# Department of Statistics

## MISSION, OBJECTIVES AND OUTCOMES

### Mission Statement

The aim of statistics department is to provide the data analysis services to the researchers from the university and other sectors including education, planning, health, agriculture, engineering, industry, banking and defense.

# M. Sc Statistics 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 Statistics

Department of Statistics aims to advance the intellectual level and enable the students to provide data analysing services to the researchers from universities and other sectors including education, planning, health, agriculture, defense etc and to train the incoming students up to the extent that they can meet the requirement of country when they are supposed to work in teaching / Research institutions or in industries in Pakistan or abroad.

## Program objectives

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

1. To enable the students of Statistics to utilize the knowledge gained in the degree program effectively and efficiently.
2. Design and run the project independently.
3. Analyze and produce the solution to different problems.
4. To enable the students of Statistics to assist, in the field experiments as well as survey method.
5. Work as a team member.
6. To enable the students of Statistics to assist, in sound and effective planning in any field of inquiry.
7. Grow in the field of social and behavior science.
8. To enable the students as a good researcher to provide data analysing services.
9. To create awareness in the students for analysing the data.

| Objective | How measured | When measured | Improvement identified | Improvement made |
|---|---|---|---|---|
| 2,3,7,8,9 | Student Course Evaluation Questionnaire | Dec 2012 | course organization, Lack of learning resources, lack of practical material, Shortage of books. | |
| 1,2,4,6 | Survey of Graduating Students | Dec 2012 | ➢ Program objectives achievements need more attention<br>➢ Infrastructure Improvement in lab 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

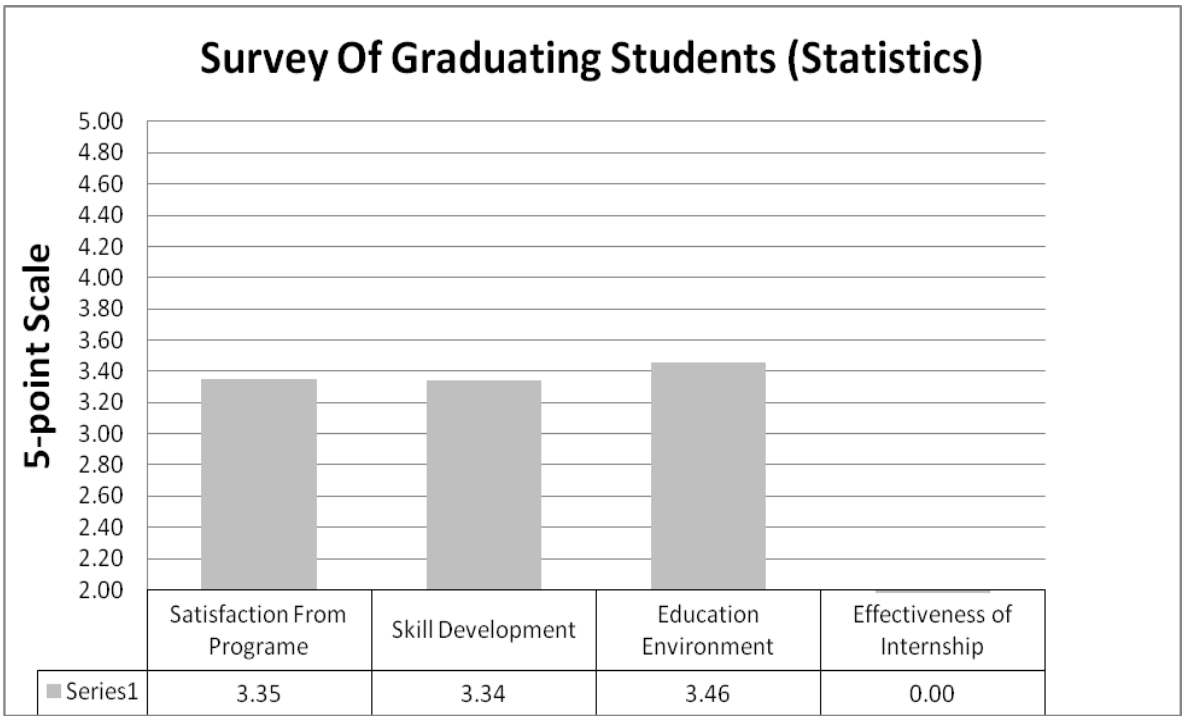
Program objectives will result in following outcomes:

