

## STA 5327 – Statistical Inference (Spring 2010)

**Lectures:** Tuesday and Thursday 11:00–12:15 in HCB 207

**Instructor:** Fred W. Huffer

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Office Hours: Tuesday and Thursday 12:15–1:15 (or by appointment)

**Required Textbook:** *Statistical Inference* (Second edition) by Casella and Berger.

**Prerequisites:** Distribution Theory (STA 5326) or equivalent background in probability, and some exposure to statistical methods.

### Syllabus:

- Sufficient statistics and the factorization criterion.
- Complete statistics.
- Exponential families.
- Ancillary statistics, Basu's Lemma, invariance.
- Methods of estimation: frequency substitution, empirical estimates, method of moments, least squares, maximum likelihood, Bayes estimates.
- Bayesian models and examples using conjugate priors.
- Estimation criteria: unbiasedness and mean squared error.
- Uniformly minimum variance unbiased estimates.
- Fisher information and the information inequality. The multi-parameter case.
- Large sample theory: consistency, asymptotic normality, and asymptotic efficiency. Asymptotic behavior of MLE's. The  $\delta$ -method.
- Introduction to hypothesis testing. The Neyman-Pearson lemma. Uniformly most powerful tests. Likelihood ratio tests.

**Grading:** Your grade will be based on two (or three) exams given in class. The exams are equally weighted. They are **not** cumulative (except in the sense that the material is naturally cumulative). The grade cutoffs are 90.0% for the lowest A–, 80.0% for the lowest B–, and 70.0% for the lowest C–. However, these grade cutoffs may be adjusted *downward* at my discretion.

**Lecture Notes and Old Exams** are posted at:

<http://stat.fsu.edu/~huffer/mordor/5327>

This address must be typed completely; you cannot get there by clicking on a series of links. The posted files are pdf files and require Acrobat Reader to read and print them.

**Assignments:** There will be assigned homework exercises. Solutions to the exercises will be provided. The homework will *not* be collected, but tests will strongly emphasize the homework material.

### **Reading Assignment**

- Reading: Chapter 6 through p. 292 (stop at Section 6.3.2).
- Exercises: 3.29, 3.30, 3.32 (and from chapter 6) 1-7, 9, 10, 13-24, 25(bcd), 30, 40.