Zeros of *L*-functions

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Overview

L-functions are the central objects in Number Theory and one of their remarkable properties is to connect Arithmetic with Analysis, for example the distribution of prime numbers with that of the zeros of the Riemann zeta function. These functions were introduced by Dirichlet in 1837 in his proof of infinitude of primes in arithmetic progressions. Several open questions on the zeros of L-functions are still out of reach though the study of the conjectures has led to the development of a fascinating new theory in the last two centuries. In particular, the location of the zeros of *L*-functions and their special values have opened up applications within and outside classical number theory.

The aim of this course is to familiarize students and young researchers with some aspects of the multiplicative theory of Dirichlet *L*-functions. We will assume that the participants are beginners of the subject and therefore spend necessary time on preliminaries. Since this GIAN course is inclusive of the students of various educational levels, the first five hours of the lectures and the first five hours of the tutorials are meant to cover all the necessary basics to bridge the knowledge gap between the less-experienced attendees and the advanced learners and to prepare the students to grasp the essence of the seminal works in the later part of the course. This course can be seen as a precursor of a CIMPA school on Automorphic L-functions to be held at IIT Ropar in 30th June to 11th July 2025.

Modules	**A: Analytic tools and the Prime Number Theorem: 09.06.2025 – 12.06.2025** **B: Siegel zeros and Average Goldbach Conjecture: 13.06.2025 – 20.06.2025** **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ You are a student (BSc/ BS-MS/ BTech/ MSc/ MTech/ IPhD/ PhD) and you are curious about the recent developments in Analytic Number Theory ▪ A post doc or a faculty member in an academic or technical institution, interested in learning about the contemporary research and development on the Average Goldbach Problem, its connection with the existence of Siegel Zeros and the further research directions in this area.
Fees	The participation fees for taking the course is as follows: **Faculty and Scientists from Academic Institutions: Rs.5000/-** **Participants from Industry/Consultancy Firms: Rs. 7,500/-** **Students (BSc/ BS-MS/ BTech/ MSc/ MTech/ IPhD/ PhD): Rs. 2000/-** **Participants from abroad: US$ 500** The above fee includes all instructional materials, computer use for tutorials and assignments, 24 hr free internet facility, lunch and refreshments. The participants will be provided with accommodation on payment basis provided the participants inform @ iro.office@iiserkol.ac.in at least fourteen days prior to the start of the program.

The Faculty Members

Prof. Gautami Bhowmik is a Professor of Mathematics at Laboratoire Paul Painlevé, Université de Lille. Her research interests ranges over various topic in Analytic and Additive Number theory, viz. bounds on Siegel zeros, Goldbach representations, moments of *L*-functions, zero-sum free sequences and estimation of Davenport's constant for groups.

Dr. Soumya Bhattacharya is an Associate Professor at the Dept. of Mathematics and Statistics of the Indian Institute of Science Education and Research (IISER) Kolkata. His research interests lie in Analytic and Probabilistic Number Theory, Sieve Methods and Modular Forms.

Course Co-coordinator

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Registration link:
https://docs.google.com/forms/d/e/1FAIpQLScNfhCVDfUzXEK2QblFIl3y-JyrEt8v42OBcMjbwuMq94-3MQ/viewform?usp=header

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