

Statistical Sciences 9861B Course Outline

1. Course Information

Course Information

Statistical Sciences 9861B: Time Series
2023-2024 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, or in equivalent courses.

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 9861** 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 such as AR, MA, ARMA, ARIMA, ARCH, GARCH, VARMA
- Seasonality, dynamic regression
- Model fitting
- Forecasting

- Parameter estimation
- Applications in econometrics, business, and other areas

Classes begin: January 8, 2024

Family Day and Spring Reading Week: February 17-25, 2024

Classes end: April 8, 2024

Approximate schedule	
Weeks	Topics
Week 1 (Jan 8 -)	Introduction, examples
Week 2 (Jan 15 -)	White noise and stationary time series
Week 3 (Jan 22 -)	AR(1)
Week 4 (Jan 29 -)	Forecasting
Week 5 (Feb 5 -)	AR(p)
Week 6 (Feb 12 -)	MA(q); Test 1 (February 13)
Week 7	Family Day and Spring Reading Week: February 17-25, 2024
Week 8 (Feb 26 -)	ARMA
Week 9 (March 4 -)	ARIMA
Week 10 (March 11 -)	Seasonality; Test 2 (March 12)
Week 11 (March 18 -)	Seasonal nonstationary time series (SARIMA)
Week 12 (March 25 -)	Model selection
Week 13 (April 1 -)	Conditional heteroskedasticity, ARCH and GARCH
Regular Final Exam (during Apr. 11–30)	
Make-up Final Exam around May 9 (exact date and time in mid-April)	

4. Course Materials

Textbook

Introduction to Time Series and Forecasting (2016 edition) by Peter J. Brockwell and Richard A. Davis.

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 course 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

Four assignments, every two-three weeks, each worth 2.5% of the course grade.

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

TEST 1: 12:30 am – 2:30 pm, Tuesday, February 13, 2024

TEST 2: 12:30 am – 2:30 pm, Tuesday, March 12, 2024

The final exam is a two-hour closed-book cumulative examination scheduled by the Registrar Office during the April examination period (April 11-30, 2024).

The overall course grade will be calculated as listed below:

Assignments	10% (=4 x 2.5%)
Test 1	20%
Test 2	30%
Final exam	40%

Tests 1 and 2, as well as the final exam are closed book. Non-programmable hand-held calculators are allowed.

Accommodated Evaluations

- Each **assignment** shall be submitted for marking approximately one week after it was announced (due date will be specified). 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 2.5%. Hence, if an assignment is submitted within one day after the due date, the assignment will be worth only 2%. If an assignment is submitted within the fifth day (or thereafter) after the due date, 0% will be given for the assignment.
- There will be no make-up **tests**. If you miss either test for a legitimate reason (as determined by the counsellors), then the weight of that test will be moved to the following test. Namely, the following rules will apply:
 - If you miss Test 1 and write Test 2, then Test 2 will be worth 50% of your final grade and the Final Exam will be worth 40% of your final grade.

- If you write Test 1 and miss Test 2, then Test 1 will be worth 20% of your final grade and 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.
- If you miss the **Final Exam** due to a legitimate reason, you will have a chance to write a make-up final exam around May 9, 2024 (exact date and time will be determined in mid-April). See **Absences from Final Examinations** below.

Rounding of Marks Statement

Across the Sciences Undergraduate 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.

6. Student Absences

Academic Consideration for Student Absences

Tests 1 and 2, and the Final Exam

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

1. For medical absences, get a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner.
2. Get appropriate documentation for non-medical absences.

Note that in all cases, students are required to contact their instructors within 24 hours of the end of the period covered to get approved, unless otherwise instructed in the course outline.

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>.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

7. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), 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),

8. Academic Policies

The website for Registrarial Services is <http://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 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 the following Web site:

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

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

In the event of health lock-down, remote proctoring software may be used in this course. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: <https://remoteproctoring.uwo.ca>.

9. 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/>.

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 (519) 661-2147 if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.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.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/mentalhealth>) for a complete list of options about how to obtain help.

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