DEPARTMENT OF APPLIED MATHEMATICS,
FACULTY OF ENGG. & TECH.,
M.J.P.R.U., BAREILLY.

Syllabus of M.Sc. (Mathematics)

2022-23 onwards.

Vision

To recognize its academic excellence at international level by producing intellectuals, excellent academic leaders and researchers in the field of Mathematics as well as to be locally relevent through its role in the development of the community.

Mission

To establish a suitable platform for higher learning in Mathematics. This is in addition to its starting objective of providing Mathematical input to technical education only. The main emphasis in both the cases is to impart functional knowledge which not only motivates students towards academic excellence but also preparing them for giving back to society in economic, social, cultural and intellectual dimensions, conventional and innovative teaching methods.

Objectives

1. To create an atmosphere that encourages students and supports their efforts.
2. To produce qualified graduates who are equipped with deeper insight and research skills in the field of Mathematics.
3. To encourage participation in scientific forums and seminars and to encourage follow up of latest scientific research and techniques in Mathematics.
4. To encourage interdisciplinary research with other areas such as statistics, operation research, physics, branches of engineering etc.
5. To develop the independent research and analytical thinking abilities of our students along with research-based developments in teaching and education reform efforts.

Program Educational Objectives (PEOs)

1. Graduates will contributes rapidly growing multidisciplinary research that uses advanced computing capabilities to understand and solve complex problems.
2. Graduate of the programme will be capable of handling every problem existing around the world through mathematical structures.
3. Graduate of the programme will become competent users of mathematics and to provide mathematical solution to real life problems.
4. Graduates will continue lifelong learning and pursue higher studies in mathematical and statistical sciences.

Program Outcome:

Graduate will be able to

a) Progress the critical analysis and problem solving skills required for research and development organization and industry.

b) Communicate confidently and effectively with industry and society at large, regarding complex problem and solution of the problem, existing around.

c) Engage in dependent and lifelong learning with a high level of enthusiasm and commitment to improve knowledge and competence continuously.
d) Contribute significantly in academics through teaching and research.
e) Demonstrate knowledge and understanding of various structure of mathematics and apply the same to one's own work, as a member and leader in a team, manage projects efficiently after consideration of economical and financial factors.
f) Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional practice.

Qualification Descriptors (Possible Career Pathways)

Upon successful completion of the course, the students receive a master degree in the Mathematics. M.Sc. Mathematics post-graduates of this department are expected to demonstrate knowledge of major portion of pure and applied mathematics and the ability to provide an overview of scholarly debates relating to Mathematics. Also it is expected that after the completion of this course they will be in a position to pursue the research in Mathematics. Along with mathematical skills, it is also expected that they will learn life skills of argumentation, communication and general social values which are necessary to live rich, productive and meaningful lives. The list below provides a synoptic overview of possible career paths provided by a postgraduate training in Mathematics:

1. Teaching

2. Research

3. Engineering

4. Computer programming (In different MNC's)

5. Statistician

6. Defense Research and Development Organization (DRDO) and Indian Space Research Organization (ISRO).

7. Can go for UPSC/Civil services exam.

8. Finance

9. Science and Business

SEMESTER WISE COURSES AND CREDIT DISTRIBUTION

CC – Core Course **DCEC – Discipline Centric Elective Courses**

GEC – Generic Elective Course **SEEC – Skill Enhancement Elective Course**

L – Lecture T – Theory P – Practical/Presentation

SEMESTER-I

Total Credits: 30 (Core Course)

Course No.	Course Code	Course name	L	T	P	Hrs/ Week	Total Credits
1	MA-511	Modern Algebra	4	2	0	6	5
2	MA-512	Real Analysis	4	2	0	6	5
3	MA-513	Introduction to Topology	4	2	0	6	5
4	MA-514	Difference Equations	4	2	0	6	5
5	MA-515	Optimization Techniques	4	2	0	6	5
6	MA-516	Seminar Presentation and Viva-Voce	0	0	10	10	5
					Total Credits		30

SEMESTER-II

Total Credits: 30(Core Course)

