Department of Mathematics

Malaviya National Institute of Technology Jaipur

Information Brochure

FOR ADMISSIONS
TO

B.Tech. in Mathematics & Computing
Master of Science (M.Sc.)
Doctor of Philosophy (Ph.D.)






WHAT'S INSIDE

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Our Inspiration

Pt. Madan Mohan Malaviya
(1861-1946)

Bharat Ratan Pandit Madan Mohan Malaviya, or Mahamana Malaviya, as he was popularly known, was an eminent educationist, social reformer and a distinguished figure of Indian independence movement.

A nationalistic to the core, he believed that freedom can be achieved only through the right kind of education. He was totally against discrimination of any sorts and believed in egalitarianism. We are inspired by the same values and espouse them in our spirits.

About Us

The Department of Mathematics has established itself as a vibrant centre for excellence in both pure and applied mathematics since its inception in 1963, continuously evolving to address emerging scientific and industrial challenges. The department offers B.Tech in Mathematics and Computing, M.Sc. in Mathematics, and PhD programs that blend strong theoretical foundations with cutting-edge computational and analytical skills. Our curriculum is carefully crafted to meet the growing demand for mathematically skilled professionals in areas such as data analytics, machine learning, financial modelling, optimisation, cryptography, and scientific computing.

OUR VISION

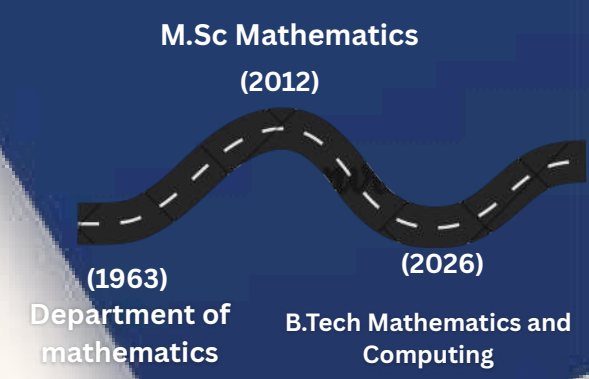
To be a nationally and globally recognized leader in mathematical sciences, driving impactful research and innovation while serving as a key partner for industry, technology development and policy advancement.

OUR MISSION

We aim to nurture highly competent graduates, postgraduates, and researchers who are equipped to excel in academia, research, and industry. Through a dynamic ecosystem of teaching, research, and innovation, we:

- Build strong analytical and problem-solving capabilities
- Encourage interdisciplinary thinking and real-world applications
- Foster creativity and research-driven learning
- Prepare students to contribute meaningfully to industry and society

Milestones



RESEARCH AREAS

Dr. Santosh Chaudhary

Computational Methods for Partial Differential Equations, Computational Fluid Dynamics (CFD), Computer Programming, System Analysis.

Dr. Ritu Agarwal

Bicomplex Analysis, Fractional Calculus, Mathematical Modeling.

Dr. Om P. Suthar

Fluid Dynamics, Hydrodynamic Stability, Dynamical Systems.

Dr. Sanjay Bhatter

Special Functions, Fractional Calculus, Integral Transform, Fractional transforms, Mathematical Modeling.

Dr. Varun Jindal

Set-Theoretic Topology, Topology and Functional Analysis.

Dr. Kushal Sharma

FHD; Fluid Dynamics: Magnetic Nanofluids, Porous Media, Variable Viscosity and Boundary Layer Flow etc.

Dr. Priyanka Harjule

Fractional Calculus, Optimisation, Machine Learning and Computational statistics

Dr. Anubha Jindal

Topology and Generalized Metric Spaces.

Dr. Geetanjali Chattopadhyay

Flow stability, Electrohydrodynamics, Immiscible two layer channel flows, Interfacial surfactant, Thin film flow.

Dr. Pratibha shakya

Optimal Control Problems, Conforming Finite Element Methods, Discontinuous Galerkin Methods, Mixed FEM, Adaptive method for PDEs.

