

Syllabus:

Real analysis (RA): Real numbers. Sequences and series of real numbers (Cauchy sequences, Heine-Borel, Bolzano-Weierstrass). Continuity and uniform continuity. Integration. Differentiation.

Linear algebra (LA): Finite dimensional vector spaces over real or complex fields. Dual space, linear transformations. Determinant, characteristic polynomial, Eigenvalues and eigenvectors. Spectral theorem for self-adjoint linear operators. If possible, some 'real-world' uses of matrices will be discussed.

Multivariable calculus (MC): The derivative in higher dimensions. Gradient, divergence, curl, etc. Greens' theorem and Stoke's theorem (without the use of forms, more intuitive approach). Inverse function theorem.

