



Syllabus of COEP Tech Ph.D. Research Program Eligibility Test (COEP Tech's RPET)

2022-23

Research Methodology and Engineering (Marks 100)

1. Research Design: concept and importance in research. Features of a good research design, exploratory research design, concept, types and uses, descriptive research designs: concept, types and uses, experimental design: concept of independent and dependent variables.
2. Sampling: Concepts of statistical population, sample, sampling frame, sampling error, sample size, Non response, characteristics of a good sample, probability sample, simple random sample, systematic sample, stratified random sample and multi stage sampling, determining size of the sample-practical considerations in sampling and sample size.
3. Probability: Sample space, Classical definition of probability and Axiomatic approach of probability, Addition theorem on probability, Conditional probability, Multiplication theorem on probability and Baye's theorem, Binomial, Poisson and Normal distributions Data Analysis:
4. Statistics: Measures of central tendency – Mean, Median and Mode, Measures of dispersion - Mean deviation, Standard deviation, Moments, Skewness and Kurtosis, Correlation and Regression
5. Data Preparation –Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis –Cross tabulations and Chi square test including testing hypothesis of association, Analysis of Variance (ANOVA)
6. Matrices: Definition of a matrix, types of matrices, Algebra of matrices, Inverse of a matrix by Adjoint method and by Elementary transformation, Rank of a matrix, Solution of system of Linear homogeneous and non-homogeneous equations, Eigen values, Eigen vectors
7. Computer Fundamentals: 'C' Programming Language, System software, Application software, Operating Systems, Basics of Internet, Browsers, Search Engines.

Reference Books:

1. Ronald E, Walpole, Sharon L. Myers, Keying Ye, Probability and Statistics for Engineers and Scientists (8th Edition), Pearson Prentice Hall, 2007
2. Erwin Kreyszig, Advanced Engineering Mathematics (10th Edition) Wiley eastern Ltd.
3. Research Methodology, C.R. Kothari, New Age International Publishers. India
4. Statistical Methods, S.P. Gupta, S. Chand Publication, Delhi.