1. Students will be able to utilize their knowledge in business, research, industry etc.
2. Students will be able to run the project individually.
3. Students will be able to analyze and produce the solution to problems.
4. Students will be take part in competitive and other carreer making examinations.
5. Students will be able to work as team member.
6. Students will be able to step into research and development effectively..
7. Students will be able to use Statistical technique being powerful tools for analyzing numerical data in almost every branch of life..
8. Students will be able to run the bureau of census projects.
9. Students will be able to apply theoratical knowledge into practical.

| **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**

| Satisfaction From Programe | Skill Development | Education Environment | Effectiveness of Internship | Aggregate |
|---|---|---|---|---|
| 3.35 | 3.34 | 3.46 | 0.00 | 2.80 |




- **Areas for improvement**
  - Program objective achievement need more attention
  - Infrastructure
  - Lack of computer labs. for practical work
  - Professional development.

**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
- Planning abiliteis
- Data analysis

**Weaknesses:**

- Program objective achievement needs more attention
- Lack of Responsibilities in official work.
- Lack of latest computer.
- Internship for completion of program.
- less communication skill.

- **List future development plan for the program**
  - Purchasing of latest computers.
  - Advance curriculum to meet the latest challenges.
  - Stress on Research Work
  - Infrastructure.
  - Professional development.
  - Start of M.Phill and Ph.D Programs.

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

Present students enrolment (M. Sc Statistics)

| Years | No of students | No of graduate students |
|---|---|---|
| 2010 | 55 | 46 |
| 2011 | 43 | 22 |
| 2012 | 48 | 33 |

# Criterion 2: Curriculum Design & Organization

**A.** **Title of Degree Program:** M. Sc Statistics

**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.

**C.** **Degree Plan:** The table-1 shows the course division of the program.

**D.** **Curriculum breakdown:** No breakdown available for the courses. Needs improvement

Following matrix links courses in the program to program outcomes

| | Courses | Program Outcomes | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **1st Year Courses** | | | | | | | | | | |
| **1st term** | Statistical Methods-I | √ | | √ | | | | | | |
| | Probability and Random variable | | | | | | | √ | | |
| | Data Processing & Statistical Computing-I | | | | | | | | | |
| | Sampling & Survey Method-I | | √ | √ | | | | | √ | |
| | English-I | | | | | | | | | |
| | | | | | | | | | | |
| **2nd term** | Statistical Methods-II | √ | | √ | | | | | | |
| | Probability Distributions | | | | | | | √ | | |
| | Data Processing & Statistical Computing-II | | | | | | | | | |
| | Sampling & Survey Method-II | | √ | | | √ | | | | |
| | English-II | | | | | | | | | |
| **2nd Year Courses** | | | | | | | | | | |
| **3rd Term** | Statistical Inference-I | | | | | | | √ | | |
| | Design & analysis of Experiments-I | | √ | √ | | | √ | | | √ |
| | Regression Analysis & Econometrics-I | | | | | | √ | | | |
| | Applied Non-Parametric(Optional)-I | | | | | | √ | | | |
| | Operational Research-I | √ | | | √ | | √ | | | √ |
| | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **4th Term** | Statistical Inference-II | √ | | | | | | √ | | |
| | Design & analysis of Experiments-II | | √ | | | | √ | | | √ |
| | Regression Analysis & Econometrics-II | √ | | | | | √ | | | |
| | Population Studies(Optional) | | | | | √ | | | √ | |
| | Quality Control | √ | | | √ | | | | | √ |
| | | | | | | | | | | |

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 | Sampling & Survey Method-I, Sampling & Survey Method-II, Probability and Random variable, English-I, English-II, Statistical inference-I, Statistical inference-II |
| Problem Analysis | Statistical Methods-I, Statistical Methods-II, Regression Analysis & Econometrics-I, Regression Analysis & Econometrics-II, Design & analysis of Experiments-I, Design & analysis of Experiments-II, Population Studies, Operational Research-I, Applied Non-Parametric-I |
| Solution Design | Statistical Quality Control, Applied Non-Parametric-I, Statistical Methods-I, Statistical Methods-II, Design & analysis of Experiments-I, Design & analysis of Experiments-II, Sampling & Survey Method-I, Sampling & Survey Method-II, Data Processing & Statistical Computing-I, Data Processing & Statistical Computing-II, |

Table 2: Fulfilling requirements in standard 2-2

**Standard2-3: The curriculum must satisfy the mathematics and basic sciences requirements for the program as specified by the respective accreditation body**

Mathematics subject is also use in the statistics to manipulate the mathematical as well as statistical problems.