Current Sponsored Projects

An AI-Driven Framework for Automated Detection and Grading of Diabetic Retinopathy Using Fractional Calculus and Annotated Fundus Imaging

PI: Dr. Priyanka Harjule
Funding: Faculty Seed Grant, MNIT Jaipur
Duration: 2025-2028

Mathematical modelling for optimal control strategies against mosquito-borne infection based on fractional Calculus

PI: Dr. Priyanka Harjule
Funding: DST-SERB (MATRICS)
Duration: 2024-2027

ICESat-2 based Ground photons retrieval in urban areas by using deep learning algorithm

PI: Dr. Priyanka Harjule
Funding: ISRO-RACS
Duration: 2023-2025

Mathematical modelling to examine the effect of various verticals on the operations of Self Help Groups in Rajasthan

PI: Dr. Priyanka Harjule
Funding: Ministry of Rural Development, NRLM, Govt. of India
Duration: 2024-2026

Formation of yielded regions in superhydrophobic microfluidic devices

PI: Dr. Geetanjali Chattopadhyay
Funding: SERB DST Start-up Research Grant (SRG)
Duration: 2024-2026

Artificial intelligence (AI)-based model to assist radiologists in silicosis screening using chest X-rays

PI: Dr. Priyanka Harjule
Funding: Directorate of Specially Abled Persons, Government of Rajasthan
Duration: 2022-2024

Application of fractional calculus in the study of dynamics of cytosolic calcium ion in astrocytes

PI: Dr. Ritu Agarwal
Funding: NBHM, Department of Atomic Energy, Govt of India
Duration: 2017-2022

Dynamics of a falling liquid film in partial wetting conditions on a complex geometry- application to a structured packing geometry
PI: Dr. Geetanjali Chattopadhyay
Funding: SERB International Research Experience (SIRE)
Duration: 2023-2024

Study of Various Structures of Spaces of Continuous Functions
PI: Dr. Varun Jindal
Funding: National Board for Higher Mathematics (NBHM) Department of Atomic Energy, Govt of India
Duration: 2020-2023

Analysis of Time-periodic Thermo-convective Flows in Composite Systems Using Physics-informed Neural Networks
PI Dr. Om P. Suthar
Funding: ANRF
Duration: 2026-2030

Analysis of semi-Lipschitz type functions in asymmetric metric spaces
PI- Anubha Jindal
Scheme- Faculty seed grant, MNIT Jaipur
Duration: 2025-2028

Thrombus Formation in Microfluidic Devices
PI: Dr. Geetanjali Chattopadhyay
Funding: Faculty Seed Grant, MNIT Jaipur
Duration: 2025-2028

Project Title: Finite element methods for optimal control of the partial differential equations in the non-divergence form

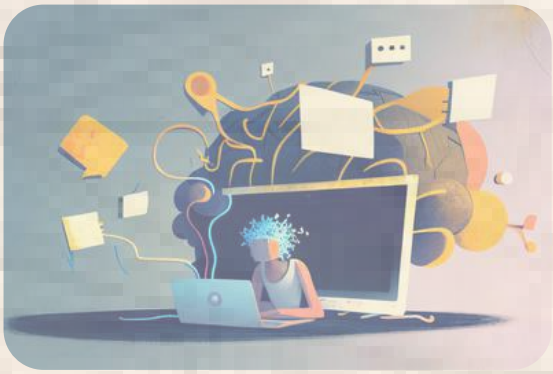
PI: Dr. Pratibha Shakya
Funding: DST Inspire Faculty Fellowship, Department of Science and Technology, Government of India
Duration: 2024-2029.

PATENTS AND TECHNOLOGIES DEVELOPED

" AI-DRIVEN FRAMEWORK FOR DIABETIC RETINOPATHY GRADING AND RELATED METHODS", Reg.No. TEMP/E1/26980/2026-DEL [Controller General of Patents, Designs & Trade Marks, Govt. of India]

"SILICO-AI: An AI-Based Portable Computer-Aided Diagnostic System for Silicosis Disease", Reg.No. 202311063986 [Controller General of Patents, Designs & Trade Marks, Govt. of India]

"AUTOMATED CLASSIFICATION SYSTEM FOR SILICOSIS USING DEEP LEARNING AND RELATED METHODS", Reg.No. TEMP/E1/26982/2026-DEL [Controller General of Patents, Designs & Trade Marks, Govt. of India]



"Every great discovery is a patent of the mind, stamped with the seal of human curiosity."
- David Hilbert

Infrastructure and other facilities

Library

The Institute has a spacious and well-equipped library which is being run according to an open access system. It has a rich collection of about 1,33,600 volumes of books, periodicals, reports and reference material. In addition to the books from main library, some more books are issued to students from book bank also. There is a video viewing facility. Large number of books, periodicals, video cassettes and CD-ROMs are available. The library is being fully computerized.

