

Department of Biological Sciences

MISSION, OBJECTIVES AND OUTCOMES

Mission Statement

The mission of the department of biological sciences is to promote effective development, growth of skill professionals in the field of Biosciences and utilization of human and natural resources

M.Sc Biology Program

(Program Mission, Objectives and Outcomes)

Standard 1-1: The program must have documented measurable objectives that support faculty / college and institution mission statements

Mission Statement for M. Sc Biology

The mission of the department of biological sciences is to promote effective development, growth of skill professionals in the field of Biosciences and utilization of human and natural resources

Program objectives

The department has the objectives to provide the knowledge in Biological sciences on both theoretical and practical so that they can meet the future challenges and be able to:

1. To promote communication skill and critical thinking and foster a continues interest in learning
2. To facilitate an understanding of the major principles and concepts in the field of biological sciences and to accommodate well in applied area of research
3. Diagnosis of disease and to develop strategy for its control
4. To work well in the field of biotechnology and to improve the yield of essential metabolites.
5. Design the project independently as well as in a team member
6. Analyze the problems and develop methods for its solution.
7. Improve oral and written communication skills.
8. Develop skill in bioremediation and in other environmental problems.
9. To utilize their hidden potentials in the field of biosciences.
10. Expert in the field of microbiology and molecular biology to solve the problem of modern challenges.
11. Develop management skills in the required area

Objective	How measured	When measured	Improvement identified	Improvement made
1,2,3,5,8	Student Course Evaluation Questionnaire	2012	Lack of course organization, Lack of learning resources, lack of practical material, Shortage of books.	
4,6,7,9	Survey of Graduating Students	2012	<ul style="list-style-type: none"> ➤ Program objectives achievements need more attention ➤ Lack of chemicals to perform practical work 	

Standards1-2: The program must have documented outcome for graduating students .It must be demonstrated that the outcome support the program objective and that graduating students are capable of performing these outcomes.

Program Outcomes

Program objectives are practically observed in the form of outcomes as given below

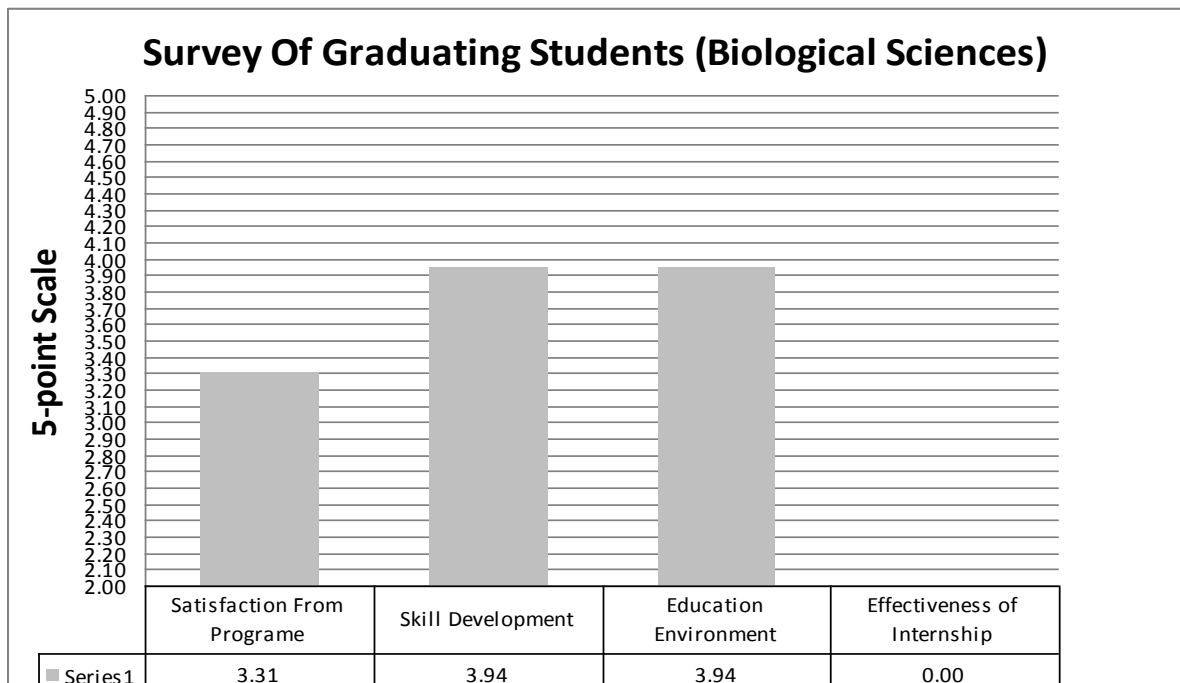
1. Applying their knowledge in educational institutions to further develop written and communication skill.
2. Playing significant role on the applied side of biosciences.
3. They are doing well for the diagnosis of disease and its treatment
4. Of course they have improved the yield of desire metabolite.
5. They are able to run the project individually as well as in team work.
6. They developed the useful tool for analyzing and solving the problems.
7. They are able to communicate effectively in written and oral.
8. Utilizing their experience best in bioremediation and related field.
9. They have the potency to utilize the hidden potentials the said field.
10. They are able to solve the problems of modern and future challenges as well as absorbed well in the market.

