



**Brochure for the B.Tech. in Mathematics and Computing Course
Offered by the
Department of Mathematics
Indian Institute of Engineering Science and Technology, Shibpur
Botanic Garden-711103, Howrah, West Bengal, India**



About the Department of Mathematics

The Department of Mathematics at the Indian Institute of Engineering Science and Technology, Shibpur stands distinguished by a venerable lineage tracing back to the very inception of the Institute. It has, over the decades, served as a cornerstone and principal intellectual pillar of engineering and scientific education, grounded in rigorous and enduring traditions of scholarship in both pure and applied mathematics.

The Department offers a Master of Science (M.Sc.) in Applied Mathematics and contributes actively to the Institute's doctoral (Ph.D.) Program. Its research endeavours are extensive and intrinsically interdisciplinary, encompassing mathematical biology, functional analysis, differential equations, numerical analysis, nonlinear dynamics, complex analysis, general relativity, astrophysics and cosmology, mathematical and statistical modelling, fluid and solid mechanics, fuzzy systems, number theory, mathematical statistics, operations research, and computational mathematics.

Anchored in a robust and vibrant research culture, the Department has produced a significant cohort of doctoral scholars and an extensive corpus of high-quality scholarly publications. It maintains active collaborations with leading national and international institutions, while a sustained programme of seminars, workshops, and invited lectures fosters a dynamic and intellectually enriching academic milieu.

In alignment with the Institute's vision, the Department remains steadfast in its commitment to advancing excellence in education, research, and innovation, with a continuing commitment to interdisciplinary scholarship and contributing meaningfully to scientific advancement and societal development.

Glorious Historical Legacy

Indian Institute of Engineering Science and Technology, Shibpur has a rich legacy that reflects the evolution of technical education in India. It was originally established in 1856 as Bengal Engineering College (B. E. College), making it one of the oldest engineering institutions in the country and a pioneer in producing skilled engineers during the colonial era. Over time, it developed a strong academic reputation and, in 2004, was granted university status and renamed Bengal Engineering and Science University, Shibpur (BESU), marking its transition into a more autonomous and research-oriented institution. Continuing its upward trajectory, in 2014 it was upgraded to its present form as an Institute of National Importance under the name IEST Shibpur, aligning it with premier institutions like the NITs. This transformation from BE College to BESU and finally to IEST represents a continuous journey of growth, modernization, and academic excellence, while preserving its historic legacy and contributions to engineering education in India.

Message from the Desk of HOD



The Indian Institute of Engineering Science and Technology, Shibpur (IEST, Shibpur), formerly known as Bengal Engineering and Science University, stands as a distinguished publicly funded institution committed to the advancement of higher education in engineering, science, and technology.

Situated in Howrah along the serene banks of the Hooghly River, the Institute was conferred the status of an Institute of National Importance in 2014 under the National Institutes of Technology Act, 2007—an acknowledgement of its enduring academic excellence and national significance.

Among its sixteen academic departments, the Department of Mathematics occupies a position of particular eminence. Within this venerable academic edifice, the Department of Mathematics stands as a locus of profound scholarly gravitas. Since its inception, the Department has cultivated a tradition of scholarly excellence characterized by intellectual rigour, marked by pedagogical distinction and sustained contributions to both fundamental and applied research. It has evolved into a vibrant centre for advanced mathematical studies, fostering expertise across a wide and intellectually rigorous spectrum of disciplines, including Differential Equations, Functional Analysis, Fuzzy Sets and Topology, Fractional Calculus, Integral Equations, Algebraic Graph Theory, Mathematical Modelling and Simulation, Mathematical Physics, Relativity, Cosmology and Astrophysics, Number Theory, Numerical Analysis, Non-linear Optimization, Stochastic Processes, Mathematical Biology, Complex Analysis, Fluid and Solid Mechanics, Thermoelasticity, Mathematical Statistics, Operations Research, and Computational Mathematics.

The Department offers postgraduate program leading to the Master of Science (M.Sc.) in Applied Mathematics and the Doctor of Philosophy (Ph.D.), and is poised to inaugurate a four-year B.Tech. program in Mathematics and Computing from the academic year 2026–2027. Its faculty, comprising scholars of considerable distinction, are actively engaged in frontier research supported by leading prestigious national funding agencies, including the Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Bhabha Atomic Research Centre (BARC), Department of Atomic Energy (DAE), and the National Board for Higher Mathematics (NBHM). A significant proportion of the faculty serve as principal investigators on government-funded projects in emerging and strategically relevant areas of mathematical science.

