PROFORMA FOR
QUALITY ENHANCEMENT CELL'S WEBSITE

All the Teaching Departments/ Institutes/ Centers of the University of Karachi are requested to provide the following information to the Quality Enhancement Cell for uploading it on its website.

A. Name of the Department/ Institute/ Center :- Department of Mathematics**.**

B. **Mission of the Departments/ Institute/ Center:-** The mission of the department of Mathematics , University of Karachi is to pursue teaching, research and service in the area of mathematics. Our department teaches both undergraduate and graduate students with a wide range of abilities and needs. At all levels, we instruct students in the rigor and precision characteristic of mathematical reasoning.

C. Mission Statement of the Programme

1. **BS**: Through our introductory courses, we provide the setting for any student to become acquainted with the elementary tools of mathematics and the techniques to use them. We provide students from disciplines that require a strong background in mathematics the opportunity to acquire the mathematical knowledge and the reasoning skills necessary to make effective use of mathematics. Through a program that emphasizes the beauty and applicability of mathematics, we also provide the setting and support for students majoring in mathematics to develop a required understanding and appreciation of mathematics as a creative discipline.
2. **MS**: At the graduate level the department teaches students seeking knowledge of advanced mathematics for either application to other areas or for its own sake. Students at the masters level acquire a solid understanding of mathematics and the ability to apply it effectively.
3. **Ph.D**.: In research, we extend the frontier of mathematical knowledge by producing quality research with original results and by collaborating with other disciplines. Our research mission complements our teaching mission; a strong research program is essential for the development of future mathematicians.

D. Objectives of the Programme

1. **BS**: (i) To teach students in diverse majors the bsic concepts and skills of mathematics, and to provide a mathematical background for all students that is appropriate to their needs.
   (ii) To equip students with the tools required and the mathematical techniques applied in the industrial, the business, the financial and the health-care organizations.
2. **MS**: (i) To equip studentsAdvanced Knowledge of Mathematics.
3. **Ph.D:** (i) Doctoral students acquire the experience necessary to do original research in mathematics, as well as the versatility to connect mathematics with other applied fields.

E. The outcomes of programme i.e. the attributes the student will acquire after successful completion of the courses of studies and research degrees

1. **BS**: (i) Students can analyze problems using mathematical definitions and criteria.

   (ii) Students must demonstrate knowledge of mathematical definitions associated with such mathematical concepts as groups, rings, harmomorphisms, automorphisms, open and closed sets, accumulation points, continuity and the theory of differentiation. They must be able to identify relevant definitions and use them in the logical construction of a valid solution.

   (iii) Students can understand and construct proofs of mathematical theorems and conjectures.

   (iv) Students must understand the logical nature of a proof and be able to write simple basic proofs on their own, modify proofs presented in a class to suit different criteria, and detect flaws or deficiencies in a given proofs.

2. **MS**: (i) The Master of Science (MS) in Mathematics is intended to provide a sound foundation for further graduate study at the doctoral level.

3. **Ph.D:** (i) The advanced studies will enable graduates to conduct theoretical and practical research in mathematics and science education.

F. Semester wise Courses (syllabus)

Proposed module of BS Program in Mathematics
List of First Year Courses

FIRST SEMESTER

S.No.	Course No.	Course Title	Credit Hours
1	MATH 301	Algebra and Calculus - I	3
2	MATH 301	Sub -I	3
3	MATH 301	Sub - II	3
4	MATH 300.1 (I.S)	Islamic Studies (Compulsory)	3
5	MATH 300.1 (E)	English (Compulsory)	3
		Total Credit Hours	**15**

SECOND SEMESTER

S.No.	Course No.	Course Title	Credit Hours
1	MATH 302	Algebra and Calculus - II	3
2	MATH 302	Sub - I	3
3	MATH 302	Sub - II	3
4	MATH 300.2 (P.S)	Pakistan Studies (Compulsory)	3

5	MATH 300.2 (U)	Urdu/ Sindhi/ Natural Sciences (Compulsory)	3
		Total Credit Hours	**15**

Total Number of Courses: 10, Total Number of Credit hours: 30

List of Second Year Courses

THIRD SEMESTER

S.No.	Course No.	Course Title	Credit Hours
1	MATH 401	Mechanics and Geometry - I	3
2	MATH 403	Data Processing and Programming - I	2+1
3	MATH 401	Sub - I	3
4	MATH 401	Sub - II	3
5	MATH 400.1	Biology Compulsory) (for the students of physical sciences)	3
6	MATH 400.1 (E)	English -II	3
		Total Credit Hours	**18**