11. Working with full management skills.

Program Objectives	Program Outcomes								
	1	2	3	4	5	6	7	8	9
1	√								
2		√							
3			√						
4				√					
5					√				
6						√			
7							√		
8								√	
9									√

Standard 1-3: The results of programs assessment and the extent to which they are used to improve the program must be documented

After the assessment of Graduating students’ survey, the strength and weaknesses identified.



- **Areas for improvement**

- Program objective achievement need more attention
- Lack of chemicals and instruments for practical work as well as research work
- Oral & Written communication skills

Describe the actions taken based on the results of periodic assessments

Actions to be taken on the recommendations of AT visits

- **Strength and weakness of the program**

Strengths:

- Program smoothness
- Independent thinking and teamwork
- Skill development
- Education environment

Weaknesses:

- Program objective achievement needs more attention
- Lack of practical work material
- Oral & Written Communication Skill

- **List future development plan for the program**

- New more specialization.
- New and advanced curriculum
- Research work capability
- Latest Labs Equipments

Standard 1-4: The department must asses its overall performance periodically using quantifiable measures.

Present students enrolment (M.Sc Biology)

Years	undergraduate students	No of graduate students
2011	Nil	108
2010	Nil	84
2009	Nil	96

Criterion 2: Curriculum Design & Organization

- A. **Title of Degree Program:** M. Sc Biology
- B. **Definition of credit hour:** One credit hour means a class of one hour per week for one term/ semester. One term means 15 weeks continuous duration program. However in case of Lab work, two hours Lab work means one credit hour.
- C. **Degree Plan:** The table-1 shows the course division of the program.
- D. **Curriculum breakdown:** No breakdown available for the courses. Needs improvement

Figure: 1

Following matrix links courses in the program to program outcomes

	Courses	Program Outcomes										
		1	2	3	4	5	6	7	8	9	10	11
1st Year Courses												
1st term	Biochemistry 1			√								√
	Cell Biology								√			
	General Genetics											
	Biometry											√
	Functional English-1	√							√			
2nd term	Biochemistry-2		√	√	√							
	Microbiology		√						√		√	
	Molecular biology										√	
	Biodiversity								√			
	Functional English-2	√							√			
2nd year courses												
(3rd term)	Gene Manipulation											√
	Protein chemistry and Enzymology			√								√
	Immunology		√						√		√	

	Physiology										√		
(4 rd term)	On cogenesis										√		
	Biotechnology		√		√			√					
	Research techniques and method of instrumental analysis			√		√	√						

Table 1: Courses versus program outcomes

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

Automation and Control Concentration (Regular Stream)	
Elements	Courses
Theoretical	Biochemistry-1, Oncogene, Microbiology, Molecular biology, Genetics, Gene Manipulation, Immunology, protein chemistry
Problem Analysis	Diagnosis of Infectious disease, profile of various metabolite, Disorder, medical microbiology, isolation and screening of bacteria and development of potent strains for the production essential metabolites, vaccine and antibiotic production. Biometry
Solution Design	, Instrumental methods of Analysis, Physiology, Research Techniques Bio Chemistry 1&2, Microbiology, Immunology, Molecular Biology and Biotechnology, Gene manipulation Enzymes, and biometry, cell biology, Oncogenesis

Table 2: Fulfilling requirements in standard 2-2

Standard 2-3: The curriculum must satisfy the mathematics and basic sciences requirements for the program as specified by the respective accreditation body

Applications of mathematics offer in biology to solve the problem of calculation calculations in the living organisms or biological system.

