

Schedule for Summer School, 25-29 May, 2015 at IMSc

1. All classes will be held in Hall 123.
2. On the first day, i.e. 25th May, Registration starts at 9:00 AM outside Hall 123.
3. There will be three lectures daily, each of duration one and half hour each. The precise schedule and title and abstract of the lectures are tabulated below.
4. The lectures on the first four days will be on Mathematics, more specifically on Algebra, Complex Analysis and Topology.
5. On the last day, there will be one talk each on Theoretical Computer Science, Physics and Computational Biology.

Date	9 : 30 AM-11 : 00 AM	11 : 30 AM-1 : 00 PM	2 : 00 PM-3 : 30 PM
25th	Alg. 1	Complan. 1	Top. 1
26th	Alg. 1	Complan. 1	Top. 1
27th	Alg. 2	Complan. 2	Top. 2
28th	Alg. 2	Complan. 2	Top. 2
29th	TCS 1	ComBi. 1	Phys. 1

11 : 00 AM-11 : 30 AM- Coffee Break

1 : 00 PM-2 : 00 PM- Lunch Break

Algebra 1 (Alg. 1)- Speaker- Jyothsna S.

Title- Sylow's Theorems and Applications

Abstract- We will prove Sylow's theorems for finite groups and give a few applications.

Algebra 2 (Alg. 2)- Speaker- Shreedevi K.M.

Title- Finite Fields

Abstract- C. F. Gauss discovered a beautiful formula for the number of irreducible polynomials of a given degree over a finite field. In this series of talks, I will derive this formula. I will also discuss behaviour of roots of irreducible polynomials over finite field.

Complex Analysis 1 (Complan. 1)- Speaker- Senthil K.

Title- Basic Complex Analysis

Abstract- We will define complex analytic (holomorphic) functions and study some of their properties.

Complex Analysis 2 (Complan. 2)- Speaker- Priyamvad Srivastav

Title- Normal families

Abstract- We review some of the basic properties of analytic functions and discuss convergence in the space of analytic functions. We then define normal families and discuss some related results. We use this to give a proof of the Big Picard Theorem.

Topology 1 (Top. 1)- Speaker- Rekha Biswal

Title- Topological Spaces and Bases

Abstract- We introduce the concept of Topological Spaces and the notion of bases of topological spaces.

Topology 2 (Top. 2)- Speaker- Issan Patri

Title- Topological Groups

Abstract- We study groups which have a topology compatible with the group operations. We will combine analysis, topology and group theory to prove some interesting theorems.

Theoretical Computer Science (TCS 1)- Speaker- Ramanathan Thinniyam

Title- Algebraic Automata Theory

Abstract- Deterministic Finite state Automata are a simple kind of computing machine with finite memory.

They are far less powerful than Turing machines. Nevertheless they have rich structure which can be explained using semi group theory. This is an introductory talk on algebraic automata theory in which we discuss some of the central results without going into the proofs in detail.

Computational Biology (ComBi. 1)- Speaker- Ankit Agarwal

Title- Genomics- Past, Present and Future

Abstract- The study of Genomics is an evergreen topic in Biology and other related fields. It is expected to come up with cures for various diseases. We give an introduction to the this fascinating subject.

Physics (Phys. 1)- Speaker- Tanmay Singal

Title- Shor's Factoring Algorithm

Abstract- The RSA cryptosystem is based on the assumption that factorization of large integers is an intractable problem. Belief in said assumption has lead the cryptosystem to underpin various information security protocols which are are said to provide secure communication for various matters, ranging from our daily lives to matters of national importance. In 1994 Peter Shor employed the quantum mechanics to show that a large integer N can be factorized in polynomial time of N , thus exposing the vulnerability of the RSA cryptosystem. This talk will be about Shor's Algorithm.