Computer Centre

A centralized computing facility of the Institute since 1989, the Centre caters to the need of different academic departments and various sections of the Institute by managing and providing extensive computing & networking facilities to the institute and facilitating the use of the latest information technology in Institute's teaching, learning, research and administration.

Sports

Adequate facilities are available for sports and games and for co-curricular activities. The campus is well laid out with roads, electrical installations, water supply and underground drainage system etc.

Medical Facilities

A full-fledged medical dispensary is available in the campus. It is supervised by a Resident Medical Officer. The dispensary also has a panel of specialists on its roaster including an Ayurvedic Doctor, a Homeopathy Doctor, an Orthopaedic Doctor, a Cardiologist, a Gynaecologist and a Paediatrician which are available to students and to the family members of the staff as per a notified schedule.

Vivekananda Lecture Theatre Complex (VLTC)

40+ Rooms of capacity 120 @VLTC: Sophisticated e-classrooms, 6 Rooms of capacity 240 @VLTC: Sophisticated e-classrooms

MNIT Innovation and Incubation Centre (MIIC)

MIIC is a Technology Business Incubator (TBI) sponsored by DST, Govt. of India, New Delhi. Its primary objective is to provide a platform for Conceiving, Realizing, Promoting & Nurturing knowledge-based Innovation & Entrepreneurship amongst all the aspiring entrepreneurs. MIIC extends incubation support to startups primarily but not limited to the areas of Product or Process design/Re-design, Material or Process innovation, Information & Communications Technology.

Other Facilities

1. Cafeteria: The Institute has multiple cafeterias at various locations within the campus.
2. Bank: There are two branches of banks; one each of ICICI Bank Ltd. and SBI in the campus where students can avail all banking related services.
3. Post Office: There is a Post Office in the campus of MNIT.

Programmes offered

The Department of Mathematics at Malaviya National Institute of Technology Jaipur offers three academic programs designed to promote strong analytical and research skills in students. The department offers a B.Tech. in Mathematics & Computing, an M.Sc. in Mathematics, and a Ph.D. in Mathematics. These programs aim to provide students with a solid foundation in mathematical theory along with computational and research-oriented training, enabling them to pursue careers in academia, research, and various industry sectors.

1. B.Tech. in Mathematics & Computing

A thorough course that combines the fundamentals of mathematics and computing is the Bachelor of Technology (B.Tech.) program in Mathematics and Computing. The goal of this program is to give pupils a solid foundation in mathematics, computing and computational thinking, allowing them to acquire and use analytical and problem-solving abilities across a range of scientific and technical domains. This program aims to equip students for strong computing skills and to give them a solid mathematical foundation for logical reasoning. Additionally, the mathematics component will provide them with a solid foundation that will allow them to lead the field.

2. Master of Science (M.Sc.) in Mathematics

The M.Sc. program aims to build comprehensive mathematical expertise by fostering strong analytical skills, collaborative problem-solving, and a deep understanding of advanced theories and their interdisciplinary applications. Whether students are preparing for continued academic research or professional careers in industry and education, the program equips them with the necessary tools for success.

These objectives are achieved through a well-rounded curriculum that combines intensive coursework, seminars, practical projects, and a research-driven thesis, allowing students to fully develop their mathematical intellect.

3.Doctor of Philosophy (Ph.D.)

In order to extend the mathematical skills and knowledge of students in both familiar and new contexts, the Department of Mathematics, MNIT Jaipur offers Ph.D. program in the areas of Pure and applied Mathematics. Students can also be supported by scholarships/ fellowships of other organizations such as National Board for Higher Mathematics, Council of Scientific & Industrial Research, University Grants Commission, Department of Science & Technology, INSPIRE and others.