Standard 2-4: The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body

The curriculum in the program is fully satisfied the major requirements and objectives of the program.

Standard 2-5: The curriculum must satisfy humanities, social sciences, arts, ethical, professional and other discipline requirements for the program as specified by the respective accreditation body

Table 3 shows how the M.Sc Biology program satisfies requirements in standards 2-3, 2-4 and 2-5. It's clear from the table that all requirements are met but only in the area of humanities and social sciences needs little attention.

M. Sc Biology	Mathematics and Basic Sciences		Biology Topics				Humanities and Social Sciences	
	Required	Present	Core				Required	Present
			Required	Present				
	2	2	15	15			0	0

Table.3: Standard 2-3, 2-4, 2-5 requirements

Standard 2-6: Information technology component of the curriculum must be Integrated throughout the program

Information technology component is the part of curriculum which delivers the knowledge of different software and computerized lab equipments. This area need more attention due to lack of the required facilities, the course of bioinformatics is in the future plane so it still in the growing stage.

Standard 2-7: Oral and written communication skills of the students must be developed and applied in the program

Oral and written communication are improving by delivering seminars and by designing assignment as well as the department is offering English courses to improve their communication skill.

Criterion 03: Biological Sciences Lab

Lab Title	Location	Objectives	Adequacy	Courses Taught	Major apparatus and	Safety
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	& area		for Instruction		Equipments	regulations and first aid box
Biochemistry lab	WxL 20x30	To train M. Sc students in Bio-chemistry	M. Sc Prev: M. Sc Final M.Phil	M. Sc Training program in Bio-Chemistry, physiology, protein chemistry & enzymology	Water bath, Balance PH meter, Glassware,	Not available
Molecular lab	WxL 20x30	To train M. Sc students in Molecular Biology	M. Sc Prev: M. Sc Final	Molecular biology and gene manipulation, oncogene, genitics	PH meter, Centrifuge, Microscope, electrophoresis 3. Distillation Apparatus Spectrophotometer, stirrer	Not available
Microbiology practical and research lab	WxL 22x32	To train students in Microbiology	M. Sc Practical and M.Phil, Ph.D research	Microbiology, Immunology, Biotechnology ,practical and research	1 2.Spectrophotometer 3. pH meter 4. Refrigerator 5. laminar flow cabinet 6. oven/incubator 7.Balance 8.Autoclave 9.Microscope 10 Shaker but not incubator shaker Distillation unit	Not available
Biotechnology lab	WxL 20x30	To train student in the biotechnology	To train	Biotechnology, cell biology research techniques	Incubator, need more instruments presently the microbiology lab is use for biotechnology	Not available

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

Lab manuals are available for each lab but no rules and regulations for safety are available. No first aid box in case of emergency. All the documented instructions for lab experiments are available to both students and faculty members. The safety regulations and first aid box will be considered in implementation plan.

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

Lab Assistants and attendants help in conduction the Lab activities; each lab has a technician, with sounds skills of the special technique, computer laboratory having net facilities is available, but after the establishment of the department in 2003 few old and useless computer was provided to the department .these computer were repaired several times but now completely useless, The

department need about 20 new computers for smooth running of the computer laboratory. The department also needs a computer programmer to look after the lab,

Standard 3-3: The university computing infrastructure and facilities must be adequate to support programs objectives.

Computer lab is established but not equipped with computers so no access to students to take benefits from digital library and other e-learning facilities. The internet Lab facility in the department needs improvement to fulfill the requirements of e-learning .Advanced internet facilities as well as digital library must be available ,after the establishment of the department few old and used computers were provided which is now useless, the department repaired several times but still functionless so computers are needed.

Criterion 4: Student Support and Advising

Standard 4.1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner.

All the courses are first discussed by departmental academic committee. The recommendations are then discussed in the Board of Studies meeting comprising of some senior professors of the university and experts of curriculum from other universities and affiliated colleges. The recommendations of this board are further submitted to Academic committee/council for approval and onward submission to the syndicate. In this way the course and the curriculum passes and screens through a number of levels.

Standard 4-2: Courses in the major areas of study must be structured to ensure effective interaction between student, faculty and teacher assistants.

