Subject Code : P8AP2

CORE COURSE – II APPLIED MATHEMATICS

Unit – I Complex Analysis

Function of complex variables – Analyticity and singularity of functions – Cauchy-Reimann condition – Polar form – Line integral and Cauchy's integral theorem – Cauchy's integral formula for the nth derivative – Liouvilles theorem – Taylors and Laurent's theorem – Cauchy Residue theorem – Application to trigonometric function.

Unit – II Fourier Series and Fourier Transform

Fourier series: Determination of Fourier coefficient – Fourier series of periodic functions – Half range series – Fourier cosine and Fourier sine series – Applications.

Fourier Transform: Fourier transforms – Fourier cosine and sine transforms – Properties – Applications – Heat equation (one-dimension).

Unit – III Laplace transform

Properties of Laplace transform – Inverse Laplace transforms – Laplace transform derivatives – Convolution theorem – Solution of linear ordinary differential equations, simultaneous equations and electrical circuits – Introduction to Z-transform.

Unit – IV Differential equations

First order ordinary differential equation – Existence and Uniqueness theorem 0-Systems of linear order differential equation – Linear ordinary differential equation of higher order with constant and variable coefficients – Application to LCR circuits – Introduction to partial differential equations.

Unit – V Error analysis

Types of error – systematic and random errors – Accuracy and precision – Significant figures and round-off – Uncertainties and probable error - Random variable – Mean, variance and standard deviation – Normal distribution – sampling technique – propagation of errors – Estimates of mean and errors – Instrumental uncertainties – statistical fluctuations – Chi square test – Goodness of fit.

Books for study

1. Ervin Kreyszig, Advanced Engineering Mathematics, John - Wiley & Sons Ltd., New Delhi (2001). (Units – I, II, III and IV).
2. B. C. Nakra and K. K. Chaudry, Instrumentation, Measurement and Analysis, Tata Mcraw Hill Ltd, New Delhi (Unit-V).

Books for reference

1. L. A. Pipes and L. R. Harvil, Applied Mathematics for Engineers and Physicists, Mc Graw Hill Company, Singapore, 1967.
2. H. K. Dass, Advanced Engineering Mathematics, S. Chand & Co., New Delhi (1998).