Admission Process

B.Tech. in Mathematics & Computing

Candidates are required to complete the admission steps provided by the Joint Seat Allocation Authority (JoSAA). To participate in counselling, candidates must have cleared the JEE (Main) exam. The official schedule and other information will be published on the JoSAA website.

UG Manual: https://www.mnit.ac.in/academics/UG
JOSAA: https://josaa.nic.in/

Master of Science (M.Sc.)

Admissions to M.Sc. (Mathematics) at MNIT Jaipur is held through CCMN (Centralized Counselling For M.Sc./M.Sc. (Tech.)) CCMN is an online admission process for all National Institutes of Technologies (NITs) and several other centrally funded institutes based on Joint Admission test (JAM) for M.Sc. examination.

Annual intake: The total sanctioned annual intake for the MSc. program is 41, with reservations for various categories as per Government of India policy.

The seat matrix for the total sanctioned intake is as below:

OPEN	OPEN-PWD	EWS	EWS-PWD	SC	SC-PWD	ST	ST-PWD	OBC	OBC-PWD	TOTAL
16	1	3	1	6	0	3	0	11	0	41

Minimum eligibility criteria: The applicant must have a B.Sc. or B.Sc. (Hons.) from a recognized institute or university with a minimum of 60% marks or equivalent CGPA for Gen/OBC/EWS candidates with and a minimum of 55% marks or equivalent CGPA for SC/ST/PWD candidates.
Special eligibility/ Restriction: Mathematics/ Applied Mathematics in all semesters in UG Level.

Doctor of Philosophy (Ph.D.)

Admissions to the Ph.D. program is based on a written test and interview. Admissions take place twice a year in the month of June and December.

Minimum eligibility criteria: The applicant must have a Master's Degree or an equivalent qualification from a recognized institute or university with a minimum of 60% marks or equivalent CGPA for Gen/OBC/EWS candidates and a minimum of 55% marks or equivalent CGPA for SC/ST/PWD candidates.
Special eligibility/ Restriction: The applicant must have a Master's Degree with specialization in Mathematics.

- All admissions to Ph.D. program shall be made only after approval of the Chairperson, Senate, on the recommendations of the duly constituted Departmental Selection Committee (DSC).
- Admissions to the Ph.D. programs may be made in either or both of the two regular semesters. Admissions shall normally be made in May/June for the ODD semester and in November/December for the EVEN semester.
- Admission to the Ph.D. Programs shall be based on the candidates' performance in the written test and/ or interview/ presentation of the candidates and short-listed by the DSC.

- GATE score will be mandatory for admission to Ph.D. program (with Institute Assistantship) acquired within past three years.
- The requirement of a written test for admission to Ph.D. program is waived-off for the candidates who have cleared any of the UGC-NET/JRF, CSIR-NET/JRF or any other National Examination that provides assistantship/scholarship for the Ph.D. program. However, such candidates shall be required to appear for the interview, and if selected, they may be offered admission to the Ph.D .program at MNIT Jaipur.
- For various admission categories in Ph.D., please go through the PG regulations of the Institute.

CCMN Website: https://ccmn.admissions.nic.in/
PG manual: https://www.mnit.ac.in/academics/PG

Program Structure

B.Tech. in Mathematics & Computing

The B.Tech. in Mathematics and Computing is a four-year, eight-semester program divided annually into odd (July) and even (January) sessions that progressively bridge general engineering with specialised dual-discipline expertise. During the first year, students build a broad foundation in fundamental engineering and basic sciences before transitioning in the second year to core foundational courses essential to both mathematical and computational fields. The third year deepens this knowledge with advanced coursework exploring specialised theoretical and applied intersections of the two disciplines, alongside departmental electives and a mandatory summer industrial internship. Finally, the fourth year prioritises specialised learning and independent research, culminating in highly specialised open electives and a comprehensive major project in which students apply their combined expertise to solve complex, real-world problems.