No proper procedure to assign the responsibility to structure courses and to maintain the consistency of contents. Improvement needs in this area to fulfill the requirements.

Standard 4-3 Guidance on how to complete the program must be available to all students and access to academic advising must be available to make course decisions and careers choices.

Guidance and counseling may be arranged so that student may select right carrier of their desire field. Presently due to lack of facilities the department does not offer specialization.

Criterion 5: Process Control

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

As per university merit policy a very transparent system for admission in M.Sc Biology from time to time. NTS test and interview is taken for admission. Admission in this program based on the following selection criteria.

1. Candidate must have passed in at least 2nd division.
2. Candidate must have either zoology or botany, or both zoology and botany subject in the bachelor degree.

3. Merit formula:

$$\text{SSC} *1 = X$$

$$\text{HSSC} *2 = Y$$

$$\text{B. Sc} *3 = Z$$

$$\text{Academic} = X+Y+Z / 6,$$

$$\text{Merit} = 60\% \text{academic} + 40\% \text{NTS}$$

Standard 5-2: The process by which students are registered in the program and monitoring of students progress to ensure timely completion of the program must be documented.

At the start of term applications are invited through leading news papers. After getting the applications students are scrutinized with reference to pre-requisite of the program. Merit list of eligible candidates is made according the formula given in standard 5-1.

To monitor the students' performance we have internal as well as external base evaluation system. In every term at least 2 tests are conducted which carry 20 % marks along with assignments at the end of the term, external exam is conducted for 80 %. The result is based over the combined assessment of the students.

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.

In order to attract qualified faculty , different domains of computing is defined in the programs and as per the expertise required , demand for the staff along with the expertise details is send to Administration for advertising the positions in leading English and Urdu News papers. As per the application received, the scrutiny committee short list the applicants for the evaluation test as per the criteria advertised. A third party is involved for conducting the test to make the process transparent and successful candidates of the test are further passed through a selection board as per statutes and criteria in which a panel of experts interviews the candidate. But for the post of associate Professor and professor documents are evaluated both by local and foreign expert. After the selection board syndicate gives the approval of these selections, there after appointment is notified.

There was no systematic process before to evaluate the faculty members, now after establishment of QEC each faculty member is evaluated by the students via “Teacher Evaluation Questionnaire”.

Standard 5-4: The process and procedures used to ensure that teaching and delivery of course material to the students emphasize active learning and that course learning outcome

is met. The process must be periodically evaluated to ensure that it is meeting the objectives.

In order to ensure that the teaching is effective a quarterly survey is conducted by the University QEC and the findings are communicated to the concern faculty members. After completion of survey assessment team meeting is called to assess the process and make implementation plan for the said department.

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

Yes the graduates complete all the standard requirement of this program which is also properly documented. Test, assignment, attendance seminars as internal and practical as internal/external and 80% theory by external evaluation is followed.

Criterion 06: Faculty

Standard 6-1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas / courses, continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph. D. in the Discipline.

The following table indicate program areas and number of faculty in each area

Program Area	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with PhD
Microbiology	Microbiology, Immunology, Biotechnology	2	1

Molecular biology	Molecular biology, Gene manipulation, cell Biology, On cogenesis,	2	2
Biochemistry	Biochemistry 1&2, Research technique, & protein chemistry And enzymology, Physiology	3	1
Genetics	Genetics ,Biodiversity,	1	0
Total :		8	4

For biometry course a teacher work on extra teaching allowance. It is clear from the above table that the information provided in the faculty members resumes that this standard is satisfied.

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 programs for faculty development must be in place.

Most of the faculty members are involved in research activities and professional development. HEC training the faculty members from time to time through the faculty development program.

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

There are different programs for faculty benefits and their motivation i.e.

- 1) Reasonable work load and class size as per the HEC requirement for getting quality in education.
- 2) Attractive salary packages.
- 3) Paid vacations.
- 4) Hard area allowance.

*For survey chart see the **Graph: 1 Criterion: 8** Institutional supports **Standard 8-1***

A faculty survey was conducted and the response is as below:

Faculty Comments:

Q.14 what are the best program/factors currently available in your Department that enhance your motivation and job satisfaction?

1.QEC

Q.15 Suggest program/factors that could improve your motivation and job satisfaction?

