

# PROGRAMME PROJECT REPORT

Master of Arts in Mathematics (PGMM) Programme

(2 Year Programme)



School of Sciences

U. P. Rajarshi Tandon Open University, Prayagraj

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22/1/2024

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## 1. Programme Mission & Objectives

In line with the mission of the University to provide flexible learning opportunities to all, particularly to those who could not join regular colleges or universities owing to social, economic and other constraints, the 2-year Post-Graduate Programme in **Mathematics** aims at providing holistic and value based knowledge and guidance to promote scientific temper in everyday life. The program offers a platform to the learners to fulfill the eligible criteria in various scientific jobs in government and private sector.

The Master of **Mathematics** Programme aims at the following objectives:

- Develop a broad academic and practical literacy in mathematics, computer science, statistics, and optimization, with relevance in data science, machine learning and artificial intelligence, so that students are able to critically select and apply appropriate methods and techniques to extract relevant and important information from data.
- Provide strong core training so that graduates can adapt easily to changes and new demands from industry.
- Enable students to understand not only how to apply certain methods, but when and why they are appropriate.
- Integrate fields within mathematics, computer science, optimization, and statistics to create adept and well-rounded data scientists.
- Expose students to real-world problems in the classroom and through experiential learning.

These program objectives acknowledge the interdisciplinary of mathematical science and the importance of building a strong foundation with our students.

## 2. Relevance of the Programme with Mission and Goals

The 2-year Post-Graduate Programme in Arts, M.A.- **Mathematics** is designed with the objective of equipping learners to cope with the emerging trends and challenges in the scientific domain. In congruence with goals of the University, the Programme also focuses to provide skilled manpower to the society to meet global demands. The Programme is designed in such a manner so that a successful learner can go for higher studies as well as join the research and development industries, software industry, mathematics monitoring projects and different (NGOs) organizations.

## 3. Nature of Prospective Target Group of Learners

The Program is targeted to all individuals looking to earn a postgraduation degree for employment, further higher education, promotion in career, professional development.

## 4. Appropriateness of Programme to be conducted in ODL mode to acquire specific skills & competence

Learning outcomes after Level 6.5		
Learning Outcomes	Elements of the descriptor	Level 6.5 (Master's in - Mathematics)
LO 1	Knowledge and understanding	• advanced knowledge about a specialized field of enquiry with a critical understanding of the emerging developments and issues relating to one or more fields of learning.
LO 2	Skills required to perform and accomplish tasks	• advanced cognitive and technical skills required for performing and accomplishing complex tasks related to the chosen fields of learning

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LO 3	Application of knowledge and skills	• apply the acquired advanced theoretical and/or technical knowledge about a specialized field of enquiry or professional practice and a range of cognitive and practical skills to identify and analyse problems and issues, including real-life problems, associated with the chosen fields of learning.
LO 4	Generic learning outcomes	• listen carefully, read texts and research papers analytically and present complex information in a clear and concise manner to different groups/audiences
LO 5	Constitutional, humanistic, ethical and moral values	• embrace and practice constitutional, humanistic, ethical and moral values in one's life
LO 6	Employment ready skills, and entrepreneurship skills and mindset	• adapting to the future of work and responding to the demands of the fast pace of technological developments and innovations that drive shift in employers' demands for skills, particularly with respect to transition towards more technology-assisted work involving the creation of new forms of work and rapidly changing work and production processes

## 5. Instructional Design

### 2-year M.Sc.- Mathematics Programme Structure

The University follows the credit system in all its programmes. One credit is equal to 30 hours of learner's study time which is equivalent to 15 lectures in conventional system. To earn a Master's Degree, a learner has to earn 80 credits in minimum four semesters (two years) with 20 credits per semester. For earning 80 credits, a learner has to go through the following Programme Structure:

### Programme Structure of M.Sc.- Mathematics NHEQF

Level	Year	Sem	Core Course 1	Core Course 2	Core Course 3	Core Course 4	Research component/ Literature Survey/ Research Project	Total credit
8	1	1 <sup>st</sup>	4	4	4	4	4	20
		2 <sup>nd</sup>	4	4	4	4	4	20
9	2	3 <sup>rd</sup>	4	4	4	4	4	20
		4 <sup>th</sup>	4	4	4	4	4	20
<b>Total credit</b>			16	16	16	16	16	80

#### Explanation of terms used for categorization of courses:

- A. **Course 1 to 4:** A course, which should compulsorily be studied by a learner as a core requirement is termed as a Core course.
- B. **Industrial Training/ Survey/ Research Project/ Field Work/Apprenticeship/ Dissertation/ Internship:** An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a learner studies such a course on his own with an advisory support by a counsellor/faculty member.