First Semester	Second Semester
Object Oriented Programming	Mathematics - II
Object Oriented Programming Lab	Data Structures and Algorithms
Mathematics I	Data Structures and Algorithms Lab
Discrete Mathematics for Computing	Linear Algebra
Other Institute Core subjects	Other Institute Core subjects

Third Semester	Fourth Semester
Real Analysis	Probability & Stochastic Processes
Differential Equations	Complex Analysis
Basics of Management	Abstract Algebra
Numerical Methods and Computations	Optimization Methods and Applications
Numerical Methods and Computations Lab	Optimization Methods and Applications Lab
Digital System and Computer Architecture	Number Theory and Cryptography
Design and Analysis of Algorithm	Soft Skills and Personality Development
Design and Analysis of Algorithm Lab	DBMS theory and DBMS LAB

Fifth Semester	Sixth Semester
History of Mathematics and Computing	Program Elective I
Computational Methods for Differential Equations	Program Elective II
Computional Methods for Differential Equations Lab	Program Elective III
Statistical Methods for Data Science	Program Elective IV
Statistical Methods for Data Science Lab	Computer Networks
Theory of Computation	Computer Networks Lab
Operating System Concepts	Artificial Intelligence and Machine Learning
Operating System Concepts Lab	Artificial Intelligence and Machine Learning Lab

Seventh Semester	Eighth Semester
Minor Project	Major Project
Program Elective V	Program Elective VII
Program Elective VI	Program Elective VIII
Open Elective I	Open Elective II
Training Seminar	
Advanced Soft Skills Lab	

B. Tech Program Electives	
Advanced Matrix Theory	Integral and Discrete Transforms
Classical Mechanics	Bayesian Data Analysis
Continuum Mechanics	Mathematical Modelling and Simulation
Data Mining	Measure, Integral and Probability
Dynamical Systems	Multivariate Techniques
Evolutionary Algorithms	Non-Linear Programming
Financial Mathematics	Numerical Optimization
Finite Element Methods	Wavelets and Applications
Functional Analysis	Digital Image Processing
Fuzzy Logic and Applications	Deep Learning
Graph Theory	Computer Vision
Information Retrieval	Compiler Design

Multi Entry\Exit Options(B.Tech)

B.Tech. Entry\Exit Options			
Semester of Study	**Entry Requirement**	**Exit Requirement**	**Degree/Certificate awarded**
1st Semester begning	Only through JosAA/DASA/ICCR /SII	NA	NA
2nd Semester end	NA	Minimum 40 credits earned + minimum 2 credits of department specific skill courses	UG Certificate in the relevent Engg. Stream
3rd Semester begning	UG Certificate in relevant Engg. Stream + 1 year of gap/work experience post UG certificate	NA	NA
4th Semester end	NA	Minimum 80 credits earned + minimum 2 credits of department specific skill courses	UG Diploma in the relevent Engg. Stream
5th Semester begning	UG Diploma in the relevent Engg. Stream + 1 year of gap/work experience post UG Diploma	NA	NA
6th Semester end	NA	Minimum 120 credits earned + minimum 2 credits of department specific skill courses	Advanced UG Diploma in the relevent Engg. Stream
7th Semester begning	Advanced UG Diploma in the relevent Engg. Stream + 1 year of gap/work experience post Advanced UG Diploma (only for students opted to exit from MNIT at earlier levels)	NA	NA
8th Semester end	NA	Regular B.Tech requirement as per the curriculum	B.Tech/B.Tech with Honors/Minor

M.Sc. Mathematics

The two-year full-time M.Sc. program offered is spread over two academic sessions, each comprising two semesters – the ODD semester (commencing usually from July every year) and the EVEN semester (commencing usually from January every year). The minimum duration to graduate from the program is two years (4 semesters). However, the students are expected to complete all academic requirements before the end of six semesters, i.e., within three years of admission to the program, which is the maximum period permissible to complete the program. During the first academic session (Semesters 1 & 2), the students are exposed to core courses necessary to build the basic foundation. During the second academic session (Semesters 3 & 4), students are exposed to a project/dissertation, which enables the student to identify their specific field of interest and take up research work under the mentorship of an experienced faculty member. Along with a project/dissertation, students opt for elective courses based on their interests.