A testament to the Department's scholarly impact is its representation in the global top 2% of scientists identified by Stanford University, wherein four of its faculty members have been internationally recognized for their research contributions. This recognition reflects the Department's sustained contribution to high-impact research and its growing global visibility .

Functioning as a cornerstone of the Institute's academic framework, the Department provides essential mathematical foundations for undergraduate engineering education while simultaneously advancing specialized and research-intensive program at the postgraduate and doctoral levels. Its robust research culture, reinforced by sustained national and international collaborations, has yielded a significant corpus of doctoral graduates and high-impact scholarly publications.

The academic milieu is further enriched through a continuous programme of seminars, colloquia, workshops, and distinguished lectures, fostering an environment conducive to intellectual engagement and innovation. These activities not only enhance the research ecosystem but also promote critical thinking, interdisciplinary engagement, and scholarly discourse.

In alignment with the broader vision of the Institute, the Department of Mathematics remains steadfast in its commitment to excellence in education, research, and innovation. It seeks to advance the frontiers of both fundamental and applied mathematics while cultivating analytical depth, intellectual discipline, and interdisciplinary competence. The Department is dedicated to the cultivation of highly skilled researchers and professionals equipped to contribute meaningfully to national priorities and global scientific progress. This vision resonates with the strategic recommendations of the Anandakrishnan Committee, emphasizing the advancement of mathematical sciences, the fostering of innovation, and the development of intellectual frameworks capable of addressing emerging scientific, complex technological and societal challenges.



Vision

The Department of Mathematics is committed to imparting science based engineering education, proliferation of research in frontier areas of studies in technology and science related to mathematics and to train up personnel with expertise suitable for service in the Research Initiatives of national priorities. This is in line with the objectives envisaged in the Anandakrishnan Committee. This includes development of Mathematics, fostering innovation, interdisciplinary collaboration, and analytical thinking to address emerging scientific, technological, and societal challenges. ovation while contributing to interdisciplinary scientific advancements and societal development.





Mission

The Department of Mathematics seeks to:

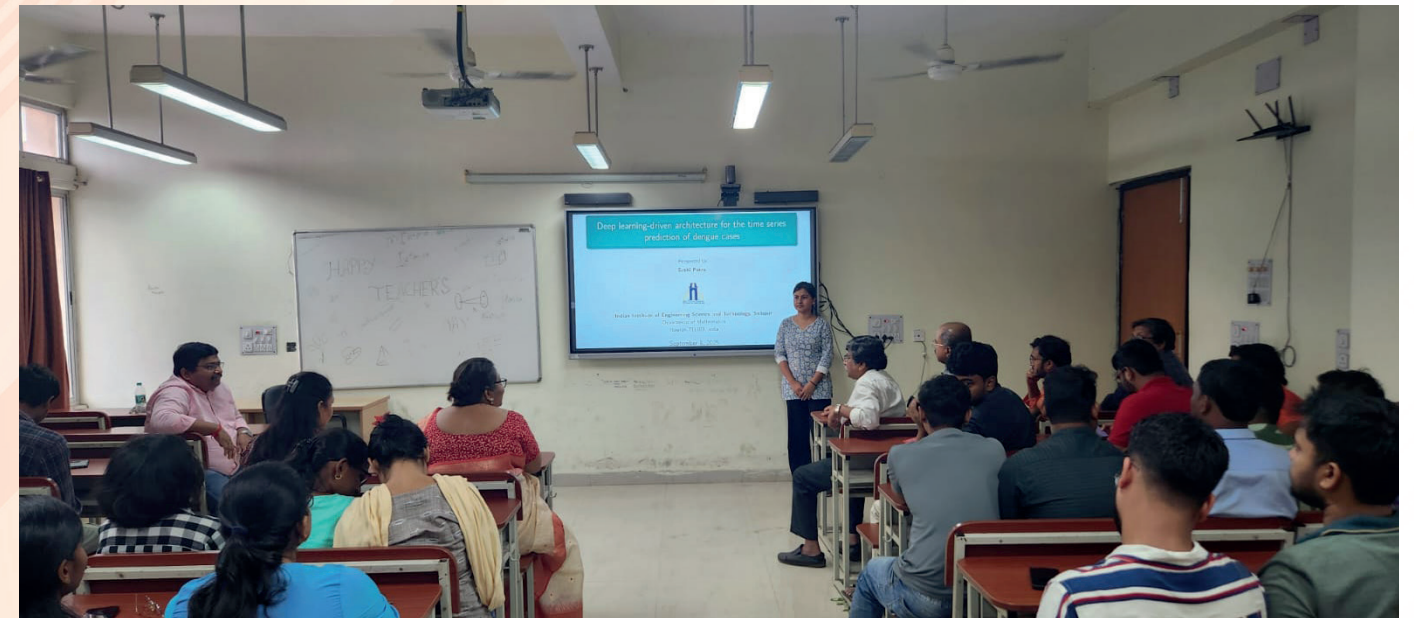
- Establish centre of excellence in mathematical education and research
- Provide strong mathematical foundations to students of engineering, science, and technology programs.
- Promote advanced research in mathematics with global relevance.
- Encourage interdisciplinary studies in subjects such as computer science, physics, engineering, and data science.
- Develop students' analytical, computational, and problem-solving skills required for academia, research, and industry.
- Strengthen international collaborations, academic exchange, and research networks.
- Align research with national developments on real world problems in different branches of mathematics.

