

Minor Specializations:

Optimization and Decision Sciences

- Linear Optimization
- Non-Linear Optimization
- Combinatorics and Design of Experiments
- Game Theory and Statistical Decisions

Algorithms and Coding Theory

- Applied Graph Theory
- Advanced Algorithms and Deep Learning
- Matrix Theory
- Algebraic Coding Theory

Other Program Electives:

- Fuzzy Logic and Neural Networks
- Functional Programming
- Theory of Computation
- Geometric Topology
- Topology of Metric Spaces
- Computational Fluid Dynamics
- Mathematics for Finance
- Advanced Number Theory and Cryptography
- Reliability Theory

In addition, students may opt for minor specializations offered by the Humanities and Management disciplines as well as minors offered by the School of Computer Engineering, providing flexibility to explore complementary fields of study aligned with their academic interests and professional aspirations.

Facilities:

Workshops:

- Well established workshop consisting of three sections: Mechanical, Electrical and Civil Engineering.

Lab Facilities:

- Mathematics and Computing Labs with MATLAB and Mathematica
- Engineering physics, Engineering Chemistry, Graphics Labs.
- Computer labs are available for students to work on their course-based laboratory activities ranging from Advanced Programming, Database Systems, Data Structures, Soft Computing, Algorithms, Machine Learning, General Purpose Programming, Software Engineering, and Artificial Intelligence Lab.

Events/Expert Talks:



- The conclave strengthened academia-industry engagement in emerging computational domains and highlighted the role of mathematics and computing in real-world applications such as artificial intelligence, data science, finance, analytics, cybersecurity, and high-performance computing. Expert talks covered topics including computational complexity, topological machine learning,

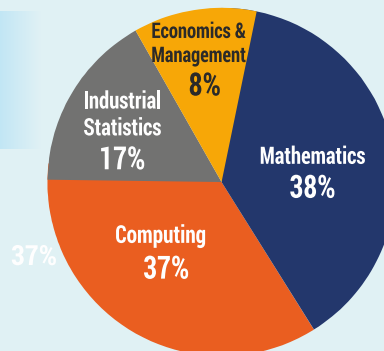
and the mathematical foundations of big data analysis, emphasizing the importance of geometry, probability, and dimensionality reduction in understanding high-dimensional data. Together with panel discussions involving industry leaders, the event provided students with insights into current research developments, industry trends, and emerging career opportunities.

- 2026: (June 30-03 July 2026): 16th Algebraic Hyperstructures and Applications International Conference (supported by ANRF, CSIR).
- 2026: Calendar Events: Conducted the Postgraduate Research Symposium (MaRS) and Women in Mathematics Day-WMD (supported by NBHM-DAE).
- 2025: Short course on Quantum Computing and Quantum Machine Learning by Dr. Rajeev Singh and hosted invited talks by Mr. Ravindra Varna of Brandscapes Worldwide, Mr. Jaideep Jagadeeshwar Rao of Fernandez Hospitals, and Mr. Santhosh Rebello of Salesforce on mathematics and computing, AI in healthcare, future workforce skills, and digital-era career opportunities.
- 2023: International Conference on Number Theory and Graph Theory and the International Conference on Algebra, Analysis and Applications, with support from national funding agencies and international collaborators (supported by ANRF)
- 2023: International Conference On Algebra, Analysis and Applications, sponsored by SERB-DST, NBHM-DAE.

Major Projects / Exchange Programs (by faculties):

- 2022-2026: SERB-DST TARE Program jointly with NITK, Surathkal, Karnataka
- 2026 NBHM - DAE Project

Weightage of Courses offered from 3rd Semester onwards



Dr Radhika M Pai, Dean SCE

Dr Smitha N Pai, Associate Dean, SCE

Dr P C Siddalinga Swamy, Associate Dean, SCE

Dr Sudha D Kamath, Dean, SBHM

Dr Yogesh Pai P, Associate Dean, SBHM

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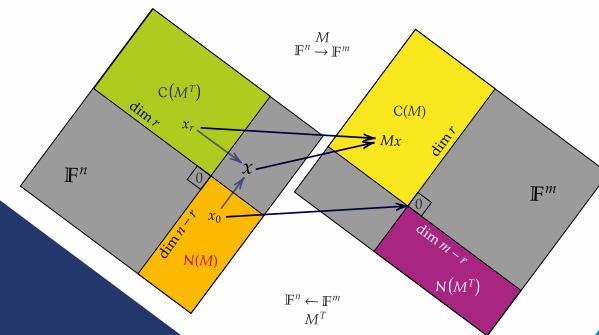
School of Basic Sciences, Humanities and Management

Manipal Institute of Technology, Manipal - 576 104, Karnataka, Ph: 0820-2925261/62



MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

B.TECH. MATHEMATICS & COMPUTING



School of Computer Engineering & School of Basic Sciences Humanities and Management