First Semester	Second Semester
Linear Algebra	General Topology
Abstract Algebra	Complex Analysis
Ordinary Differential Equations	Introduction to Numerical Analysis
Real Analysis	Partial Differential Equation
Mulativariable Calculus	Probability and Statistics
Computer Language	Program Elective-I
Computer Lab	

Third Semester	Fourth Semester
Functional Analysis	Program Elective - VI
Program Elective - II	Program Elective - VII
Program Elective - III	Program Elective - VIII
Program Elective - IV	Disseratation - II
Program Elective - V	
Disseratation - I	

MSc Program Electives	
Applied Linear Algebra	Special Functions
Commutative Algebra	Probability Theory
Field and Galois Theory	Geometric Function Theory
Graphs and Matrices	Fractional Calculus and its Application
Number Theory	Calculus of Variations and Tensor Analysis
Discrete Mathematics	Fractional Differential Equations
Introduction to Graph Theory	Finite Element Method
Measure and Integration	Integral Equations
Advanced Analysis	Integral Transforms
Introduction to Operator Theory	Dynamical Systems
Flow and Thermal Instability	Classical Mechanics
Advanced Functional Analysis	Fluid Dynamics

Evaluation and Assessment

The Institute evaluates students academic achievement using an ongoing approach. In addition to the regular in-class assessments conducted throughout the semester, the evaluation procedure consists of midterm and end-term tests.

Regular quizzes, assignments, presentations, seminars, attendance status, and other activities are used by the course coordinators to assess students' engagement and performance in class. The approach for assessment and evaluation is made to help participants attain the program's goals of comprehensive development without being overly stressful.

Credit System

The educational structure at MNIT Jaipur revolves around a credit-based system. Key aspects of this system include continuous evaluation, performance and the flexibility for students to advance at a pace that aligns with their capabilities and preferences, provided they meet the minimum criteria for continuing their academic programs. Each course has a certain number of credits, which describes its weightage. A student's performance is measured by the number of credits that he/she has to complete as per set standards. A minimum number of earned credits should also be obtained in order to qualify for the degree. The minimum required CGPA for semester promotion, including minimum and maximum credits to be registered in a particular semester are indicated in the institute's UG & PG Regulations Manual, which is available on the Institute website

Ph.D.

The Ph.D. program has minimum duration of six semesters. All Ph.D. students shall have to register for a defined number of courses, comprising the course-work, at the start of their Ph.D. program. All students registered in the Ph.D. program must pass a written comprehensive examination designed to test the student's overall comprehension in the various subjects in the area of the proposed research. Every Ph.D. student shall be required to present a State-of-the-Art Seminar covering the area of research before the Departmental Research Evaluation Committee (DREC) within one month from the successful completion of the Comprehensive written examination. The progress of Ph.D. candidates in their research work shall be continuously monitored through end-of-the-semester presentations made by the Ph.D. student before the DREC constituted by the Supervisor of the concerned Department as per the notified schedule in the Academic Calendar.

