

Statistical Sciences 4861B Course Outline

1. Course Information

Course Information

Statistical Sciences 4861B: Time Series
2024-2025 Winter Term

Lectures: Tuesday 12:30-2:30 pm & Thursday 1:30-2:30 pm
Location: WSC 240

Requisites

A minimum mark of 60% in both Statistical Sciences 3858A/B and Statistical Sciences 2864A/B.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Antirequisites

The former Statistical Sciences 3861A/B.

2. Instructor Information

Instructor: Dr Ricardas Zitikis
E-mail: rzitikis@uwo.ca
Office: WSC 231
Office Hour: After each lecture
When contacting:

- use only Western (@uwo.ca) email address
- include the course code **Stats 4861** into the subject line of your email so that I would know which class you belong to (I am teaching other classes too)

3. Course Syllabus, Schedule, Delivery Mode

ARIMA models, seasonality, dynamic regression, model building, forecasting, intervention analysis, control, applications in econometrics, business, and other areas.

Learning Outcomes

Upon successful completion of this course, students will be familiar with:

- Time-series models (AR, MA, ARMA, ARIMA, SARIMA, ARCH, GARCH)
- Seasonality, dynamic regression
- Model fitting
- Forecasting
- Parameter estimation
- Applications

Classes begin: January 6, 2025

Classes end: April 4, 2025

Weeks	Topics and assessments
Week 1 (Jan 6 -)	Topic 1: Introduction and examples Assignment 1 (start January 6, due January 19)
Week 2 (Jan 13 -)	Topic 2: White noise
Week 3 (Jan 20 -)	Topic 3: Stationary time series Assignment 2 (start January 20, due February 2)
Week 4 (Jan 27 -)	Topic 4: AR(1)
Week 5 (Feb 3 -)	Topic 5: Forecasting Topic 6: Statistics Assignment 3 (start February 3, due February 23)
Week 6 (Feb 10 -)	Topic 7: AR(p) TEST 1 (February 11; based on Topics 1-6)
Week 7	Spring Reading Week: February 15-23
Week 8 (Feb 24 -)	Topic 8: MA(q) Assignment 4 (start February 24, due March 9)
Week 9 (March 3 -)	Topic 9: ARMA
Week 10 (March 10 -)	Topic 10: ARIMA Assignment 5 (start March 10, due March 23) TEST 2 (March 11; based on Topics 1-9)
Week 11 (March 17 -)	Topic 11: Seasonality, SARIMA
Week 12 (March 24 -)	Topic 12: Model selection
Week 13 (March 31 -)	Topic 13: Conditional heteroskedasticity, ARCH and GARCH
Regular Final Exam (during the April Exam Period (April 7–30); based on Topics 1-13)	
Make-up Final Exam (in May ; exact date will be announced around mid-April)	

4. Course Materials

Textbook (based on which detailed lecture slides will be prepared and posted on OWL):

Introduction to Time Series and Forecasting (3rd edition) by Peter J. Brockwell and Richard A. Davis.

<https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2024B&courses%5B0%5D=001 UW/STA4861B>

Students are welcome to purchase second-hand or 2nd edition of this textbook. (The 1st edition will not be sufficient.)

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

Five assignments, every two-three weeks, each worth 2% of the course grade. The start and due dates are specified in the course schedule.

Two term tests, cumulative and closed book, both during lecture times in WSC 240.

TEST 1: 12:30 pm – 2:20 pm, Tuesday, **February 11**, 2025

TEST 2: 12:30 pm – 2:20 pm, Tuesday, **March 11**, 2025

Final Exam is a two-hour closed-book cumulative examination to be scheduled by the Registrar Office during the April examination period (April 7-30, 2025).

The overall course grade will be calculated as listed below:

Assignments	10% (=5 x 2%)
Test 1	20%
Test 2	30%
Final Exam	40%

Test 1 and Test 2, as well as the Final Exam will be closed book. Non-programmable hand-held calculators will be allowed.

Accommodated Evaluations

- Each **assignment** shall be submitted for marking approximately two weeks after it is announced (start and due dates specified in the course schedule). If a student submits an assignment late, for each late day (irrespective of whether it is working or weekend day) 0.5% will be deducted from 2%.
 - For example, if an assignment is submitted within one day after the due date, then the assignment will be worth only 1.5%, and if an assignment is submitted within the fourth day (or thereafter) after the due date, then 0% will be given for the assignment.
- There will be **no make-up tests**. If you miss a test due to a legitimate reason (one miss can be self-reported, but if more, then the other miss requires a counsellor's permission), then the weight of that test will be moved to the final exam. Namely, the following rules will apply:
 - If you miss Test 1 and write Test 2, then the Final Exam will be worth 60% of your final grade.
 - If you write Test 1 but miss Test 2, then the Final Exam will be worth 70% of your final grade.
 - If you miss both Test 1 and Test 2, then the Final Exam will be worth 90% of your final grade.

Note. A self-reported absence can be used only once. In other words, two tests cannot be missed using self-reported absences.
- If you miss the Final Exam due to a legitimate reason (to be determined by a counsellor), you will have a chance to write a **Make-up Final Exam**, which will be in May, 2025 (exact date and time will be determined in mid-April). See **Absences from Final Examinations** below.

Rounding of marks statement

Across the Sciences Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. Final grades on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75.

Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sept24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods.
- One of the two midterm tests.
- Four of the five assignments.

6. Additional Statements

Religious Accommodation

When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

<https://www.edi.uwo.ca>.

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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

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 their official university address is attended to in a timely manner.

In the tests and exam, non-programmable hand-held calculators will be allowed.

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

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

Support Services

Please visit the Science & Basic Medical Sciences Academic Advising 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.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.