Syllabus for the Ph.D. exam in

Applied Statistics

Choose two of the following three areas for examination:

1. **Sampling From Finite Populations.**
2. **Categorical Data Analysis.**
3. **Design of Experiments.**

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**Sampling From Finite Populations**


Topics:

1. Simple random sampling. Chapters 2 through 4 (except Sections 4.10, 4.11).
5. Systematic sampling. Chapter 8. Sections 8.1 through 8.6 and 8.8, 8.9, 8.11.
Syllabus for Preliminary Examination in Experimental Design

Linear models, Gauss-Markov Theorem, Cochran’s Theorem, Distribution of quadratic forms, Permutation tests, Multiple comparisons procedures (Scheffé’s and Tukey’s tests), Analysis of covariance, Use of covariance for missing values. Fixed, random, mixed effects models, Single-factor and Two-factor designs with and without interaction, Complete and crossed and nested multiple-factor designs, Latin squares, Factors with two or three levels, Confounding. Fractions of factorial designs, Resolution classes, Orthogonal contrasts, Orthogonal polynomials, Efficiency and relative efficiency of two designs, Approximate F-tests.

Principal Reference: Statistical Design and Analysis of Experiments, Peter W.M. John (MacMillan 1971). Chapters 1, 2, 3, 4 (except 4.9), 5 (sections 5.1 - 5.6), 6, 7, 8.


Analysis of Variance, Henry Scheffé (Wiley, 1959). Chapters 3 (Sections 3.4 - 3.8, only material relevant to S-method and T-method), 7, 8, 9 (Sections 9.1, 9.3), 10 (Sections 10.1, 10.2, 10.4).