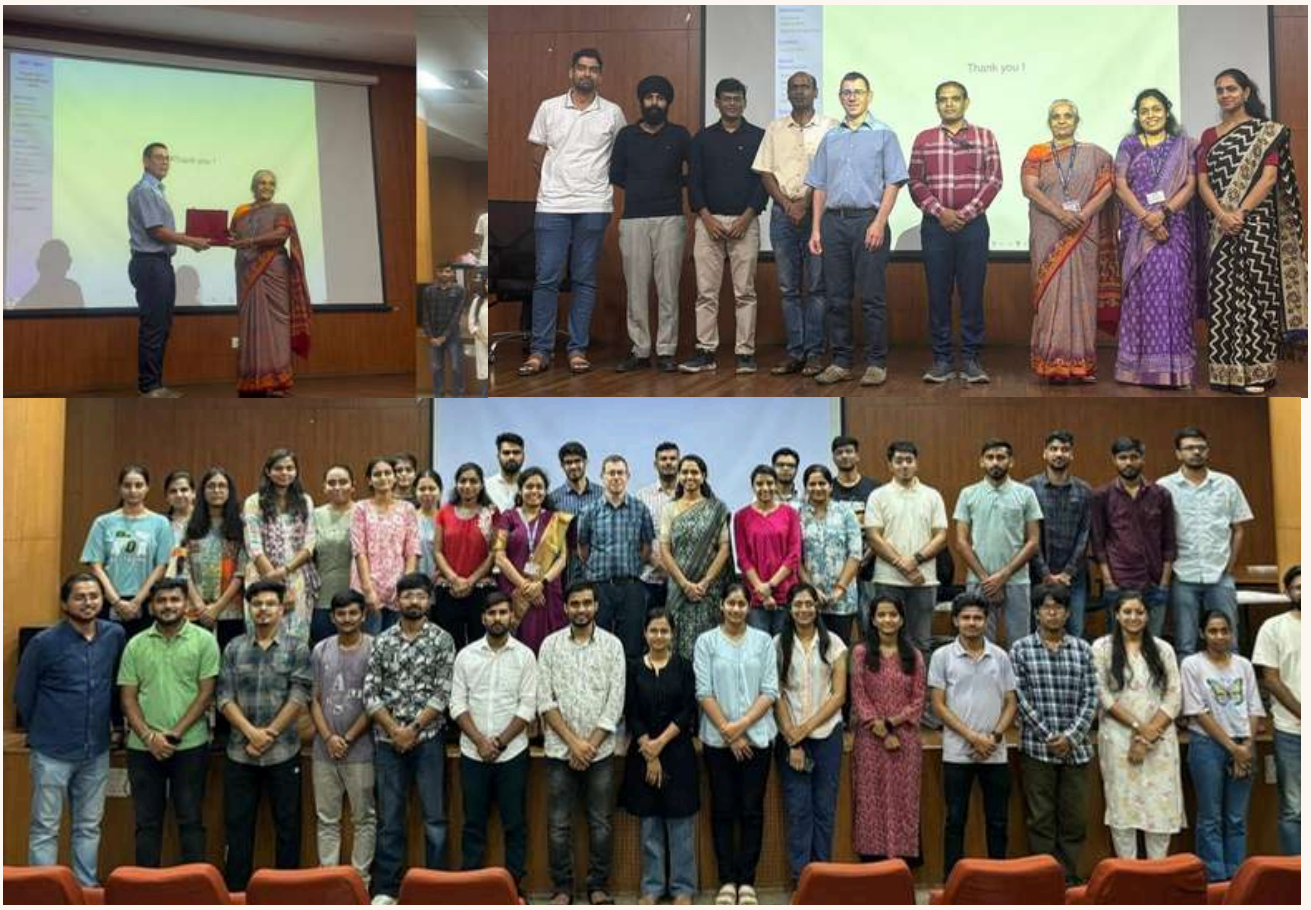
Co-Curricular & Extra Curricular Activities

The Mathematics Department at MNIT Jaipur provides different kinds of co-curricular activities aimed at enriching students' academic experiences and instilling a greater passion for mathematics. The Mathematics Department organizes guest lectures, career workshops, or field trips to expose members to various STEM pathways and opportunities. The events are designed to make the students active and employable by enhancing their overall development along with academics. The activities are organized at the institute level and at the department level. Besides lectures, Department of Mathematics actively engages in organising and participating in numerous mathematics events. Some of the events include

▪ Quizzes ▪ Expert lectures ▪ Workshops ▪ Conferences

Activities at Department Level

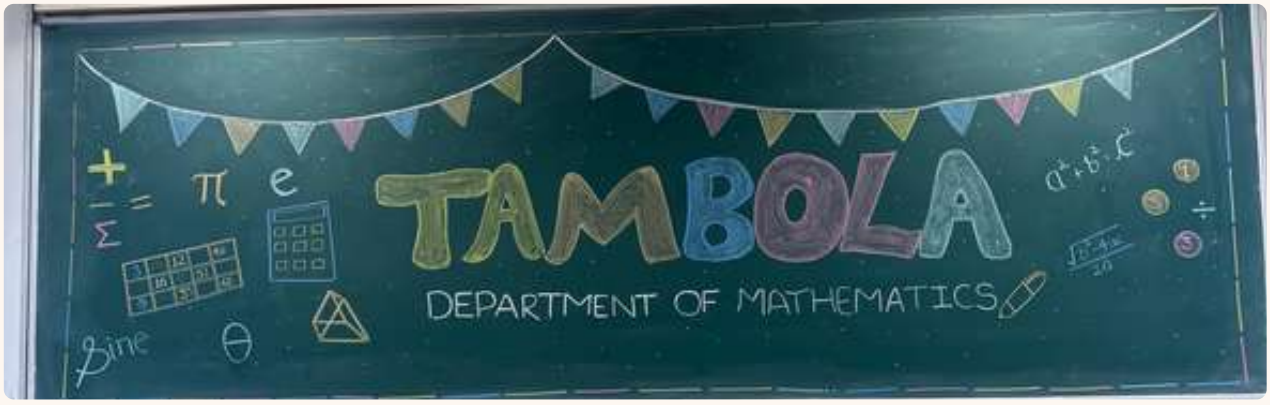
Department of Mathematics Teacher's Day 2025



