experience.

Or

MSc. in Biotechnology with 6 years of relevant experience.

c. Associate Professor (BPS- 20)

Minimum Qualification

Ph.D in Biotechnology

Experience

10 years of relevant experience

Minimum Number of Publications

10 research publications in HEC/ BASR approved journals

d. Professor (BPS-21)

Minimum Qualification

Ph.D in Biotechnology

Experience

15 years of relevant experience

Minimum Number of Publications

15 research publications in HEC/ BASR approved journals

Bases for Appointments / Promotions

Through selection board conducted by University of Karachi.

Standard 5-4: The process and procedure used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives.

Meetings of Departmental Research Committee held at regular intervals to ensure and evaluate the active learning and the outcome of the program.

Standard 5-5: The process that ensures that graduates have completed the requirements of the programme must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

After completing the dissertation, the same is evaluated by two technical experts of the field from technically / academically advanced country. After positive evaluation, defence of the dissertation is conducted.

CRITERION-6

FACULTY

Criterion-6 Faculty

Standard 6-1: There must be enough full time faculty who are committed to the programme to provide adequate coverage of the programme areas / courses with continuity and stability. The interest of all faculty members must be sufficient to teach all courses, plan, modify and update courses. The majority must hold a Ph.D. degree in the discipline.

The department has four full-time permanent Ph. D. faculty members for the smooth running of this program. They have ability to teach plan, modify and update courses.

Standard 6-2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programmes for faculty development must be in place.

Faculty members regularly participate in seminars, conferences, workshops at national / international levels.

Standard 6-3: All faculty members should be motivated and have job satisfaction to excel in their profession.

Job satisfaction is there but faculty members are required to be motivated by fair & timely promotions by the University of Karachi.

CRITERION-7

INSTITUTIONAL FACILITIES

Criterion-7 Institutional Facilities

Standard 7-1: The Institution must have the infrastructure to support new trends in learning such as E-learning.

a) Departmental library and Internet Facility

- Departmental seminar library has stock of about 500 books related to various field of biotechnology and is updated periodically.
- Having problem with departmental internet facility that will be resolved soon.

b) Main Library

A well established main library has various sections that provides:

- numerous books
- scientific journals
- digital library having access to journals & e-books

c) Offices

Department has adequate office for the faculty members.

d) Class Rooms

Inadequate

Standard 7-2: The library must possess on up-to-date technical collection relevant to the programme and must be adequately staffed with professional personnel.

Seminar library has up-to-date technical collection with a professional person as librarian.

Standard 7-3: Class rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibility.

Classrooms

Classrooms are adequately equipped however, multimedia projectors are required.

Faculty Offices

Faculty offices are adequate but not fully equipped.

CRITERION-8

INSTITUTIONAL SUPPORT

Criterion-8 Institutional Support

Standard 8-1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teacher and scholars.

Institution support is not sufficient enough. Financial resources are required to meet the program's objectives.

Standard 8-2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. Students

Degree Programme	Years		
	2015	2016	2017
Ph.D	—	—	01

Student/Faculty Ratio (for the last three years) 1:1

Standard 8-3: Financial resources must be provided to acquire and maintain library holding, laboratories and computing facilities.

The University of Karachi provides limited financial resources to maintain library, laboratories and computing facilities. HEC is also requested to provide additional financial resources for strengthening the Department of Biotechnology.

Faculty CVs

Survey's Results