

## MS in Mathematics

### Program Overview:

The MS degree in Mathematics at the Balochistan University of Information Technology, Engineering and Management Sciences (BUIEMS) emphasizes strengthening the ability of a student in mathematical reasoning. Students in this program prepare themselves either for further graduate work in academia, work in industry and government employment.

The MS program offered to the undergrad degree holders (16 years of education) takes at least three semesters to complete the Program of Study. The department offers a variety of courses in the domains of Algebra, Analysis, Topology, Logic, and Applied Mathematics. The rules, regulations and evaluation schemes for this program will be the same as those given in the academic rules of the University for Graduate Programs.

### Main Areas of Research:

- *Advanced Group Theory*
- *Graph Theory and Combinatorics*
- *Fuzzy Set Theory*
- *Mathematical Biology*
- *Fluid Mechanics*
- *General Relativity*
- *Computer-Aided Geometric Designs*
- *Geometric Function Theory*
- *Special Functions*
- *String Theory*
- *Scientific Computing, High-performance computing*
- *Visualization*

For more information, please refer to the list of faculty members for their research field on the Department website.

### Admission Requirement:

16 years of education or equivalent i.e. BS (4 years) or an MA/ M.Sc. in Mathematics (Pure or Applied or both) from an HEC recognized university with at least 60% Marks (Annual System) or CGPA  $\geq 2.5$  out of 4 (Semester System).

GAT general with at least 50% marks or GAT subject with at least 60% marks or HAT for the admission /scholarship in the specific program of study.

For more information on application deadlines, tests and other admission requirements, please visit the admissions section of the Graduate Studies Office

**Program Requirement:**

The minimum and maximum duration of the MS program is 1.5 to 4 years. Students must meet the following requirements for graduation:

- A minimum of 24 credit hours course work with a minimum CGPA of 2.5
- The successful defense of the synopsis/ research proposal and its approval from the Advanced Studies and Research Board (AS&RB).
- A minimum of 6 credit hours of research work/ thesis.
- Thesis defense and viva.

S#	Course Codes	Course Title	Credit Hours
<b>FIRST SEMESTER</b>			
1		Core-I	3 + 0
2		Core-II	3 + 0
		Core-III	
3		Core-IV	3 + 0
<b>SECOND SEMESTER</b>			
1		Elective-I	3 + 0
2		Elective-II	3 + 0
		Elective-III	3 + 0
3		Elective-IV	3 + 0
<b>THIRD SEMESTER</b>			
1		Thesis	6 + 0
<b>TOTAL</b>			<b>6</b>
<b>Total Courses</b>			<b>24</b>
<b>Total Credit Hours</b>			<b>30</b>

**Semester-Wise Breakdown as per HEC**

## Program Structure:

### COURSE STRUCTURE OF MS (MATHEMATICS)

The following are the core courses for the MS program. The department may add more courses to the list of core courses, keeping in view the available human resources, with approval of the Board of Studies and other statutory bodies of the university.

### CORE COURSES

Serial #	Subject Area	Course Code	Course Title	Credit Hours
1	Pure Mathematics	MATHP-524	Theory of Group Actions	3
2	Pure Mathematics	MATHP-531	Riemannian Geometry	3
3	Pure Mathematics	MATHP-543	Algebraic Topology	3
4	Computational Mathematics	MATHA-531	ODEs and Computational Linear Algebra	3
5	Applied Mathematics	MATHA-548	Integral Equations	3
6	Pure Mathematics	MATHP-575	Theory of Partial Differential Equations	3
7	Computational Mathematics	MATHA-533	Numerical Solutions of PDEs	3
8	Applied Mathematics	MATHA-549	Advanced Mathematical Physics	3
9	Applied Mathematics	MATHA-532	Special Functions	3
10	Applied Mathematics	MATHP-552	Research Methodology	3
11	Pure Mathematics	MATHP-511	Rings and Modules	3
12	Applied Mathematics	MATHA-550	General Theory of Relativity	3
13	Pure Mathematics	MATHP-525	Near Rings-I	3
14	Pure Mathematics	MATHP-526	Advanced Ring Theory-I	3
15	Pure Mathematics	MATHP-514	Commutative Algebra-I	3
16	Pure Mathematics	MATHP-527	Homological Algebra-I	3

17	Applied Mathematics	MATHA-551	Magneto hydrodynamics-I	3
18	Applied Mathematics	MATHA-552	Advanced Analytical Dynamics-I	3
19	Applied Mathematics	MATHA-553	Plasma Theory-I	3
20	Pure Mathematics	MATHP-576	Multivariable Analysis-I	3
21	Pure Mathematics	MATHP-551	Algebraic Number Theory	3

The rest of the courses will be Electives, which the student will choose from the list given below, subject to the approval of the department. The Elective courses are from domains of Pure Mathematics, Applied Mathematics, and Computational Mathematics. These lists may be extended with the consent of the Board of Studies of Mathematics in the department.