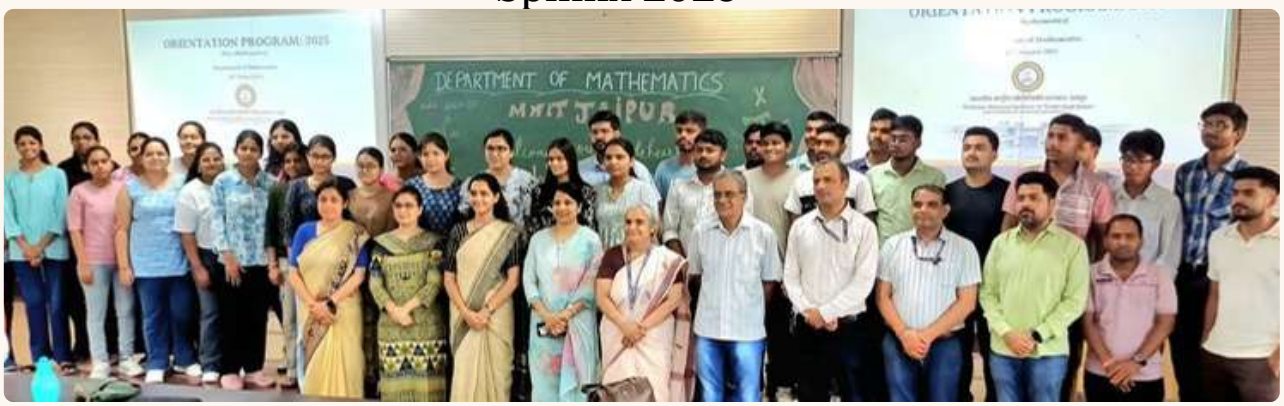
The Department of Mathematics, MNIT Jaipur organized a two-days expert lecture series featuring Prof. Christian Ruyer-Quil from Université de Savoie Mont-Blanc, France.

Prof. P. Shunmugaraj, Department of Mathematics and Statistics at IIT Kanpur delivered expert lecture on 'Hyperspace topologies and their applications'

On 2nd December 2025, MNIT Jaipur had the privilege of hosting Prof. Ravi P. Agarwal, Emeritus Research Professor at the Departmebt of Mathematics and Systems Engineering, Florida Institute of Technology, USA.



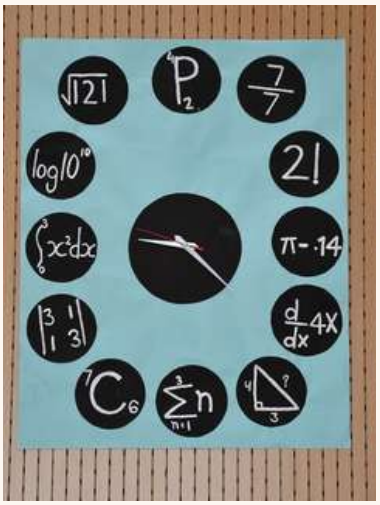
Tambola Game By Department of Mathemathematics
Sphinx 2025



The Department of Mathematics warmly welcomed its new M.Sc. (Mathematics) batch with an orientation programme(2025)

Two Days National Workshop on Computational Mathematics using MATLAB at MNIT, by a team of experts from Mathworks

SHIDHANT 2.0 THE MATH FEST



The Department of Mathematics unveiled a captivating symphony of equations and theorems during the Math Fest Siddhant.

Mathematics is the most beautiful and most powerful creation of the human spirit.
– Stefan Banach

MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR

JAWAHARLAL NEHRU MARG, MALAVIYA NAGAR, JAIPUR-302017, RAJASTHAN
(An Autonomous Institute of National Importance)