CHENNAI MATHEMATICAL INSTITUTE

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(a University under Section 3 of the UGC Act, 1956)

Lecture Programme for students of class XI and XII

3rd and 4th July 2026

Friday, 3rd July 2026		
Time	**Speaker**	**Title and Abstract**
10:00–11:15	Kavita Sutar	**The geometry of vision** Abstract: In this talk we will explore how geometric reasoning about images evolves. On the way we will learn some amazing facts about vision and work through the basic mathematical model used to describe human vision.
11.15–11.45	**Snacks break**	
11.45–13.00	Amritanshu Prasad	**Continued fractions, and what they tell us about numbers** Abstract: The history of continued fractions can be traced back to Euclid's Elements; an algorithm to find the greatest common measure of two real numbers (which may not even exist). Using Euclid's idea of continued fractions, we will discover (in Euclid's style) that the hypotenuse of an isoscles right triangle has no common measure with its side (in other words, the square root of two is irrational). The truncations of continued fraction expansions give rational approximations of real numbers. From a seven-layer deep truncation we rediscover an approximation for the square root 2 as 577/408 due to Baudhayana from 300 to 500 years before Euclid!
13.0–14.00	**Lunch Break**	
14.0–15.15	Ajith Kumar	**expEYES–Bridging Theory and Laboratory for Modern Science Education** Abstract: The expEYES (Experiments for Young Engineers and Scientists) project, initiated under the PHOENIX program at the Inter-University Accelerator Centre (IUAC), provides a comprehensive, low-cost solution for hands-on science education. By integrating versatile, open-source hardware with the Python programming language, expEYES transforms personal computers and Android devices into portable, multi-functional laboratories capable of performing functions like oscilloscopes, signal generators, and data loggers. Designed to replace expensive and rigid commercial test equipment, the platform facilitates an inquiry-based "learn-by-doing" approach, allowing students from secondary school through university levels to explore core concepts in physics and electronics through real-time data acquisition and visualization. By adhering to the principles of Free Software and Open Hardware, the project seeks to democratize access to high-quality scientific instrumentation, bridging the critical gap between abstract mathematical theory and real-world empirical practice.
15.15–15.45	**Snacks break & departure**	

Saturday, 4th July 2026		
10:00–11:15	Bijita Sarma	**The Quantum Revolution: How the Strange Rules of Nature Could Transform Computing** Abstract: Have you ever wondered what comes after the computers and smartphones we use today? Classical computers have changed the world, but there are still massive, complex problems they simply cannot solve - even if they ran for a million years. This is where quantum computing comes in. In this talk, we will journey into the fascinating world of quantum mechanics and discover how scientists are harnessing its unusual laws to build a new kind of computer. We will explore remarkable ideas such as 'superposition', where quantum systems can exist in combinations of multiple possible states, and 'entanglement', - where two particles stay mysteriously linked no matter how far apart they are. We will then see how quantum bits, or 'qubits,' put these strange ideas to work and give quantum machines their superpowers, enabling them to solve certain problems in fundamentally different ways from classical machines. From breaking modern encryption to designing new materials and medicines, quantum computing has the potential to reshape science and technology. Join us to discover how the strangest ideas in physics are inspiring one of the most exciting technological revolutions of the 21st century.
11.15–11.45	**Snacks break**	
11.45–13.00	Rajeeva L Karandikar	**The Secret World of Cryptography: How Mathematics Protects Information** Abstract: The need to send secret messages has existed for thousands of years. Kings and commanders used to devise ways of communicating important instructions so that even if a message was intercepted, an enemy would not be able to understand it. In today's digital world, the challenge is even broader. We not only want to keep information secret, but also need to make sure that a message truly comes from the person who claims to have sent it–for example, when giving instructions to a bank to transfer money from one account to another. How can we achieve such security? The answer lies in a fascinating area of mathematics called cryptography. In this talk, we will explore the basic ideas behind secret codes, encryption, and authentication, and see how simple mathematical principles form the foundation of secure communication in the modern world.

13.0–14.00	**Lunch Break**	
14.0–15.15	Aiswarya Cyriac	**Computability: A Gentle Introduction Through a Toy Example** Abstract: What can-and cannot-be computed? This fundamental question lies at the heart of theoretical computer science. In this talk, we provide a gentle introduction to computability through a simple toy model of computation based on graphs. We define a special class of graphs that compute functions from the natural numbers to the natural numbers. Through a series of hands-on exercises, we construct graphs that compute given functions and, in the process, gain intuition about how this model works. We then explore its limitations by examining functions that cannot be computed by such graphs and discussing the underlying reasons for their non-computability.
15.15–15.45	**Snacks break & departure**	