Semester	AUG 2022
Open to semester	13,21
Course code	**MT6144**
Course title	**Analysis - I**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Kaneenika Sinha
Nature of Course	Lectures
Pre-requisites	-
Objectives (goals, type of students for whom useful, outcome etc)	The purpose of the course is to introduce PhD students to fundamental notions in analysis (measure theory, functional analysis and complex analysis).
Course contents (details of topics /sections with no. of lectures for each)	Abstract measures and integration, monotone and dominated convergence theorems, product measures, theorems of Fubini and Tonelli, integration in polar coordinates. (12 - 15 lectures) Bounded linear maps on Banach spaces, Hahn-Banach extension theorem, dual spaces, Riesz representation theorems for L_p(X) and C_c(X). (7 - 10 lectures) Hilbert spaces, complete orthonormal systems, fourier expansion, Parseval's theorem, compact operators and the spectral theorem for compact self-adjoint operators. (10 lectures) Holomorphic functions, Cauchy’s integral formula and power series representation, Morera’s theorem, Schwarz reflection principle. Zeros and singularities, the residue formula, the argument principle and applications: Rouche’s theorem, open mapping theorem, maximum modulus theorem. Schwarz lemma, the automorphisms of the disc and the upper half plane. (7 lectures)
Evaluation /assessment	End-Sem Examination-50% Mid-Sem Examination-50% Others-%

Suggested readings (with full list of authors, publisher, year, edn etc.)	1. E.M. Stein and R. Shakarchi: Real analysis 2. E.M. Stein and R. Shakarchi: Functional analysis 3. E.M. Stein and R. Shakarchi: Complex analysis 4. W. Rudin: Real and complex analysis