Department of Statistics and Actuarial Science
The University of Hong Kong

STAT 3902: Statistical Models (Fall Semester)

Lecturer: Dr. Jinfeng Xu Room 228
Tutors: Mr. Harrison Cheung Room 234

Lecture Hours:
Tuesday LE2 1:30pm - 4:20pm

1. Course Aim

This course is on the basis of "STAT1801 *Probability and Statistics: Foundation of Actuarial Science*.'' It will further study the concepts and methods of statistics. The course will lay emphasis on the estimation and hypothesis testing, the two major areas of statistical inference. Through the study of this course, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of data.

2. Syllabus or Course Contents

Distribution and density of function of random variables, order statistics, central limit theorem; Maximum likelihood estimator (MLE), moment estimator, Bayesian estimator, properties of estimators, limiting properties of MLE; Confidence interval estimations for normal mean, the difference of two normal means, normal variance, the ratio of two normal variances, and large-sample confidence intervals; Power function, Neyman-Pearson Lemma, likelihood ratio test, and goodness of fit test.

3. Learning Objectives and Outcomes

On successful completion of the course, students should be able to:

- understand the importance of sufficient statistic(s) in data reduction and statistical inferences such as point estimation, confidence interval estimation, and testing hypothesis;
- derive maximum likelihood estimators of parameters to calculate maximum likelihood estimates;
- locate pivotal quantity to construct confidence intervals of parameters;
- find testing statistic to test hypotheses associated with one-sample and/or two-sample normal distributions with small sample sizes and non-normal distributions with large sample sizes.

4. Teaching Hours

The course consists of 36 lectures and 12 tutorials/example classes.

5. Assessment

The assessment consists of five assignments (15%), a 1.5 hours written midterm test (10%) and a three-hour written examination (75%). Partially or wholly copied assignments will be penalized and/or reported as plagiarism. For HKU's plagiarism, please go to http://www.hku.hk/plagiarism

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4
- Assignment 5

6. Department's policy on absence from midterm/class test

If for any reason you are or have been unable to attend a mid-term/class test, and if you wish to have a supplementary mid-term/class test,

(a) all **full-time** students (including **MStat** students) should write to the General Office of the Department of Statistics and Actuarial Science giving reasons for your absence;

(b) all **part-time** students should write to the course instructor giving reasons for your absence,

within **7 days** of the absence.

A special/supplementary test is normally granted to those absent from the original test due to illness and with original medical certificate provided. Students absent due to other reasons are not granted a special/supplementary test unless with very special circumstances and with valid documental proofs provided.

7. Main References

[1] Miller, I. and Miller, M. (2004). **John E. Freund's Mathematical Statistics with Applications (7th Edition).** Prentice-Hall, New Jersey.

[2] Hogg, R. V., McKean, J. W. and Craig, A. T. (2014). **Introduction to Mathematical Statistics (7th Edition**). Pearson Education Limited.

[3] Arnold, S.F. (1990). **Mathematical Statistics**. Prentice Hall, New Jersey.

[4] Casella G. and Berger, R. L. (2002). **Statistical Inference (Second Edition).** Duxbury Advanced Series.

[5] Rice, J. A. (2007). **Mathematical Statistics and Data Analysis (Third Edition).** Duxbury Advanced Series.