MATS UNIVERSITY

NAAC GRADE A+ ACCREDITED UNIVERSITY

MATS University

MATS SCHOOL OF SCIENCES

SYLLABUS

FOR

Two Year Full Time Master Degree Program

Master of Science

M.Sc. MATHEMATICS

SEMESTER PATTERN

(2025- 2027)

Syllabus M.Sc. Mathematics

GENERAL INTRODUCTION OF THE DEPARTMENT

MATS School Sciences (MSS) was established with a vision to create technocrats in the applied branches of Sciences to convey updated scientific knowledge. In the school the performances of the students are constantly monitored by continuous assessment. The School believes in supplementing academic input of students with the help of regular Seminar, Guest Lectures, Industrial/Research Institute visits and encouraging the students to participate in National & International Seminars, Conferences and Workshops.

DEPARTMENT HIGHLIGHTS

- Research focus on frontier of Sciences and Technology
- Highly acclaimed scientists as faculty
- Training program
- Academia – Industry interface
- Multidisciplinary research

COURSE DESIGN

The department follows a unique course-design which is contemporary and cutting-edge. It includes modern and advanced papers/ subjects including the papers from Management / Science as given in the curriculum matrix

PEDAGOGY

- Chalk Board, LCD and Projector based teaching
- Research based teaching
- Project based learning
- Separate lab bench for each student

FACULTIES

- Well experienced faculties from Academic Institutes and Industries
- Invited lectures by eminent scientists from different countries

M. SC. MATHEMATICS: SCOPE AND CONTENT

The Master of Science (M.Sc.) in Mathematics is an advanced postgraduate program designed to provide in-depth theoretical knowledge and strong analytical skills. The scope of this program is broad and spans pure mathematics, applied mathematics, computational techniques, and interdisciplinary applications. It prepares students for careers in teaching, research, data science, software development, banking, finance, engineering, and government services.

With the growing importance of mathematical modeling, artificial intelligence, cryptography, operations research, and scientific computing, M.Sc. Mathematics graduates are in demand across industries such as IT, defense, space research, healthcare analytics, finance, and academia. The program also serves as a strong foundation for Ph.D., competitive examinations (CSIR-NET, GATE), and international studies.

OBJECTIVES OF THE M.Sc. MATHEMATICS PROGRAM

The Mathematics Education route is for anyone with a research or professional interest in mathematics education at Post graduate level, wanting to undertake advanced study in a world-class setting as well as in research.

The Mathematics Education route develops students' understanding of a number of important issues in the field of mathematics education. Students learn to interpret and critically engage with ideas and debates in mathematics education research in following ways:

• Through taught sessions in mathematics education;

• Through work on course assignments under the supervision of a member of the teaching team.

• Through participation in seminars led by students on the route and in project workshops.

ELIGIBILITY FOR ADMISSION:

Interested aspirants for M.Sc. Mathematics degree need to fulfill the below mentioned minimum eligibility criteria.

- Completion of UG (10+2+3) level of education with mathematics as one combination.
- Mathematics as one of the subjects at UG level

Instead of mathematics, one may even have had any subject related to biological sciences as one of the main subject of study.

PROGRAM OUTCOME:

On successful completion, Post graduates will be able to:

PO1. Students will be able to gain fundamental knowledge of skills.

PO2 Students will be able to apply knowledge, concepts to solve issues related to their course.

PO3 Solve problems through analytical thinking.

PO4. Apply knowledge of mathematics to solve various real-life problems.

PO5. Formulate mathematical models to interpret and analyze data for interdisciplinary research and development.

PO6. Solve various mathematical problems by using relevant mathematical and statistical software.

PO7. Exhibit strong ethical and professional responsibility.

PO8. Post Graduate holders will have the knowledge for the need of sustainable development.

PO9. Post Graduate holders will have the knowledge of ethics and regulatory norms of their respective course.

PO10. The students will get wide range of Mathematical skills, including problem solving, project work and presentation; they may enable to take prominent roles in a wide spectrum of employment in academics and research.

PROGRAM SPECIFIC OUTCOMES:

The Post Graduates will be able to:

PSO-1. Get a strong knowledge in mathematical sciences which include courses from Mathematics.

PSO-2. Select a successful career in the sectors such as teaching, research, banking, planning and higher education, administrative service and for the advance study.

PSO-3. Exhibit professionalism, ethics, communication skills, team work in their profession and adapt to current scenario by engaging in lifelong learning for the service of the society

ATTENDANCE:

A candidate shall be deemed to have undergone a regular course of study in the University, if he/she has attended at least 60% of the lectures in each subject will be at least 75% in the aggregate of lectures, tutorials and practical in order to be eligible to appear in the Final Examination.

SCHEME OF EXAMINATION, EVALUATION AND DISTRIBUTION OF MARKS

1 The overall weightage of a course in the Syllabi and Scheme of Teaching & Examination shall be determined in terms of Marks assigned to the course.

2 The evaluation of students in a course shall have two components unless specifically stated otherwise in the Scheme of Teaching & Examination and Syllabi:

(i) Evaluation through a semester-end examination (University Examination Marks)

(ii) Continuous evaluation by the teacher(s) of the course.

3 Continuous Evaluation (Internal Marks)

i) Theory courses

The division of internal marks will of 50% marks for mid semester examination and 50% of marks for the internal class tests. There shall be three class tests held during each semester. The three class tests shall ordinarily be held after 4 weeks, 8 week s and 12 weeks of teaching in accordance with the University Academic Calendar.

