



UNSWSCIENCE

School of Maths and Statistics

Course outline

MATH5905

Statistical Inference

Term 1, 2023



## Course Aims

The aim of the course is to introduce the main ideas and principles behind the parametric and nonparametric inference procedures. Both frequentist and Bayesian perspective will be discussed. Estimation, confidence set construction and hypothesis testing are discussed within decision theoretic framework. Both finite sample optimality and asymptotic optimality will be defined and discussed.

Computationally intensive methods such as bootstrap are discussed and are compared to asymptotic approximations such as Edgeworth expansions and saddle point method. Students will learn how to determine appropriate inference procedure and to draw inferences using the chosen procedure. Time permitting, applications in Statistical Financial Engineering will shortly be discussed.

## Course Description

This course presents General inference theory based on maximum likelihood and on Bayes methods is reviewed. Estimation, confidence set construction and hypothesis testing are discussed within decision -theoretic framework. Computationally intensive methods such as bootstrap are discussed and are compared to asymptotic approximations such as saddle point and empiricd

4. Demonstrate mastery of the parametric and non-parametric delta

- Wasserman, L., All of Nonparametric Statistics. Springer (2006).
- DasGupta, A. Asymptotic Theory of Statistics and Probability. Springer (2008).

From the textbooks, the recommended text by Casella and Berger (2001) will be most useful. The remaining texts complement the lecture notes and cover different aspects of the course. Lecture notes will be provided regularly, before the start of each week.

The books of Young and Smith (2005) and A.W. van der Vaart (1998) are a bit more advanced but contain important material and will be used for some more specialized topics. The textbook DasGupta, A. (2008) is an encyclopaedic book covering both classical and modern topics of inference. It also contains many examples.

## Moodle

Log in to Moodle to find announcements, general information, notes, lecture slide, classroom tutorial and assessments etc.

The UNSW Student Code provides a framework for the standard of conduct expected of UNSW students with respect to their academic integrity and behaviour. It outlines the primary obligations of students and directs staff and students to the Code and related procedures.

In addition, it is important that students understand that it is not permissible to buy essay/writing services from third parties as the use of such services constitutes plagiarism because it involves using the words or ideas of others and passing them off as your own. Nor is it permissible to sell copies of lecture or tutorial notes as students do not own the rights to this intellectual property.

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The UNSW Student Code and the Student Misconduct Procedure can be found at:

<https://student.unsw.edu.au/plagiarism>

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the related aspects of ELISE will help you make the most of your studies at UNSW.

The ELISE training