Programs offered by Department (at present):

B. Tech. in
Mathematics
and Computing

M.Sc. in Applied
Mathematics

Ph.D. in
Mathematics





B. TECH. MATHEMATICS AND COMPUTING

The department is starting a 4-year B.Tech. Program in Mathematics and Computing from the Academic Year 2026-2027 with an intake of 40 students. Admission to this program is through Joint Entrance Examination – Main (JEE–Main). The program’s aim is to produce leaders who will be at the forefront of technological development, cutting edge of innovation in futuristic disciplines and next-generation technologies that require an extensive understanding of mathematics, computer science, and data science. This program will give students a formidable combination of Mathematics and Computer Science by concentrating on areas where mathematics and computing are most relevant to each other. This Program is intended to provide students with the skills and knowledge required to develop computational methods for solving complex mathematical problems, as well as to analyse and design computer algorithms and systems using mathematical techniques. The program will prepare graduates well for advanced degrees and careers in a variety of fields in industry. The curriculum is designed in such a way that this program provides a perfect platform for those who seek strong mathematical and analytical components with a specialization in AI. The program is typically structured to cover core topics in mathematics, such as Calculus, Linear Algebra, Probability Theory, and Statistics, as well as fundamental concepts in Computer Science, such as programming, Data Structures, Algorithms, and Computer Architecture. Students also have the opportunity to choose from a wide range of elective courses. The B.Tech. in Mathematics and Computing Program is ideal for students who are passionate about Mathematics and its applications in Computer Science. Graduates of this programme are well-prepared to work in a variety of fields, including software development, data analytics, finance, scientific computing, and research and development in industry, academia, and government sectors. Upon successfully completing the Mathematics and Computing program, students will be able to pursue their dream of being industry professionals. This program also provides an opportunity for higher education in mathematics, computer science, artificial intelligence, etc. in world-class universities.

The four-year program is divided into eight semesters. The first and second semester of the course will be common for all undergraduate students at the institute. In the next three semesters, in addition to fundamental computer science and mathematics courses, students will be exposed to variety of other courses. Fifth to eighth semesters will offer flexibility and the students can make suitable choices of some courses depending on their area of interest. Through the core courses, the students will get a rigorous exposure to topics such as Data Science, Artificial Intelligence and Machine Learning at the level suitable for the program. There is a mandatory Summer Internship for the students after sixth Semester. The students can opt for a Bachelor thesis in the final year of their curriculum.

Overall, the program maintains a fine balance between flexibility and rigor. Students can earn nearly fifteen percent of their total credits through different electives. The core requirements of the program are divided almost equally between Mathematics and Computer Science and the theoretical courses are backed up by state-of-the-art laboratory experiences. In addition to this, students are also encouraged to explore their interest with industries by undertaking internships/co-op programs. They can also work towards setting up start-ups and take steps to become future entrepreneurs.



Salient Features of the Program :



The program will provide students to develop skills of scientific computation, research and development.



The curriculum of this program is designed to meet the needs of mathematics in scientific investigations and recent technological innovations.



The program core consists of 40% Mathematics, 30% core CS and 30% AI related courses.



The students will be having flexibility to choose elective courses from a broad spectrum of courses depending on their interests



Majority of the courses are designed to give both the theoretical knowledge and practical training through Labs/ Practicals/ Case studies.



Apart from the capstone project, a six months industry internship option is mandatory.