(ii) Practical/Laboratory courses

The total internal marks in practical/Laboratory courses shall be based on performance in the laboratory, regularity, practical exercises/assignments, quizzes, etc. The assessment shall be given at three nearly equi-spaced intervals.

Evaluation through a semester-end examination

The distribution of weightage for various components of the evaluation shall be as given below:

	Bachelor's degree/ Under-graduate diploma	Master's degree/ Post-graduate diploma
A. THEORY COURSES (i) Semester-end examination	70%	70%
(ii) Continuous evaluation by the teachers	30%	30%
B. PRACTICAL/LABORATORY COURSES		
(i) Semester-end examination	70%	70%
(ii) Continuous evaluation by the teachers	30%	30%
C. DISSERTATION/THESIS		
(i) Assessment by External Examiner	70%	70%
(ii) Assessment by Internal Examiner	30%	30%

PASSING MARKS:

For postgraduate students, obtaining a minimum of 40% marks in aggregate in each course shall be essential for passing the course and earning its assigned credits. A candidate, who secures less than 40% of marks in a course, shall be deemed to have failed in that course.

GRADING SYSTEM:

For UG:

80% and above – "10 Grade Point" and Letter Grade "O" (Outstanding)

40% and above but below 45% - "Grade Point 4" and Letter Grade "P" (Pass)

For PG:

80% and above – "10 Grade Point" and Letter Grade "O" (Outstanding) 45% and above but below 50% - "Grade Point 4" and Letter Grade "P" (Pass)

PROGRAM DURATION:

The maximum permissible period for completing a program for which the prescribed program duration is **n semesters**, shall be **(n+2)** semesters. All the program requirements shall have to be completed in (n+2) semesters.

ATKT criteria:

ATKT Candidate means a candidate who failed in not more than forty percent of the total number of Core and Core bracket papers, excluding the Practical Examination/Project Work/Viva Voce Examination in the Semester Examination and is appearing in the Examination same semester again which is organized with the next Semester Examination. Forty percent (of the total number of Core and Core bracket papers) will be rounded off to higher side in case it is not a whole number. In case a Students fails or was absent in Practical Examination/ Project Work/Viva Voce Examination, he/she may be allowed to have ATKT exam on his/her own expenses.

Teaching and Learning Schemes

Master of Science (Mathematics)Course *Credits

	Theory + Practical
I. Core Course (13 Papers) II. **Core Course with practical (02 Papers)**	13×4 = 52 2x3=6
I. Core Course Practical / Tutorial*(02 Papers)	2×2 = 4
II. Elective Course (4 Papers)	*4x4 = 16*
III. Dissertation	*1x6=6*
Total Credit	84

M.Sc. (Mathematics)

First Semester

Subject Code	Name of Subject	Credit Theory	Credit Lab/Tutorial	ESE Marks	Internal Marks	Total Marks
MSCM101	ALGEBRA	4		70	30	100
MSCM102	REAL ANALYSIS	4		70	30	100
MSCM103	DIFFERENTIAL EQUATIONS	4		70	30	100
MSCM104	DISCRETE MATHEMATICS	4		70	30	100
MSCM105	ELECTIVE 1	4		70	30	100
Total		20				500

Second Semester

Subject Code	Name of Subject	Credit Theory	Credit Lab/Tutorial	ESE Marks	Internal Marks	Total Marks
MSCM201	COMPLEX ANALYSIS	4		70	30	100
MSCM202	PARTIAL DIFFERENTIAL EQUATIONS	4		70	30	100
MSCM203	LINEAR ALGEBRA	4		70	30	100
MSCM204	MATLAB	3		70	30	100
MSCM205	MATLAB (PRACTICAL)		2	35	15	50
MSCM206	ELECTIVE 2	4		70	30	100
Total		19	2			550

Third Semester

Subject Code	Name of Subject	Credit Theory	Credit Lab/Tutorial	ESE Marks	Internal Marks	Total Marks
MSCM301	TOPOLOGY	4		70	30	100
MSCM302	MATHEMATICAL METHODS	4		70	30	100
MSCM303	FUNCTIONAL ANALYSIS	4		70	30	100
MSCM304	LATEX & MATHEMATICA	3		70	30	100
MSCM305	LATEX & MATHEMATICA (PRACTICAL)		2	35	15	50
MSCM306	ELECTIVE 3	4		70	30	100
Total		19	2			550

Fourth Semester

Subject Code	Name of Subject	Credit Theory	Credit Lab/Tutorial	ESE Marks	Internal Marks	Total Marks
MSCM401	NONLINEAR DIFFERENTIAL EQUATION	4		70	30	100
MSCM402	OPERATION RESEARCH	4		70	30	100
MSCM403	FUZZY SETS THEORY	4		70	30	100
MSCM404	ELECTIVE 4	4		70	30	100
MSCM405	PROJECT/DISSERTATION	6				200
Total		22				600

List of Electives

Elective 1	**NUMERICAL METHODS**	**MATHEMATICAL STATISTICS**	**DIFFERENTIAL GEOMETRY**
Elective 2	**DISTRIBUTION THEORY**	**INFORMATION THEORY**	**MECHANICS**
Elective 3	**GRAPH THEORY**	**MATHEMATICAL BIOLOGY**	**NUMBER THEORY & CRYPTOGRAPHY**
Elective 4	**APPROXIMATION THEORY**	**METRIC SPACES AND FIXED POINT THEORY**	**MATHEMATICAL MODELING**