University of Western Ontario
Winter 2023

STATS 3858B - Mathematical Statistics

Instructor Information

- Instructor

  Grace Y. Yi, Ph.D.
  Professor, Canada Research Chair in Data Science (Tier 1)
  Department Statistical and Actuarial Sciences
  Department of Computer Science
  University of Western Ontario
  http://fisher.stats.uwo.ca/faculty/yyi/
  https://covid-19-canada.uwo.ca
  Email: *gyi5@uwo.ca*

- Office Hour: Wednesdays 3:30 - 4:30pm, WSC 235

- Note: The instructor has to handle massive emails on a daily basis, and it is not possible to offer you effective help by email. Come to see her at office hours if you need help. If it is absolutely necessary to contact her by email, you need to use your Western (*@uwo.ca*) email address (so the emails won't be mis-treated as spams by the university email system), and put the subject title "**STATS 3858B**" to attract her attention.

Teaching Assistance

- **Teaching Assistants**

  Pingbo Hu, Email: *phu43@uwo.ca*

  Yijia Weng, Email: *yweng54@uwo.ca*

- **TA's Office Hours**

  Mondays 3:00 - 5:00pm, WSC170 (Pingbo Hu)

  Tuesdays 1:00 - 3:00pm, WSC 214b (Yijia Weng)

Course Delivery

- **Lectures**

  Time: Mondays, Wednesdays, Fridays   11:30am - 12:30pm
  Location: B&GS-1056

- **Tutorials**

  Time: Wednesdays   5:30am - 6:30pm
  Location: B&GS-1056

- **Important Dates**

  - Classes begin on Jan. 9 and end on Apr. 10.
  - Reading Week: Feb. 20 - 24

Course Information

- **Prerequisite(s)**

  A minimum mark of 60% in Statistical Sciences 3657A/B is required.

- **Topics to be Covered in Lectures**

  The course will cover the following topics, together with others: point estimation, sufficiency, completeness, consistency, unbiasedness, the Cramer-Rao inequality, the Rao-Blackwell theorem, hypothesis testing (uniformly most powerful tests, likelihood ratio tests).

- **Learning Outcomes**

  The course is designed to provide you with

  - an advanced introduction to the basic concepts of statistical inference;
  - basic theory that supports the procedures used for solving a variety of problems arising from data analysis;
  - a foundation for advanced learning in Statistical Science.

Course Materials

- **Lecture Notes**

  - There will not be a single textbook for this course, but the lecture notes will be organized in a coherent and self-contained manner. Attending all lectures will provide you with relevant course materials.
  - Additional course materials will be posted at OWL: *http://owl.uwo.ca.*
  - Students are responsible for checking OWL (*http://owl.uwo.ca*) for announcements and updates regularly.

- **Reference Book**

  For extended reading, you may refer to the following books:

  - *Introduction to Probability and Mathematical Statistics* (2nd edition), by Lee J. Bain and Max Englehardt, Duxbury Press.
  - *Introduction to Mathematical Statistics* (8th or previous editions), by R.V. Hogg, J. W. McKean and A.T. Craig. Pearson/Prentice Hall (2019).

Evaluation and Course Work

- **Evaluation Scheme**

$$17\% \text{ assignments } + 33\% \text{ tests } + 50\% \text{ final exam}$$

- **Tests**

  - Time

    | Test 1: | 5:30-6:20pm | Wednesday | Feb. 8 |
    | Test 2: | 5:30-6:20pm | Wednesday | Mar. 8 |
    | Test 3: | 5:30-6:20pm | Wednesday | Mar. 29 |

  - Location: B&GS-1056

- **Assignments**

  - Due in class (**before the class starts**):

    | Assignment 1: | Wednesday | Feb. 1 |
    | Assignment 2: | Wednesday | Mar. 1 |
    | Assignment 3: | Wednesday | Mar. 22 |

  - Late assignments will not be accepted because solutions to assignment questions will be posted.

- **Important Note**

  - To receive a pass on the course, you must achieve
    a passing mark (50%) on BOTH the final exam AND the term work.
  - The "term work" is evaluated based on
    * the average score of the **three** assignments and
    * the average score of the **best two** tests
  - Late assignments will **NOT** be accepted.
  - There will be **NO** make-up tests. If a student misses two tests (which I hope you won't!), the student will receive an incomplete (**INC**) in the course grade.
  - The final exam takes place during the examination period, which will be scheduled by the Registrar's Office.
  - The tests and final exam are *closed book*; a double-sided crib sheet (letter size) is allowed for the *final exam* (not for tests). A nonprogrammable calculator is allowed for the tests and final exam. Other devices such as cell phones cannot be used as a calculator.

Disclaimer

The lecture notes and any distributed course materials are intended **ONLY** for your own use to enhance your understanding of the course. Please do **NOT** share with anyone **NOT** registering for this course in 2023 without the instructor's permission.

General Information

- **Student Absences**

  If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

  For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

  https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

  The Student Medical Certificate is available at

  https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

- **Accommodation and Accessibility**

  - Religious Accommodation

    When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

    https://multiculturalcalendar.com/ecal/index.php?s=c-univwo

  - Accommodation Policies

    Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

    https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf

- **Academic Policies**

  The website for Registrarial Services is

  http://www.registrar.uwo.ca

In accordance with policy,

http://www.uwo.ca/its/identity/activatenonstudent.html

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

A non-programmable calculator is needed in the tests. Other devices such as cell phones cannot be used as a calculator in the tests.

- **Support Services**

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters:

https://www.uwo.ca/sci/counselling/

Students who are in emotional/mental distress should refer to

Mental *Health@Western* (*https://uwo.ca/health/*)

for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html

To connect with a case manager or set up an appointment, please contact *support@uwo.ca.*