Department will support the collaboration of students within and outside the institute through different activities. Students will get opportunities for learning as well as developing computational software.

Career/Job Prospects :

- The data from IITs where similar programs are running, convey that this is a very successful program and provides a broad spectrum of very good career opportunities.
- It is expected that the graduates from this program will get opportunities in renowned companies related to information technology, banking & finance, machine learning assisted technologies etc.
- The advent of Big Data and Data Analytics have created opportunities for startup companies with very small partners/employees' strength. Institute Incubation centre at IEST, Shibpur supports in-house start-ups.
- The graduates could also be Data Scientists in different domains.
- The program will help the students to pursue MS/PhD in world renowned Universities/Institutes in areas like Machine learning, Artificial Intelligence, Big Data, Mathematical Modelling, Economics and Finance, Image Processing Banking, Finance etc.



Faculty Profiles in the Department of Mathematics



Prof. Santanu Saha Ray

Head & Professor,
Department of Mathematics

Area of work:

Fractional Calculus, Numerical Analysis, Mathematical Physics, Stochastic Modelling, Wavelet Methods, Integral Equations, Mathematical Modelling.



Prof. Binayak S. Choudhury

Professor (HAG)

Area of work:

Functional Analysis, Topology, Fuzzy Mathematical Systems, Probability Theory, Nonlinear Dynamics and Chaos.



Prof. Murari Mitra

Professor

Area of work:

Reliability Theory, Mathematical Statistics, Operations Research, Nonparametric Inference.



Prof. Asoke Kumar Dhar

Professor

Area of work:

Problems concerning Partial Differential Equations, Stability Analysis of Water Waves, Zakharov's Integral Equation Technique, Deterministic and Random Schools, Nonlinear Fluid Dynamics.



Prof. Pritha Das

Professor

Area of work:

Mathematical Biology, Disease Modelling and Simulation, Ecology & Sustainability, Evolutionary Game, ML & Data Analysis, Supply Chain Management.



Prof. Guruprasad Samanta

Professor (HAG)

Area of work:

Mathematical Biology, Operations Research, Dynamical Systems, Statistical Modelling.



Prof. Tapan Kumar Kar

Professor (HAG)

Area of work:

Mathematical Biology, Epidemiological Modelling, Nonlinear Dynamics, Computational Modelling and Scientific Machine Learning



Prof. Ujjal Debnath
Professor

Area of work:
Relativity, Cosmology, Astrophysics.



Dr. Sarita Ojha
Assistant Professor

Area of work:
Matrix Theory, Operator Theory.



Dr. Shariful Alam
Associate Professor

Area of work:
Mathematical Biology, Ecological Modelling, Multi-criteria decision making in uncertain environment, Fuzzy Mathematics, Fuzzy Optimization.



Dr. Nirupam Ghosh
Assistant Professor

Area of work:
Composition Operator on Hardy Space, Cesaro Operator on Hardy Space, Univalent Analytic functions, Harmonic functions on Complex plane.



Dr. Smita Pal (Sarkar)
Associate Professor

Area of work:
Solid Mechanics, Mathematical Theory of Elasticity, Thermoelasticity.



Dr. Subha Sarkar
Assistant Professor

Area of work:
Graph Theory, Ramsey Theory, ZeroSum Problems, Additive Number Theory.



Dr. Sourav Rana
Assistant Professor

Area of work:
Mathematical Biology, Mathematical and Statistical Modelling, Distribution Theory, Dynamical Systems, Epidemiology.



Dr. Chayanika Rout
Assistant Professor

Area of work:
Inventory Modelling, Supply Chain Management, Fuzzy Set Theory, Multi-criteria Decision Making.

Frequently Asked Questions (FAQs)

1. What were the opening and closing ranks in this program last year?

As the course is starting from this current Academic Year 2026–2027, no such data is available.

2. Is B.Tech. (Mathematics & Computing) the same as B.Tech. (CST) at IEST, Shibpur?

Well, the answer is a clear NO. While computing does require knowledge of the fundamental courses of CSE, the focus of the Mathematics & Computing program is on doing the mathematics and essential programming and computational courses.

3. Is B.Tech. (Mathematics & Computing) the mix of B.Tech. (CST+ IT + EE) at IEST, Shibpur?

The answer is a clear NO. The mathematics courses constitute the major component of this curriculum. In this course, students do standard introductory engineering, programming, and AI courses. Students are encouraged to use free electives to register for courses of their interests. Moreover, a student maintaining a good CGPA will be allowed to take additional courses.

