

University of Nevada, Las Vegas
Department of Mathematical Sciences
STA765 Statistical Decision Theory

SYLLABUS (Fall 2009)

Instructor: Hokwon A. Cho, Ph.D., Associate Professor, CDC-1008, Office: 895-0393, e-mail: cho@unlv.nevada.edu.

Class Time and Location: Tue. and Thu., 8:30 a.m.-9:45 a.m., CBC-118.

Office Hours: Tue. and Thu., 11:00 a.m.-Noon and 2:00 p.m.-3:30 p.m. or by appointment.

Textbook: *Statistical Decision Theory and Bayesian Analysis*, 2nd Edition by James Berger. Springer-Verlag.

Scope of the Course:

This is a mathematical statistics course in which statistical concepts and procedures are developed and examined from the point of view of *game theory*, *optimization* and *decision theory*. We explore an overview of fundamental ideas and results about statistical (and rational) decision-making under uncertainty. Hence, the course includes classical approaches, Bayesian methods and recent developments, sequential methods, and further developed methodologies such as Ranking and Selection.

The major topics will be covered are:

1. *Preliminaries & Decision Theory* - Loss, Risk, Information, Decision rules/functions, Utility function, Completeness (Sufficiency), Invariance, Convexity, Admissibility, Minimax.
2. *Bayesian Methods* - Elicitation of subjective probabilities, Priors and posteriors, Predictive distribution, Bayes rules/estimators, Bayesian testing, Empirical Bayes, Criticism.
3. *Sequential Analysis* - Sequential probability ratio test (SPRT), Bayesian sequential analysis.
4. *Multiple Decision Theory* - Ranking and Selection. (If time is permitted.)

Homework: There will be weekly assignments given in class and expected to turn in on time. Some of them will be discussed in class.

Exams: Two midterm exams will be most likely on 5th and 10th week. The final exam is scheduled on Thursday, December 10, from 8:00 a.m. to 10:00 a.m.

Grading: The course grade will be based on a weighted average of standardized scores from (1) homework assignments = 20% (2) two mid-semester exams = 25% each, and (3) a final exam = 30%.

Grade Scale: A-A⁻: 85% or above, B⁺-B: 75% or above, C⁺-C: 65% or above, D⁺-D: 55% or above, F: Below 55%.

Notes: (1) No make-up tests will be given at any case except a pre-arrangement by the instructor. The above schedule or contents may be changed without notice. (2) Holiday observance: Labor Day: Mon., Sep. 7, Veteran's Day: Wed. Nov. 11, Thanksgiving Day: Thu., Nov. 26 - Fri., Nov. 27.

NOTE: STATEMENT FROM THE LEARNING ENHANCEMENT SERVICES

Learning Enhancement Services (LES) houses Disability Services, Tutoring Services, and Learning Strategies. If you have a documented disability that may require assistance, you will need to contact LES for coordination in your academic accommodations. LES is located in the Reynolds Student Services Complex, suite 137. The phone is 702-895-0866, or TDD 702-895-0652. You may also visit our website at www.unlv.edu/studentlife/les.