



Module PMRF-ISSS080/2023

# Real Analysis

## Name of the PMRF student

Piyush Lalitkumar Tiwary

## Required background of the students taught

- Undergraduate in any Discipline
- Undergraduate level mathematical concepts and basic intuitions are enough.



## Details of the content of the module

- Module 1:** Construction and Properties of Rational Numbers, Construction of Real Line, Countability, Principle of Induction, Cantor Diagonalization
- Module 2:** Metric Spaces, Open and Closed Sets, Compact Sets, Relation between – open and closed sets, compact and closed sets, Heine-Borel Theorem, Connected Sets, Cantor Sets
- Module 3:** Sequences, Convergence of Sequences, Subsequences, Cauchy Sequences, Complete Spaces
- Module 4:** Series, Relation between Series and Sequences, Series Convergence Tests
- Module 5:** Functions – limits and continuity, Continuous Functions, Uniform Continuity, Discontinuous Functions, Derivatives, Mean-Value Theorem
- Module 6 (Optional):** Taylor's Theorem, Ordinal Numbers, Transfinite Induction

## Schedule of the module

**Start Date:** Jan 09, 2024

### Details of the Content of the Module

Live lectures will be conducted (or recorded lectures uploaded) on Tuesdays and Thursdays from 11:00 AM to 01:00 PM (25 Lectures)

**End Date:** Tentatively by April 16, 2024

**Total Lecture Hours:** 50 (approx.)

Meeting link : Will be shared later

[Link](#)

Contact email ID: [issf.forum@gmail.com](mailto:issf.forum@gmail.com)

Registration link:

<https://forms.gle/4DJmTy91aF7igpMJ8>