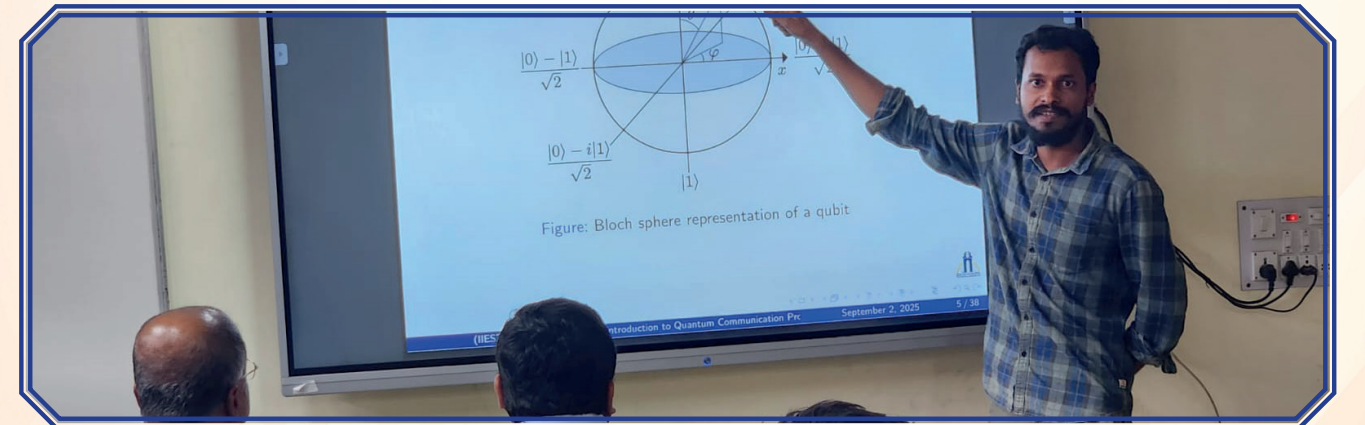
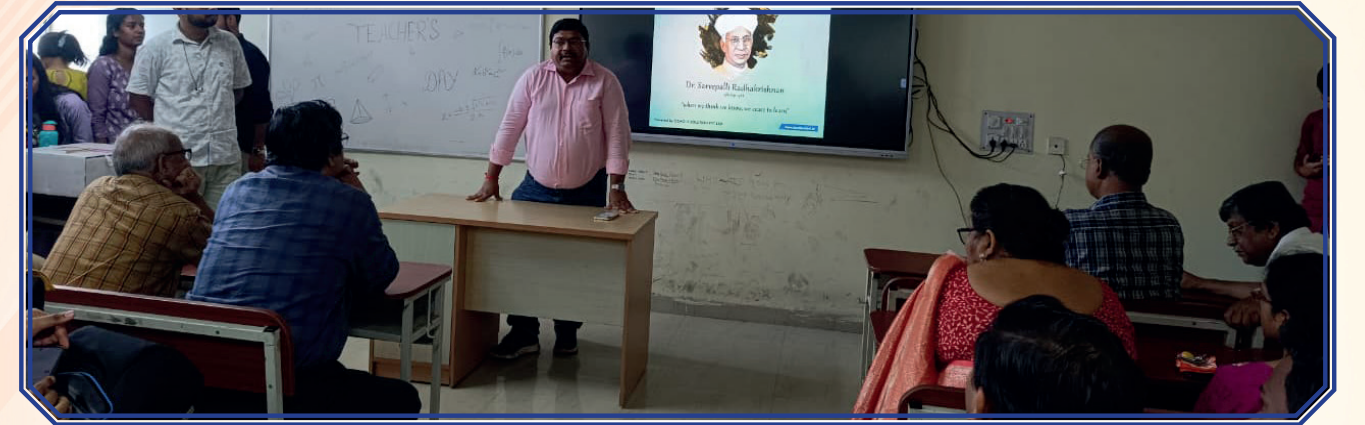
4. What are the higher education opportunities after B.Tech. (Mathematics & Computing)?

This program provides an excellent opportunity to learn theoretical and computational mathematics to pursue higher education in mathematics, computer science, artificial intelligence, etc., in worldclass universities.

5. Will there be good placements for the students of this stream?

The data from IITs where similar programs are running, convey that this is a very successful program and provides a broad spectrum of very good career opportunities. Further, the program is one of the top choices among advanced JEE rankers.







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