- i. **Course curriculum:** The details of syllabus is given in Appendix-1
- ii. **Language of Instruction:** English. However, learner can write assignment and give Term End Examination (TEE) either in Hindi or English.

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iii. **Duration of the Programme**  
 Minimum duration in years: 02      Maximum duration in years: 04

iv. **Faculty & Support Staff**  
 Professor (1), Assistant Professor (3) and support staff (2)

6. **Procedure for admissions, curriculum transaction and evaluation**

i. **Admission Procedure**

- (a) The detailed information regarding admission will be given on the UPRTOU website and on the admission portal. Learners seeking admission shall apply online.
- (b) Direct admission to 2-year M.Sc. (**Mathematics**) program is offered to the interested candidates.
- (c) Eligibility: Bachelor degree in concerned subject (B.Sc. (**Mathematics** OR Any 4 year Graduate Degree in **Mathematics** OR B.Tech. (CS/IT/EC etc.)

ii. **Programme Fee:** Rs. 12000 / year. The fee is deposited through online admission portal only.

iii. **Evaluation**

The evaluation consists of two components: (1) continuous evaluation through assignments, and (2) term-end examination. Learner must pass both in continuous evaluation as well as in the term-end examination of a course to earn the credits assigned to that course. For each course there shall be one written Terminal Examination. The evaluation of every course shall be in two parts that is 30% internal weightage through assignments and 70% external weightage through terminal exams.

(a) <b>Theory course</b>	<b>Max. Marks</b>
Terminal Examination	70
Assignment	30
<b>Total</b>	<b>100</b>

(b) <b>Practical course:</b>	<b>Max. Marks</b>
Terminal Practical Examination	100

Marks of Terminal Practical Examination shall be awarded as per following scheme:

i. Write up /theory work	30
ii. Viva-voce	30
iii. Execution/Performance/Demonstration	20
iv. Lab Record	20

The following 10-Point Grading System for evaluating learners' achievement is used for CBCS programmes:

10-Point Grading System in the light of UGC-CBCS Guidelines

Letter Grade	Grade Point	% Range
O (Outstanding)	10	91-100
A+ (Excellent)	9	81-90
A (Very Good)	8	71-80
B+ (Good)	7	61-70
B (Above Average)	6	51-60

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C (Average)	5	41-50
P (Pass)	4	36-40
NC (Not Completed)	0	0-35
Ab (Absent)	0	
Q	Qualified	Applicable only for Non-Credit courses
NQ	Not Qualified	

Learner is required to score at least a 'P' grade (36% marks) in both the continuous evaluation (assignments) as well as the term-end examination. In the overall computation also, learner must get at least a 'P' grade in each course to be eligible for the M. Sc. degree.

### Computation of CGPA and SGPA

(a) Following formula shall be used for calculation of CGPA and SGPA

For jth semester $SGPA (S_j) = \frac{\sum (C_i * G_i)}{\sum C_i}$	where, $C_i$ = number of credits of the $i$ th course in $j$ th semester $G_i$ = grade point scored by the learner in the $i$ th course in $j$ th semester.
$CGPA = \frac{\sum (C_j * S_j)}{\sum C_j}$	where, $S_j$ = SGPA of the $j$ th semester $C_j$ = total number of credits in the $j$ th semester

The CGPA and SGPA shall be rounded off up to the two decimal points. (For e.g., if a learner obtained 7.2345, then it will be written as 7.23 or if s(he) obtained 7.23675 then it will be written as 7.24)

CGPA will be converted into percentage according to the following formula:

$$\text{Equivalent Percentage} = CGPA * 9.5$$

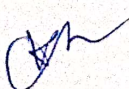
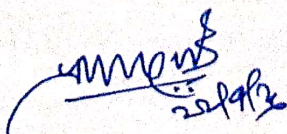
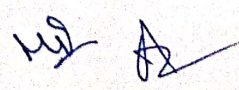
(b) Award of Division

The learner will be awarded division according to the following table:

Division	Classification
1 <sup>st</sup> Division	6.31 or more and less than 10 CGPA
2 <sup>nd</sup> Division	4.73 or more and less than 6.31 CGPA
3 <sup>rd</sup> Division	3.78 or more and less than 4.73 CGPA

### **7. Requirement of the laboratory support and Library Resources**

The practical sessions are held in the science laboratories of the Study Centre. In these labs, the learner will have the facility to use the equipment and consumables relevant to the syllabus. The SLM, supplementary text audio and video material of the various courses of the program is available through the online study portal of the University. The

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University also have a subscription of National Digital Library to provide the learners with the ability to enhance access to information and knowledge of various courses of the programme.

