

Syllabus for the written examination in
Statistics
for admission to the Ph.D. programme

Probability: (40% weightage)

Classical, relative frequency and axiomatic definitions of probability, conditional probability, Bayes' theorem, independent events; Random variables and probability distributions, moments and moment generating functions, quantiles; Standard discrete and continuous univariate distributions; Probability inequalities (Chebyshev, Markov, Jensen); Function of a random variable; Jointly distributed random variables, marginal and conditional distributions, product moments, joint moment generating functions, independence of random variables; Transformations of random variables, sampling distributions, distribution of order statistics and range; Characteristic functions; Modes of convergence; Weak and strong laws of large numbers; Central limit theorem for independent and identically distributed random variables with existence of higher order moments.

Inference: (40% weightage)

Unbiasedness, consistency, sufficiency, completeness, uniformly minimum variance unbiased estimation, method of moments and maximum likelihood estimations; Tests of hypotheses, power, types of errors, most powerful and uniformly most powerful tests, likelihood ratio tests.

Regression Analysis: (20% weightage)

Simple and multiple linear regression, estimation, confidence intervals and testing for regression coefficients.