Manipal Institute of Technology

Manipal - 576 104 Karnataka, India

Email: maths@manipal.edu

B.Tech. Mathematics & Computing

School of Basic Sciences, Humanities & Management

The School of Basic Sciences, Humanities & Management (SBHM) at Manipal Institute of Technology (MIT), Manipal, a constituent institute of Manipal Academy of Higher Education (MAHE), is a multidisciplinary school that brings together faculty expertise across Mathematics, Physics, Chemistry, Humanities, and Management. Established through the integration of foundational science and management disciplines, the school provides a rich academic ecosystem that promotes interdisciplinary teaching, research, and innovation, preparing graduates for diverse academic, research, and professional pathways. The School offers M Sc (Physics), M Sc (Chemistry), M Sc (Applied Mathematics and Computing), M Tech Engg. Management, Integrated M Tech Entrepreneurship. The Department of Mathematics at Manipal Institute of Technology was started in 1957 and now it is a part of School of Basic Sciences, Humanities and Management. It provides the mathematical foundation required to formulate, analyse and solve the problems of engineering and management. The faculty members, along with the regular teaching, also guide the students in acquiring higher-level knowledge of mathematics. It also takes up teaching specialized subjects to M.Tech. and MCA programs. There are 47 faculty members with diversified specializations in the domain of Mathematics. The core competencies of mathematics domain include Linear Algebra, Numerical Analysis, Fluid Dynamics, Applied Graph Theory, Number Theory, Complex Analysis, Algebra and Applications, Functional Analysis, Topology, Statistical Inferences, Deep Learning, Reliability Theory, Control & Optimization. The school also offers Ph.D. programs in various specializations for students admitted through national level entrance exams. The Mathematics domain is associated with the Centre for Advanced Research in Applied Mathematics & Statistics (CARAMS), MAHE.

B.Tech. Mathematics & Computing Program Highlights

- Focus on subjects such as Computational Linear Algebra, Probability, Data Structures, Time Series Analysis, Multivariate Analysis, Scientific Computing & Operations Research makes the graduates industry ready.
- A strong base in classical subjects like Mathematical Analysis, Algebraic Structures, Mathematical Logic and Computability, and Discrete Mathematics and Graph Theory prepares students for research programs in reputed institutes either in India or abroad.
- Inclusion of topics such as Coding Theory, Mathematical Economics, Game Theory, Algorithms and Computational Complexity, Cryptography enable students for careers in reputed organizations.
- The program offers Minor Specializations in emerging and application-oriented domains such as: Optimization & Decision Sciences, and Algorithms & Coding Theory.

Career Prospects

- Career opportunities in the IT industry, software development, data analytics, computing, and AI-ML.
- Opportunities for higher education in reputed institutes and universities in India and abroad.

School of Computer Engineering

The School of Computer Engineering at MIT, MAHE brings together faculties from the fields of Computer Science, Information and Communication Technology, and Data Science & Computer Applications. It provides a rich academic ecosystem in AI & Machine Learning, High-Performance Computing, Networks & Security, Data Science, and Multimedia Systems, driven by combined strengths in teaching excellence, innovation, research, and active industry collaboration. The School of Computer Engineering offers a globally aligned curriculum reinforced with experiential learning, international collaborations, and access to state-of-the-art research facilities. There is a wide range of undergraduate, postgraduate, and doctoral programs, supported by experienced faculty, advanced infrastructure, with focused research groups on innovation and real-world applications. Faculty and students actively contribute to research through funded grants, published papers in reputed journals, and the filing of patents across emerging areas of technology. Several programs offered are accredited by national and international agencies including NBA and IET (UK). Graduates from the School are equipped to pursue careers across diverse sectors including information technology, aerospace, healthcare, defense, finance, telecommunications, and smart infrastructure systems, and have been placed in top-tier companies such as Microsoft, Amazon, Deloitte, Goldman Sachs, Oracle, Cisco, and Samsung.

- Employment opportunities in corporate sectors involving computer-assisted technologies.
- Strong computational thinking and problem-solving skills aligned with emerging technologies and evolving industry demands.

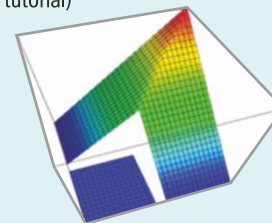


Pattern in Chaos: Fern using Random Numbers

Course List: First and second semesters are common to all B.Tech. Programs in computer stream of MIT, Manipal.

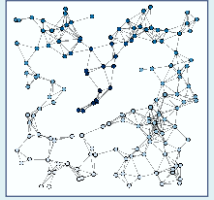
3rd Semester:

- Computational Linear Algebra (with lab tutorial)
- Probability and Stochastic Process
- Data Structures
- Elementary Number Theory
- Advanced Programming
- Discrete Mathematics
- Advanced Programming (Python) Lab
- Data Structures Lab



4th Semester:

- Mathematical Logic and Computability
- Real Analysis
- Algebraic Structures
- Database Systems
- Operating Systems
- Vector Analysis and Complex Variables
- Operating Systems Lab
- Database Lab

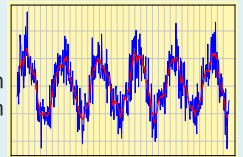


5th Semester:

- Foundation of Technology and Management
- Fundamentals of Machine Learning (with lab)
- Artificial Intelligence
- Algorithms and Computational Complexity
- Multivariate Analysis (with lab)
- Algorithms and Computational Complexity Lab
- Creativity, Problem Solving and Innovation (Open Elective -1)

6th Semester:

- Emerging Economic Landscape
- Time Series Analysis (with lab)
- Advanced Numerical Methods
- Program Elective-1/Minor Specialization
- Program Elective-2/Minor Specialization
- Open Elective -2
- Scientific Computing Lab

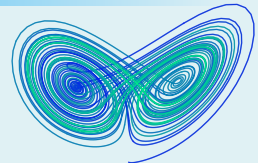


7th Semester:

- Program Elective - 3 / Minor Specialization
- Program Elective - 4 / Minor Specialization
- Program Elective - 5
- Program Elective - 6
- Program Elective - 7
- Open Elective -3
- Mini Project (Minor specialization)

8th Semester:

- Industrial Training / Internship (MLC)
- Capstone Project Work



Prof. Arthur T. Benjamin, celebrated American Mathematician and TED Speaker launched the new program B. Tech. (Mathematics & Computing) on 03 March, 2023 at MAHE, Manipal.