Mathematical Statistics

MH7004

Introduction

This lecture

1. Who am I?
2. Who are you?
3. Schedule
4. Teaching method
5. Learning subjects
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9. Indicative assessment
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Background

- **Since 09.2024:** Tenured Associate Professor at NTU
- **01.2019-08.2024:** Nanyang Assistant Professor at NTU
- **06.2015-12.2018:** Postdoc in Financial and Insurance Mathematics at ETH Zurich
- **02.2012-05.2015:** PhD in Mathematics, ETH Zurich (Columbia U.)

  Supervisors: Prof. Marcel Nutz (Columbia University), Prof. Martin Schweizer (ETH Zurich)

  Thesis title: Knightian Uncertainty in Mathematical Finance
- **10.2006-10.2011:** Bachelor and Master in Mathematics at ETH

Research interests:

- Machine Learning Algorithms in Finance and Insurance
- Model Uncertainty in Financial Markets
- Financial and Insurance Mathematics
- Stochastic Analysis & Stochastic Optimal Control
- Stochastic Optimization and Applied Probability Theory

Who are you?

Who are you?

Schedule

1. **Lecture:** Friday 13:30-17:20 at MAS Exec Room 2

Teaching method

1. We shall have a lecture followed by a tutorial
2. No designated tutorials
3. Many examples throughout the lectures
4. No homework assignments, only recommended exercises

Learning subjects

- Part 0: Introduction
- Part I: Descriptive statistics
- Part II: Elements of Probability
- Part III: Random variables
- Part IV: Confidence interval
- Part V: Point Estimation
- Part VI: Maximum Likelihood Estimation
- Part VII: Bayesian Inference
- Part VIII: Hypothesis Testing
- Part IX: Regression
- Revision

Learning outcomes

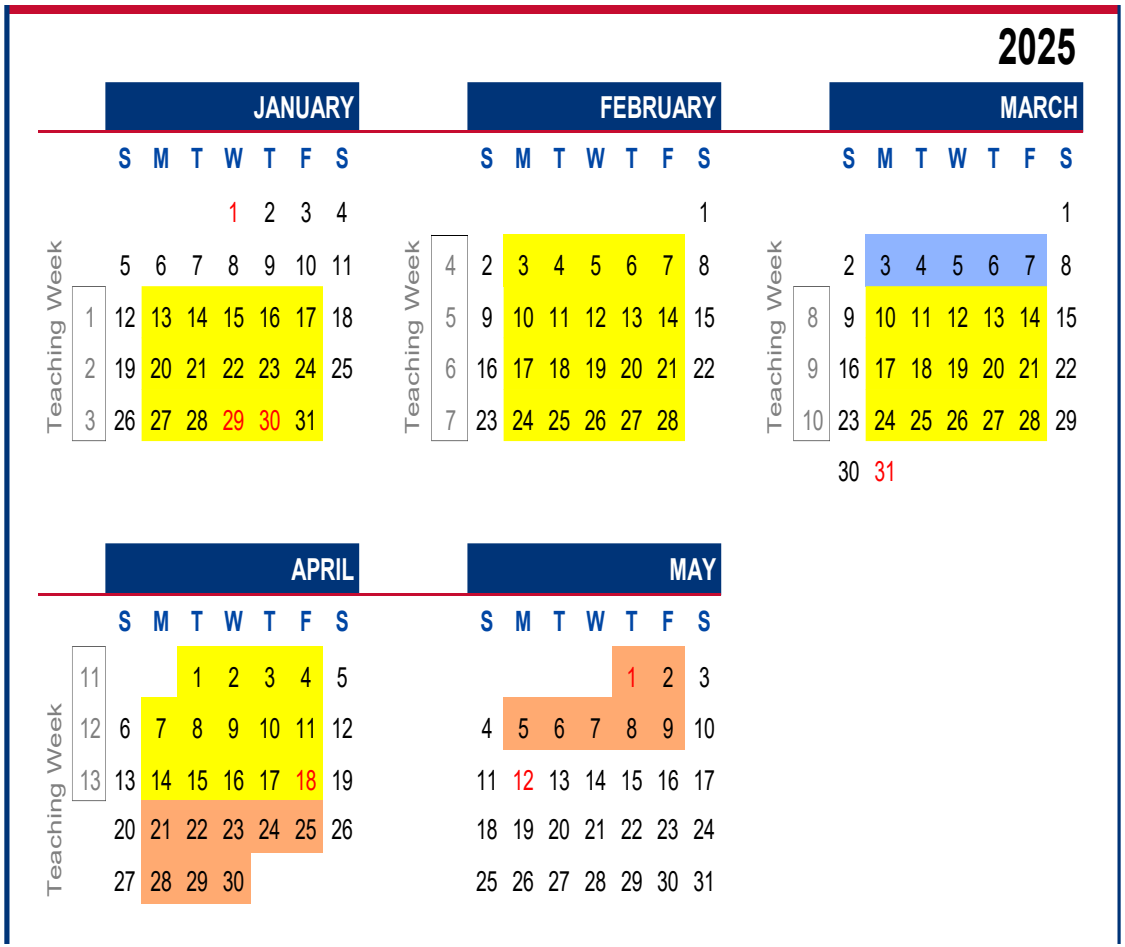
Upon successful completion of the requirements for this course, students should have the knowledge and skills to:

1. Demonstrate an understanding of probability theory
2. Demonstrate knowledge of, and properties of, statistical models in common use
3. Understand the basic principles underlying statistical inference (estimation and hypothesis testing)
4. Be able to construct tests and estimators, and derive their properties
5. Understand the difference between Frequentist and Bayesian approaches

Learning resources

1. **Slides** will be available online via NTULearn and my homepage
2. **Book:** Statistical Inference, 2nd Ed,
   by George Casella and Roger L. Berger, 2001
   (You can find it using google)
3. **Consult** and **discuss** with your class mates
4. My **email** address: ariel.neufeld@ntu.edu.sg

Semester Dates



SINGAPORE PUBLIC HOLIDAYS

National Day	9 Aug 2024 (Fri)
Deepavali	31 Oct 2024 (Thu)
Christmas Day	25 Dec 2024 (Wed)
New Year's Day	1 Jan 2025 (Wed)
Chinese New Year	29-30 Jan 2025 (Wed-Thu)
Hari Raya Puasa	31 Mar 2025 (Mon)
Good Friday	18 Apr 2025 (Fri)
Labour Day	1 May 2025 (Thu)
Vesak Day	12 May 2025 (Mon)
Hari Raya Haji	6 Jun 2025 (Fri)

Public holiday dates are marked in red on the calendar.

Indicative assessment

1. Individual Oral Exam (30 minutes each)

   Date: T.B.A.

Questions

Questions?