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CUET- PG STATISTICS Syllabus (PGQP29)

SEQUENCES AND SERIES:

- Convergence of sequences of real numbers, Comparison, root and ratio tests for convergence of series of real numbers.

DIFFERENTIAL CALCULUS:

- Limits, continuity and differentiability of functions of one and two variables. Rolle's Theorem, mean value theorems, Taylor's theorem, indeterminate forms, maxima and minima of functions of one and two variables.

INTEGRAL CALCULUS:

- Fundamental theorems of integral calculus. Double and triple integrals, applications of definite integrals, arc lengths, areas and volumes.

MATRICES:

- Rank, inverse of a matrix. Systems of linear equations. Linear transformations, eigenvalues and eigenvectors. Cayley-Hamilton theorem, symmetric, skew-symmetric and orthogonal matrices.

DIFFERENTIAL EQUATIONS:

- Ordinary differential equations of the first order of the form $y' = f(x,y)$. Linear differential equations of the second order with constant coefficients.

DESCRIPTIVE STATISTICS & PROBABILITY:

- Measure of Central tendency, Measure of dispension, skewness and Kurtosis, Elementary analysis of data. Axiomatic definition of probability and properties, conditional probability, multiplication rule. Theorem of total probability. Bayes' theorem and independence of events.

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RANDOM VARIABLES:

- Probability mass function, probability density function and cumulative distribution functions, distribution of a function of a random variable. Mathematical expectation, moments and moment generating function. Chebyshev's inequality.

STANDARD DISTRIBUTIONS:

- Binomial, negative binomial, geometric, Poisson, hyper-geometric, uniform, exponential, gamma, beta and normal distributions. Poisson and normal approximations of a binomial distribution. Chi-square distribution, t-distribution and F-distribution.

JOINT DISTRIBUTIONS:

- Joint, marginal and conditional distributions. Distribution of functions of random variables. Product moments, correlation, simple linear regression. Independence of random variables Limit Theorems: Weak law of large numbers. Central limit theorem (i.i.d.with finite variance case only).

ESTIMATION:

- Unbiasedness, consistency and efficiency of estimators, method of moments and method of maximum likelihood. Sufficiency, factorization theorem. Completeness, Rao-Blackwell and Lehmann-Scheffe theorems, uniformly minimum variance unbiased estimators. Rao-Cramer inequality. Confidence intervals for the parameters of univariate normal, two independent normals, and one parameter exponential distributions.

TESTING OF HYPOTHESES:

- Basic concepts, applications of Neyman Pearson Lemma for testing simple and composite hypotheses. Likelihood ratio tests.

SAMPLING & DESIGNS OF EXPERIMENTS:

- Simple random sampling, stratified sampling and Cluster sampling, One-way, two-way analysis of variance. CRD, RBD, LSD and 2^2 and 2^3 factorial experiments.

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