### ELECTIVE COURSES

Serial #	Subject Area	Course Code	Course Title	Credit Hours
1	Pure Mathematics	MATHP-633	Differentiable Manifolds	3
2	Pure Mathematics	MATHP-652	History of Mathematics	3
3	Pure Mathematics	MATHP-667	Approximation Theory	3
4	Pure Mathematics	MATHP-668	Fixed Point Theory	3
5	Pure Mathematics	MATHP-618	Lattice Theory	3
6	Pure Mathematics	MATHP-617	Commutative Algebra	3
7	Pure Mathematics	MATHP-612	Category Theory	3
8	Pure Mathematics	MATHP-651	Axiomatic Set Theory	3
9	Pure Mathematics	MATHP-670	Theory of Ordinary Differential Equations	3
10	Applied Mathematics	MATHA-641	Classical Electrodynamics-I	3
11	Applied Mathematics	MATHA-642	Classical Electrodynamics-II	3
12	Applied Mathematics	MATHA-643	Representation Theory-I	3
13	Applied Mathematics	MATHA-644	Representation Theory-II	3

14	Applied Mathematics	MATHA-632	Computer-Aided Geometric Design (CAGD).	3
15	Applied Mathematics	MATHA-633	Multi-resolution Geometric Modeling.	3
16	Applied Mathematics	MATHA-634	Mathematical Modeling	3
17	Applied Mathematics	MATHA-646	Perturbation Methods I	3
18	Pure Mathematics	MATHP-669	Geometric Function Theory	3
19	Applied Mathematics	MATHA-645	Fluid Mechanics	3
20	Pure Mathematics	MATHP-615	Banach Algebras	3
21	Pure Mathematics	MATHP-616	Theory of Group Graphs	3
22	Pure Mathematics	MATHP-618	Lie Groups and Lie Algebras	3
23	Pure Mathematics	MATHP-619	Semi Group Theory	3
24	Pure Mathematics	MATHP-620	LA-Semigroups	3
25	Pure Mathematics	MATHP-621	Near Rings-II	3
26	Pure Mathematics	MATHP-666	Several Complex Variables	3
27	Pure Mathematics	MATHP-671	Non-Standard Analysis	3
28	Pure Mathematics	MATHP-622	Advanced Ring Theory-II	3
29	Pure Mathematics	MATHP-672	Topics in Complex Analysis	3
30	Pure Mathematics	MATHP-623	Loop Groups	3
31	Pure Mathematics	MATHP-624	Nilpotent and Soluble Groups	3
32	Pure Mathematics	MATHP-613	Commutative Algebra-II	3
33	Pure Mathematics	MATHP-625	Commutative Semigroup Rings	3
34	Pure Mathematics	MATHP-626	Homological Algebra-II	3
35	Pure Mathematics	MATHP-627	Theory of Semigroups	3
36	Pure Mathematics	MATHP-628	Fuzzy Algebra	3

37	Pure Mathematics	MATHP-629	Algebraic Coding Theory	3
38	Applied Mathematics	MATHA-647	Magneto hydro dynamics-II	3
39	Pure Mathematics	MATHP-630	Introduction to Algebraic Cryptography	3
40	Applied Mathematics	MATHA-648	Advanced Analytical Dynamics-II	3
41	Applied Mathematics	MATHA-613	Mathematical Techniques for Boundary Value Problems	3
42	Applied Mathematics	MATHA-649	Plasma Theory-II	3
43	Applied Mathematics	MATHA-650	Astrophysics	3
44	Applied Mathematics	MATHA-651	Non-Newtonian Fluid Mechanics	3
45	Pure Mathematics	MATHP-673	Multivariable Analysis-II	3
46	Applied Mathematics	MATHA-652	Statistical Mechanics	3
47	Applied Mathematics	MATHA-635	Linear Systems Theory	3
48	Applied Mathematics	MATHA-653	Heat Transfer	3

**Contact Information:**

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