**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 Statistics 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 Statistics | Mathematics and Basic Sciences | | Statistics Topics | | | | Humanities and Social Sciences | |
|---|---|---|---|---|---|---|---|---|
| | | | Core | | Elective | | | |
| | Required | Present | Required | Present | Required | Present | Required | Present |
| | 2 | 2 | 6 | 6 | 0 | 0 | 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 but due to shortage of latest computers in lab information technology components are not being met.

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

Oral and written communication has been given importance in the program. Students are to take following English courses to improve their communication skills:

- English (Study Skills)
- Communication Skills

Students' skills in oral and written communication are not satisfactory, its need improvement.

# Criterion 03: Statistics Lab

| Lab Title | Location & area | Objectives | Adequacy for Instruction | Courses Taught | Major apparatus and Equipments | Safety regulations and first aid box |
|---|---|---|---|---|---|---|
| Computer Lab | 25*19 | To provide the IT skills to students of statistics department. | Masters | Data Processing & Statistical Computing-I, Data Processing & Statistical Computing-I | Only P-1 & P-II computers are available in the lab. | No |
| | | | | | | |

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

We don't have any instructions available for the computer lab.

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

Lab attendant is available to help out students during practical work over different applications. He also maintains the lab equipments.

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

Computer lab is established and equipped with computers but no access to students to take benefits from Digital library and other e-learning facilities.

# 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 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**.

A faculty member is assigned responsibility to discuss and coordinate with student in taking specialization. Also the said faculty member is responsible for organizing workshops, visits of the students to different universities and industry.

# 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.**

A very transparent system for admission in M. Sc Statistics. NTS test and interview is taken for admission. Admission in this program based on the following selection criteria.

1. The candidate must qualify NTS test to appear in interview.(40%)
2. Candidate must have passed B.Sc. / B.A. at least 2nd division.
3. if any student has Math-A or Math-B & Statistics courses in B.Sc, they will be given 10 extra marks on the behalf of B.Sc.
4. Candidate must have
5. Merit formula: (60%)

   SSC *1 = X

   HSSC*2 = Y

   B. Sc*3 = Z OR {(B.Sc+10)*3 (in case of Math)}

Merit = X+Y+Z / 6 = A*60/100= **R1**

NTS test Formula: 40%

NTS Marks*40/100 = **R2**

**Final Merit: R1+R2**

**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 to 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 in which a panel of experts interviews the candidate. After the selection board syndicate gives the approval of these selections, there after appointment is offered to the faculty.

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".

**<u>Standard 5-4</u>: 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.

**<u>Standard 5-5:</u> 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.**

No proper procedures to assure that the graduates meet the program requirements or not. This area needs concentration to develop this procedure. Plan required for this area.

# 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.**

All the faculty members are qualified and capable to deliver their lectures. All the members have fully command over statistics subjects and applications.

| 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 |
|---|---|---|---|
| **M.Sc Statistics** | Thermodynamics of Solutions, Radio and Nuclear Chemistry, Photochemistry, Spectroscopy, Statistical Thermodynamics, Polymer Chemistry | 8 | 0 |
| **Total :** | | **8** | **0** |

**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.**

The department of Statistics has number of faculty members involved in professional development. No specific time frame to arrange the workshops and seminars. Improvement needs to arrange refresher courses.

**<u>Standard 6-3:</u> Faculty members should be motivated and have job satisfaction to excel in their profession**

There are different programs for faculty benefits and there 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.

# 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 with small number & out dated computers but no access to the M. Sc students.

**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 latest books. The total numbers of books in the library are

| Name of Item | Quantity |
|---|---|
| Books | 5000 |

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## Central Library:

The central library has also the facility to facilitate the chemistry department graduate students but with small 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 present in the classrooms.
2. **Sound System:** No sound system present.
3. **Desks / Chairs:** Desks and chairs are present but their conditions are not good.
4. **Light System:** Light system is present but not up to the requirements.

No multimedia concept here. All the lectures are delivered on white board.

# 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.**

All the financial matters of Department of Statistics run by University Finance Directorate and very little is left at department level. The university provides all the financial support needed to run the programs of studies in Department of Chemistry. Salaries of the faculty as well as supporting staff are facilitated by the university. The compensation including benefits like housing and children are also provided by the administration.

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

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

We have highly quality graduate students but the y have not been utilized in research activities because M.Phil & P.Hd programs are not available here. We don't have any P.Hd in the department therefore no research activities have been started yet and no research assistants are available.

**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 5000 volume of books, out of these most are latest in different fields. Computer lab is available but with out-dated computers.