MATH 2411 Applied Statistics, Spring 2024

The midterm exam will be held on Sunday March 24, 9:00am-10:30am. Please email the instructor by Feb 7 if you have a conflict with another UST course that you registered. No make-up exams will be offered, and you will lose proportion of the course score (30%) if you miss the midterm exam.

Please include [MATH2411] in your title for all email communications about the course.

1. **Instructor(s)**

   L1

   Name: Dr. YE Guibo

   Contact Details: Rm 3419; Phone: 3469-2615; Email: magbye@ust.hk

2. **Teaching Assistant(s)**

   T1A

   Name: MA, Wanteng

   Email: wmaah@connect.ust.hk

   T1B

   Name: HOU, Zhen

   Email: zhouah@connect.ust.hk

3. **Meeting Time and Venue**

   Lectures:

   L1

   Date/Time: Mon & Wed 12:00 PM – 1:30 PM

   Venue: Rm 5583 (near lift 29-30)

   Tutorials:

   T1A

   Date/Time: Mo 05:00PM - 05:50PM

   Venue: Rm 1027, LSK Bldg

T1B

Date/Time: Th 12:00PM - 12:50PM

Venue: Rm 4579, Lift 27-28

Office Hour L1:

Date/Time: TBA (will post on Canvas)

Venue: Rm 3419

4. Course Description

Credit Points: 4
Pre-requisite: MATH 1014 OR MATH 1018 OR MATH 1020 OR MATH 1024
Exclusion: IELM 2510, ISOM 2500, LIFS 3150

Brief Information:
This course covers the basics of probability theory, including random variables, probability distributions, expectation, moment generating functions, and gives a systematic introduction to statistical inference, including the point and interval estimation, hypothesis testing, ANOVA, linear regression, goodness-of-fit tests, and using R to perform these analyses.

5. Intended Learning Outcomes

Upon successful completion of this course, students should be able to:

No.	ILOs
1	Solve some basic problems in probability.
2	Make inferences about the population by applying a range of statistical approaches, such as estimation and hypothesis testing.
3	Formulate a statistical solution to real-data problems and interpret the results.
4	Analyzing data with R.

6. Assessment Scheme

a. Examination duration: 1.5 hrs for the midterm exam and 3 hrs for the final exam

b. Percentage of coursework, examination, etc.:

Assessment	Assessing Course ILOs
30% by homework (five sets)	1, 2, 3, 4
30% by the midterm exam	1, 2, 3, 4
40% by the final exam	1, 2, 3, 4

The midterm exam will cover the topics in about the first half of the course. The final exam will cover ALL topics of the course, with an emphasis on the second part taught after the midterm exam.

c. Late submissions of homework will result in a penalty in score. Submissions beyond one day past due will not be accepted (0 score). No make-up exams will be offered other than exceptional cases such as medical emergency. You will lose their percentage if you miss the exams.

7. Student Learning Resources

No textbook is required and the main reference is the lecture slides, which will be made available on Canvas.

Optional textbook:

"*Probability and statistical inference*" by Hogg et al. Available in HKUST library.

8. Teaching and Learning Activities

Weekly schedule: 3 hrs for lecture and 1 hr for tutorial

9. Course Schedule

- Introduction
- Basic probability theory
- Random variables, distribution, special random variables
- Point estimation, confidence interval
- Hypothesis testing, p-value, t-test
- Two sample tests, ANOVA
- Linear regression
- Q-Q plot, K-S test, goodness-of-fit test

Total=12.5w

- Introduction [0.5 week=1 lecture]
- Basic probability theory [1w]
- Random variables, distribution, special random variables [2w]
- Point estimation, confidence interval [1.5w]
- Midterm Mar 24
- Hypothesis testing, p-value, t-test [2w]
- Two sample tests [1w]
- ANOVA [1.5w]
- Linear regression [1.5w]
- Q-Q plot, K-S test, goodness-of-fit test [1w]
- Review [0.5w]