Mathematics – 3   (4 Credits)

Module 1:

Probability Theory. Combinatorial analysis, counting. Axioms of probability theory. Conditional probability, independence. Random Variables: Discrete – expected value, variance – Binomial random variable, Poisson random variable, geometric random variable. Continuous random variables – Expected value, variance, uniform, Normal (Gaussian) random variables, Gamma distribution, Beta distribution. Function of a random variable.

Module 2:

Jointly distributed random variables, conditional distributions. Limit theorems – Law of large numbers, central limit theorem.

Complex Analysis. Complex numbers – Set theory – Reimann Sphere -- Complex functions – Analytic functions, curves, contours, connected domains. Mobius transformation.

Module 3:

Complex integrations – independence of path – Deformation theorem, Cauchy's Integral formula – The fundamental theorem of algebra – Sequences and series – Power series – Taylor's series – Laurent's series.

Books:

A First Course In Probability, Sheldon Ross.

Introduction to Probability Models, Sheldon Ross.

Introduction to Probability, Dimitri P. Bertsekas and John N. Tsitsiklis, MIT Lecture notes.

An Introduction to Complex Analysis, Ravi P. Agarwal, Kanishka Perera, Sandra Pinelas.

Complex Analysis, Stein, Shakarchi.

 Visual Complex Analysis. Tristan Needham.

Theory of complex functions. Reinhold Remmert.