1. QEC

Criterion 07: Institutional Facilities

Standard 7-1: The institution must have the infrastructure to support new trends in learning such as e-learning

The e-learning facilities are not sufficient to fulfill the requirements to meet the new challenges. Computer Lab is available but no computers for M Sc students are available. Improvement needs for this section and will be implement in the implementation plan.

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

The departmental library has the collection of limited latest books. The total numbers of books in the library are

Name of Item	Quantity
Books	3000

Central Library:

The central library has also the facility to facilitate the department students but with limited number of books. Our central library has very small number of books in all fields. No e-learning facility. Improvement needs in this section.

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

Class room shortcomings

1. **Multimedia:** No multimedia is available in the department.
2. **Sound System:** No sound system present.
3. **Desks / Chairs:** Desks and chairs are present but their conditions are not good.
4. **No stage to deliver lecture.** Stage need in the classrooms
5. **Air-conditions** Class rooms need air-conditions

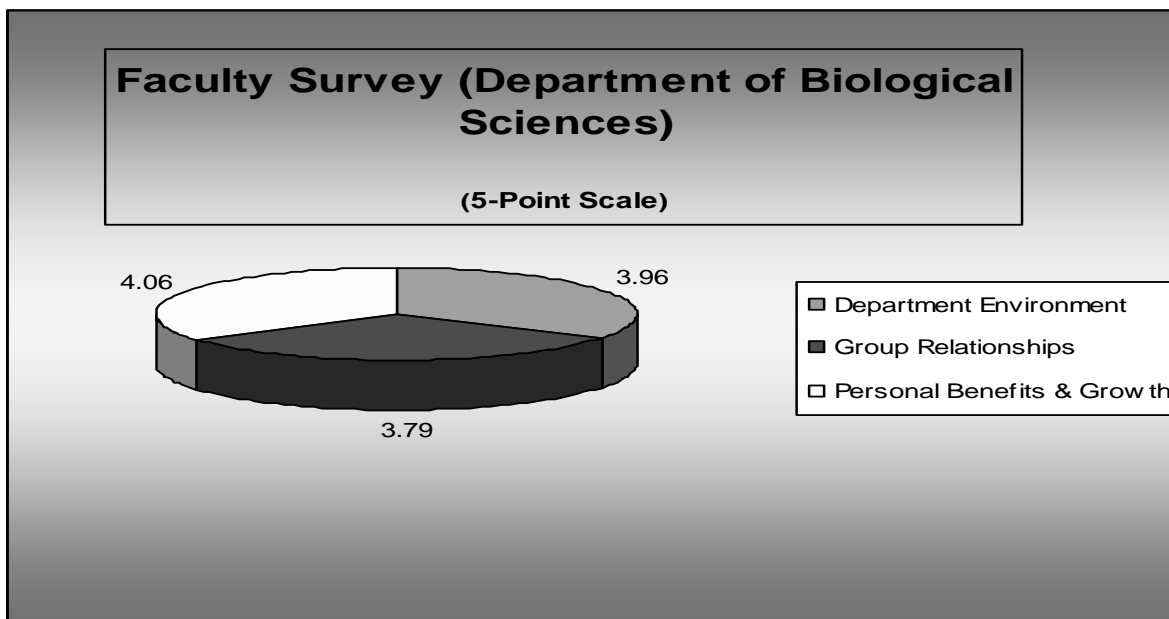
Criterion 08: Institutional Support

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 scholar.

The University authority through the finance directorate provides all the financial support needed to run the programs of studies in all departments. Salaries of the faculty as well as supporting staff are facilitated by the university. The university also provide on accommodation on rent basis .The chairman of the department is authorized up to a very limited extent to facilities the department from the development fund on emergent basis.

The University has the department of Staff Welfare which is run by the SWO (Staff Welfare Officer).

For this purpose we have conducted the survey



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

The department was established in 2003 so the department is still in the growing stage. Inspire of limited resources and infrastructure this department has awarded one PhD degree as well as six M,Phil degree up June 20012.The has also registered 15 students for M.Phil study as well as PhD including HEC indigenous If chemicals as well as equipments are provided then more qualitative and quantities research will be carried out,

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

At the moment the departmental library has almost 3000 volume of books, out of these most are latest in different fields.

The department has established a computer lab which has the facility of internet and digital library but need about 20 new computers.

The department is not well equipped with instruments so the students need full facility to perform the experiments. The department is still facing problem to get chemicals etc for practical as well as for research.