



Module	Contents of the Module	Hours	CO's
1	<b>Linear Algebra &amp; Graph Theory</b> <b>Linear Algebra:</b> Vector space, Linear dependence, Dimension & basis, Linear transformations, Matrix representation of linear transformation. Definition, Types of graph, Circuits, Hamilton graph, Matrix representation, Application Problems	08	CO1
2	<b>Complex Variable</b> Basic definitions, Elementary function, Analytic function, Cauchy-Riemann equations in Cartesian and polar coordinates, Analyticity of given function, Harmonic function, Construction of analytic functions (with application problem), Milne-Thompson method, Application Problems	08	CO2
3	<b>Probability Distributions</b> Types of variables, Probability mass & density function, Expectation or Mean & variance of random and continuous variable, Probability Distribution: Geometric distribution, Poisson distribution, Exponential and Normal distributions, Application Problems	08	CO3
4	<b>Sampling Distribution</b> Sampling, sampling distribution, central limit theorem, Sampling with & without replacement, Confidence limits for means, Student's t distribution, Chi-Square distribution as a test of goodness of fit, Application Problems	08	CO4
5	<b>Joint Probability Distribution &amp; Markov Chains</b> Concept of joint probability, joint probability distribution, Expectation, variance, covariance and correlation, Stochastic or random processes, Transition and Regular stochastic matrix, Markov chain, Transition probabilities matrix, Higher transition probabilities. Application Problems	08	CO5, CO6

#### Text Books:

1. B.S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, 43<sup>rd</sup> Edition, 2014 June, ISBN: 9788174091956.
2. Erwin Kreyszig; Advanced Engineering Mathematics; John Wiley & Sons, 9<sup>th</sup> Edition, 2007, ISBN: 9788126531356.
3. Gilbert Strang, Linear Algebra and its Applications, 4<sup>th</sup> edition, Cengage Publishers, 2014, ISBN: 9788131501726,

#### References:

1. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill, 2006; ISBN: 9780070634190.
2. M. K. Jain, S. R. K. Iyengar and R. K. Jain "Numerical Methods: For Scientific and Engineering Computation", New Age International Publications, 6<sup>th</sup> Edition, 2012, ISBN: 9788122433234.
3. Murray Spiegel, Schaum's Outline of "Advanced Mathematics for Engineers and Scientists" McGraw-Hill, 1971; ISBN: 9780070602168.
4. Schaum's Outline: Introduction to Probability and Statistics, McGraw Hill Education (India) Private Limited (1 September 2005); ISBN-13: 978-0070605015.
5. David C Lay, "Linear Algebra and Application", Pearson Education, ISBN-9788177583335

**Self-study component:**

**Unit 1: Inner product space**

**Unit 2: Cauchy's Integral formula and Cauchy's theorem**

**Unit 3: Binomial distribution**

**Unit 4: Hypothesis testing for proportions and difference of means**

**Unit 5: Markov chain**