LIST OF ELECTIVES

ELECTIVE A: MATHEMATICS

MA2010: COMPLEX VARIABLES

Course Content:

Analytic functions: Limits and continuity, differentiability and analyticity, analytic branches of inverse of functions, branches of logarithm, Cauchy-Riemann equations, harmonic conjugates. Complex integral: Cauchy's theorem and integral formula, series of complex functions and the Weierstrass M-test, Taylor series, identity theorem, isolation of zeros of an analytic function, statements of open mapping, inverse function, Liouville's theorem, fundamental theorem of Algebra. Residue Calculus: Singularities and their classification, Laurent series, residue theorem and argument principle, computing real integrals using residues. Bilinear transformation: Bilinear transformation, conformal mapping, elementary properties of the mapping of exponential, sine and cosine functions. Complex integrals: Line integral, Cauchy's integral theorem and integral formula, Taylor and laurent series, Residue theorem and applications, Bilinear transformations. Transforms: Fourier transformations Fourier transforms (exp, sin, cos), Laplace transforms inversion integrals, Convolutions, Applications.

Text Books:

1. **E. Kreyszig**, Advanced Engineering Mathematics, 10th Ed., John Willey & Sons, 2010.

Reference Books:

1. **R.V Churchill & J.W. Brown:** Complex Variables and Applications, Mc-Graw Hill, 1990.
2. **S. Ponnusamy and H. Silverman**, Complex Variables with Applications, Birkhauser, 2006.

Prerequisite:

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