

MATH 567A. COURSE DESCRIPTION (Spring 2008). TTR 2:00-3:15 p.m. (OPTI 432)

The course aims at developing optimal statistical methodologies for estimation and testing of hypotheses. Although the emphasis here is on parametric models, nonparametric and semiparametric methods are also introduced.

TOPICS. *1. Sampling techniques:* simple random sampling and stratified random sampling. *2. Decision theoretic framework:* comparison of risks; admissibility; minimax procedures. *3. Methods of estimation:* Bayes estimators and their optimality; M-estimators (m.l.e., method of moments, etc.); Cramer-Rao information inequality and asymptotic efficiency; sufficient statistics and uniformly minimum variance unbiased estimators. *4. Testing of hypotheses:* generalized Neyman-Pearson Lemma; uniformly most powerful (unbiased) tests (i) against one-sided alternatives, (ii) against two-sided alternatives, (iii) against one- or two-sided alternatives, in the presence of nuisance parameters. *5. General linear models:* optimal invariant tests in GLM with applications to (i) regression and (ii) the comparison of treatments in one-way and two-way layout (analysis of variance). *6. Some examples of semiparametric models.* *7. Non-parametric tests:* one-sample sign test and two-sample Wilcoxon-Mann-Whitney test, and their asymptotic efficiencies.

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TEXT: Mathematical Statistics : Lecture Notes. (By the Instructor)