Course No.	Course Code	Course name	L	T	P	Hrs/ Week	Total Credits
7	MA-521	Linear Algebra	4	2	0	6	5
8	MA-522	Complex Analysis	4	2	0	6	5
9	MA-523	Advanced Topology	4	2	0	6	5
10	MA-524	Tensor Analysis and Elementary Differential Geometry	4	2	0	6	5
11	MA-525	Operations Research	4	2	0	6	5
12	MA-526	Powerpoint Presentation and Viva-Voce	0	0	10	10	5
					Total Credits		30

SEMESTER-III

Total Credits: 30(CC– 25, DCEC – 5, SEEC -0)

Course No.	Course Code	Course name	L	T	P	Hrs/ Week	Total Credits
13	MA-631	Functional Analysis	4	2	0	6	5
14	MA-632	Basic Statistics	4	2	0	6	5
15	MA-633	Fluid Dynamics	4	2	0	6	5
16	MA-634	Differential Equations	4	2	0	6	5
17	MA-635	Project/Dissertation	0	0	0	10	5
Discipline Centric Elective Courses							
18	MA-636	MOOC/DCEC	4	2	0	6	5
Discipline Centric Skill Based Courses							
19	MA-637	SEEC	1	1	2	4	0
					Total Credits		30

DCEC Courses offered for M.Sc. (Mathematics) students only

Course Code	Course name
MA-636(a)	Advanced Differential Geometry
MA-636(b)	Measure Theory and Integration
MA-636(c)	Mathematics for Finance and Insurance
MA-636(d)	Integral Equations
MA-636(e)	Bio-Mechanics

Note : Student can choose any one from DCEC Course as per the availability of the subject teachers/experts. Student may complete the course of his/her choice through MOOC.

SEEC (Skill Enhancement Elective Course, non-credit, only qualifying in nature): This may include a course based on Theoretical/Experimental/Computational Techniques/Methods. The department may offer more than one courses depending on specialization and strength of faculty members, and the student has to opt one of them.

Course Code	Course name
MA-637(a)	Programming in MATLAB
MA-637(b)	Programming in SCILAB
MA-637(c)	Artificial Intelligence and Machine Learning
MA-637(d)	Programming in C
MA-637(e)	Research Methodology

Note : Student can choose any one from SEEC Course as per the availability of the subject teachers/experts. Student may complete the course of his/her choice through MOOC.

SEMESTER-IV

Total Credits: 30(CC – 21, DCEC – 5, GEC -4)

Course No.	Course Code	Course name	L	T	P	Hrs/ Week	Total Credits
20	MA-641	Advanced Partial Differential Equations with Applications	4	2	0	6	5
21	MA-642	Advanced Mathematical Statistics	4	2	0	6	5
22	MA-643	Advanced Discrete Mathematics	4	2	0	6	5
23	MA-644	Project/Dissertation	0	0	12	12	6
Discipline Centric Elective Courses							
24	MA-645	MOOC/DCEC	4	2	0	6	5
Generic Elective Courses							
25	MA-646	MOOC/GEC (To be taken from other departments)	3	1	0	4	4
						Total Credits	30

DCEC Courses offered for M.Sc. (Mathematics) students only

Course Code	Course name
MA-645(a)	Theory of Relativity & Cosmology
MA-645(b)	Fuzzy Set Theory
MA-645(c)	Space Dynamics
MA-645(d)	Advanced Fluid Dynamics
MA-645(e)	Introduction to Cryptography
MA-645(f)	Mechanics
MA-645(g)	Wavelet Analysis

Note : Student can choose any one from DCEC Course as per the availability of the subject teacher/expert. Student may complete the course of his/her choice through MOOC.

GEC courses offered to PG students of other departments only

Course Code	Course name
MA-646(a)	Graph Theory
MA-646(b)	Mathematics for Chemists
MA-646(c)	Mathematical Modelling
MA-647(d)	Bio-Statistics
MA-647(e)	Research Methodology

Note : GEC Courses will be offered only to those students who have studied mathematics upto 10+2 level and as per the availability of subject teacher/expert. Student may complete the course of his/her choice through MOOC.