### 8. Cost estimate of the programme and the provisions

2-year M.Sc. programme consists of 15 theory courses, 4 laboratory courses and (basic research, mini and major project, and Dissertation) research activities. One course is of 4 credits which consists of approx. 12 units. The total approximated expenditure on the development of 15 courses is:

S. No.	Item	Cost per Unit (writing & editing)	Total cost (Rs.)
1	Total no. of units in 12 courses = $15 \times 12 = 180$	5000	900000
2	BOS Meetings etc.	100000	100000
<b>Total</b>			<b>1000000</b>

### 9. Quality assurance mechanism and expected programme outcomes

(a) **Quality assurance mechanism:** The program structure is developed under the guidance of the Board of studies comprising external expert members of the concerned subjects followed by the School board. The program structure and syllabus is approved by the Academic Council of the University. The course structure and syllabus is reviewed time to time according to the feedback received from the stakeholders and societal needs.

The Centre for Internal Quality Assurance will monitor, improve and enhance effectiveness of the program through the following:

- ✓ Annual academic audit
- ✓ Feedback analysis for quality improvement
- ✓ Regular faculty development programs
- ✓ Standardization of learning resources
- ✓ Periodic revision of program depending upon the changing trends by communicating to the concerned school

#### (b) Expected programme outcomes (POs)

Knowledge and understanding	PO1	Apply knowledge of a wide range of mathematics and scientific computing techniques to solve complex scientific and real-life problem.
Skills related to specialization	PO 2	To develop the problem-solving skills and apply them independently in pure and applied mathematics, statistics and computer science.
Application of knowledge and skills	PO 3	To provide students with strong mathematical knowledge and capability in formulating & analysis of real-life problem using modern tools of mathematics.
	PO 4	To provide knowledge and insight in mathematics so that students can work as excellent mathematical professional.
Generic learning outcomes	PO 5	To prepare the students to as per the need of software industry through knowledge of mathematics and scientific computational techniques.
	PO 6	To prepare and motivate the students to pursue their higher studies and conduct fundamental and applied research for the welfare of society and mankind

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## M.Sc. /M.A. (Mathematics) (PGMM/MAMM)

Semester	Course Code	Title of Papers	Credit	Max. Marks
1 <sup>st</sup> SEM	PGMM-101N/MAMM-101N	Advanced Real Analysis and Integral Equations	4	100
	PGMM-102N/ MAMM-102N	Classical Optimization Techniques	4	100
	PGMM-103N/ MAMM-103N	Discrete Mathematics	4	100
	PGMM-104N/ MAMM-104N	Numerical Analysis	4	100
	PGBR-01	Basic in Research	4	100
Total Credit of 1 <sup>st</sup> Semester			20	500
2 <sup>nd</sup> SEM	PGMM-106N/ MAMM-106N	Advanced Algebra	4	100
	PGMM-107N/ MAMM-107N	Complex Analysis	4	100
	PGMM-108N/ MAMM-108N	Mathematical Statistics	4	100
	PGMM-109N/ MAMM-109N	Topology	4	100
	PGED-02	Entrepreneurship Development	4	100
Total Credit of 2 <sup>nd</sup> Semester			20	500
3 <sup>rd</sup> SEM	PGMM-111N/ MAMM-111N	Advanced Differential Equations	4	100
	PGMM-112N/ MAMM-112N	Functional Analysis	4	100
	PGMM-113N/ MAMM-113N	Measure Theory and Integration	4	100
	PGMM-114N/ MAMM-114N	Theory of Probability	4	100
	PGRT-03	Research Tools	4	100
Total Credit of 3 <sup>rd</sup> Semester			20	500
4 <sup>th</sup> SEM	PGMM-116N/ MAMM-116N	Operation Research	4	100
	PGMM-117N/ MAMM-117N	Fluid Dynamics	4	100
	PGMM-122N/ MAMM-122N	Dissertation with Viva-voce	4	100
	Select any one of the following			
	PGMM-118N/ MAMM-118N	Soft Computing	4	100
	PGMM-119N/ MAMM-119N	Number Theory and Cryptography	4	100
	Select any one of the following			
	PGMM-120N/MAMM-120N	Machine Learning Techniques	4	100
	PGMM-121N/MAMM-121N	Vedic Mathematics	4	100
Total Credit of 4 <sup>th</sup> Semester			20	500
Total Credit			80	2000

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