FOURTH SEMESTER

S.No.	Course No.	Course Title	Credit Hours
1	MATH 402	Mechanics and Geometry – II	3
2	MATH 404	Data Processing and Programming - II	2+1
3	MATH 402	Sub - I	3
4	MATH 402	Sub - II	3
5	MATH 402.1	Biology Compulsory) (for the students of physical sciences)	3
6	MATH 400.1 (C.S)	Computer Applications (Compulsory)	3
		Total Credit Hours	**18**

Total Number of Courses: 12, Total Number of Credit hours: 36

Curriculum for BS- IV

Compulsory Courses

Pure Math	Course #	Credit Hrs	Applied Math	Course #	Credit Hrs
Abstract Algebra	601	3+0	Applied Algebra	607	2+1
Projective Geometry	647	3+0	Bio Mathematics	609	2+1
Measure Theory	605	3+0	Fluid Dynamics	655	2+1

Optional Courses

Pure Math	Course #	Credit Hrs	Applied Math	Course #	Credit Hrs
Operations Research (P & A)	645	2+1	Electromagnetism (A)	661	3+0
Functional Analysis (P & A)	611	3+0	Astronomy	685	3+0

Numerical Analysis (P & A)	631	2+1	Applied Algebra (P)	607	2+1
Mathematical Statistics (P & A)	633	3+0	Classical Mechanics (A)	651	3+0

List of M. Phil/ M.S Courses in Mathematics

MATH 701	Lie Algebra – I
MATH 702	Lie Algebra – II
MATH 703	Comprehensible Flow – I (2+1)
MATH 704	Comprehensible Flow – II (2+1)
MATH 705	Fourier Series - I
MATH 706	Fourier Series - II
MATH 707	Homological Algebra – I
MATH 708	Homological Algebra – II
MATH 709	Abelian Groups
MATH 710	Soluble and Nilpotent Groups
MATH 711	Theory of Rings – I
MATH 712	Theory of Rings – II
MATH 713	Near Rings
MATH 714	Special classes of Rings
MATH 715	Galois theory and applications – I
MATH 716	Galois theory and applications – II
MATH 717	Astrodynamics – I
MATH 718	Astrodynamics – II
MATH 719	Abelian groups – I
MATH 720	Abelian groups – II
MATH 721	Integral equation
MATH 722	Partial differential equation
MATH 723	Non linear system – I
MATH 701	Non linear system – II

ASR 701 Research Methodology (Compulsory)

List Of Ph.D Courses In Mathematics

MATH 801	Computational Methods for Fluid Flow – I (2+1)
MATH 802	Computational Methods for Fluid Flow – II (2+1)
MATH 803	Modeling and Simulation for Biological Systems – I (2+1)
MATH 804	Modeling and Simulation for Biological Systems – II (2+1)

MATH 805	Special classes of rings - I
MATH 806	Special classes of rings - II
MATH 807	Stochastic processes
MATH 808	Renewal processes and queuing theory

LIST OF FACULTY MEMBERS WITH QUALIFICATION AND DESIGNITION

S. NO.	NAME	QUALIFICATION	DESIGNITION
1	Dr. Sarwar Jahan Abbasi	Ph.D	Professor & Chairperson
2	Dr. Rana Khalid Naeem	Ph.D	Professor
3	Dr. Syed Arif Kamal	Ph.D	Professor
4	Dr. Syed Anwar Ali	Ph.D	Professor
5	Mrs. Rehana Shakeel	M.Phil	Assistant Professor
6	Mrs. Nuweda Qamar	M.Phil	Assistant Professor
7	Mrs. Akhter Jehan Aziz	M.Phil	Assistant Professor
8	Mr. Mushtaq Ahmed	M.Phil	Assistant Professor
9	Dr. M. Jawed Iqbal	Ph.D	Assistant Professor
10	Mr. M. Javed Ansari	M.Phil	Assistant Professor
11	Mr. Waseem Ahmed Khan	M.Phil	Assistant Professor
12	Mrs. Syeda Sadia Zia	M.Phil	Assistant Professor
13	Mr. Khurram Kamran	M.Phil	Lecturer
14	Mr. Waseen Ahmed Ansari	M.Sc.	Lecturer
15	Mrs. Saba Naz	M.Sc.	Lecturer
16	Mr. M. Imtiaz	M.Phil	Lecturer
17	Mr. Syed InayatUllah	M.Phil	Lecturer
18	Mr. Najeeb Alam Khan	M.Sc.	Lecturer
19	Mr. Tanveer Ahmed Siddiqui	MIBM	Lecturer
20	Mr. Asif Raza Khan	M.Sc.	Lecturer