Generic Course of Mathematics for BCA Honours Students.

Semester I (Five Lectures per week + one Tutorial)

GE-1: Calculus

UNIT – 1: Differential Calculus

Successive differentiation, Leibritiz Theorem, Taylors theorem with Lagranges forms of remainders, Expansion of a function of one variable in Taylors and Meclanrin's infinite series. Maxima and Minima of one variable, partial Derivatives, Euler's theorem, change of variables, total differentiation, Errors and approximation.

UNIT – 2: Integral Calculus

Definite integral and its application for area, length and volume.Multiple integrals. Change of order of integration. Transformation of integral from Cartesian to polar. Applications in areas, volume and surfaces.

UNIT – 3: Differential Equation

First degree and first order Differential equation : Higher order differential equation with constant coefficients.

TEST BOOKS:

1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers.
 2. Das BC and Mukherjee, Lalji Prasad, Integral Calculus, Calcutta, U.N. Dhar Publishers.
 3. Grewal B.S., Higher Engineering Mathematics, Delhi Khanna Publishers.
4. Lalji Prasad, Integral Calculus And Differential Equation. Paramount publications.

Semester II (Five Lectures per week + one Tutorial)

GE-2: Algebra

Unit 1: ABSTRACT ALGEBRA

Group, Subgroups, Ring, Integral Domain, Field and Introduction of Boolean Algebra.

Unit 2: LINEAR ALGEBRA

Spaces and Subspaces, Basic and Dimension of Vector Spaces, Linear Transformation, Their Nullity and Rank.

Unit 3: MATRIX ALGEBRA

Elementary Transformation, Inverse of a Matrix by Row Operation, Rank, Solution of a System of Linear Simultaneous Equation by Matrix Methods, Eigen Values and Eigen Vectors, Quadratic Forms.

TEXT BOOKS:

1. "Modern Algebra" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd Meerut.
2. "Matrices" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd Meerut.
3. "Advanced Course in Modern Algebra" By Prof Dr.K.K.Jha, New Bharat Prakashan Delhi- 6.

Semester III (Five Lectures per week + one Tutorial)

GE-3: Probability and Statistics

Unit 1

Probability Introduction, Events & Different Types of Events, Addition & Multiplication Law, Conditional Probability, Bay's Theorem. Probability Distribution Random Variables, Probability Function, Binomial Poison & Normal Distribution.

Unit2

Statistics & Measures of Central Tendency Definition, Function & Scope of Statistics. Arithmetic Mean, Weighted A.M., Median, Mode, Geometric & Harmonic Mean and Their Merits & Demerits. Measures of Variation: Range, The Interquartile Range or Quartile Deviation, Average (Mean), Deviation Standard Deviation, Coefficient of Variation, Skew ness, Moments &Kurtosis.

Unit 3

Correlation Analysis: Introduction, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient. Regression Analysis: Difference between Correlation & Regression, Regression Lines, Regression Equations, Regressions Coefficient.

Text Books

1. S.P. Gupta & M.P. Gupta, "Business Statistics", Sultan Chand & Sons.
2. S.C. Gupta & V.K. Kapoor ,"Fundamental of Mathematical Statistics", Sultan Chand & Sons.

Semester IV (Five Lectures per week + one Tutorial)

GE-4: Elements of Analysis

Unit 1

Finite and infinite sets examples of countable and uncountable sets. Real line; absolute value bounded sets suprema and infima, statement of order Completeness property of R, Archimedean property of R, intervals.

Unit 2
Real sequences, Convergence, sum and product of convergent sequences, proof of convergence of some simple sequences such as $(-1)^n/n$, $1/n^2$, $(1+1/n)^n$, xn with $|x|<1$, a_n/n, where an is a bounded sequence. Concept of cluster points and statement of Bolzano Weierstrass' theorem. Statement and illustration of Cauchy convergence criterion for sequences. Cauchy's theorem on limits, monotone sequences and their convergence.

Unit 3
Definition and a necessary condition for convergence of an infinite series. Cauchy convergence criterion for series, positive term series, geometric series, comparison test, limit comparison test, convergence of
p-series, Root test, Ratio test, alternating series, Leibnitz's test. Definition and examples of absolute and conditional convergence.

REFERNCES:

1. R.G. Bartle and D.R. Sherbert: Introduction to Real Analysis, John Wiley and Sons (Asia) Pte. Ltd., 2000.
2. C. P. Simon and L. Blume: Mathematics for Economists, W W Norton and Company, 1994.
3. K. Sydsaeter and P.J. Hammod, Mathematics for Economics Analysis, Pearson Education, 2002.
4. Lalji Prasad, Real Analysis, Paramount Publications.