

STATISTICS 432/512 SYLLABUS - Spring 2008

Dr W J Ewens

Textbook

“Introduction to Mathematical Statistics”, by R.V. Hogg, J. W. McKean and A. T. Craig, sixth edition, (Prentice Hall, 2005). References to this book (as HMC) are given below against each topic covered in the course. It will be assumed that the material covered in HMC chapters 1 - 3 is known. It will however be reviewed in the first few lectures of the course.

The basic aim of the course is to give an introduction to statistical theory. Topics covered will include estimation theory, including in particular the desirable properties of estimators and how these can be met, as well as the concepts of sufficient statistics and maximum likelihood estimation, confidence intervals, hypothesis testing theory and the various methods of hypothesis testing, sequential hypothesis testing and distribution-free methods of hypothesis testing, and tests involving linear models.

Class hours, office hours, course requirements and other information will be provided in a separate handout.

TOPIC	HMC
Review of probability theory.	Chapters 1 - 3
Desirable properties of estimators	4.1
The likelihood function and maximum likelihood estimation.	6.1 - 6.5
The Cramer-Rao inequality.	6.2
Concepts of efficiency, consistency, sufficiency. The Rao-Blackwell theorem. Criteria for sufficiency.	7.1 - 7.9
Concepts of hypothesis testing.	5.5 - 5.6
Neyman-Pearson theory and likelihood ratio tests. Applications.	6.3, 8.1 - 8.3
Sequential tests.	8.4
Distribution –free (non-parametric) tests.	10.1 -10.4
Bayesian methods.	11.1 - 11.
Hypothesis testing for linear models.	12.5