

SCHOOL OF MATHEMATICAL AND STATISTICAL SCIENCES

DEPARTMENT OF STATISTICAL AND ACTUARIAL SCIENCES

SS4861B/SS9861B COURSE OUTLINE¹

BY RIČARDAS ZITIKIS

1. GENERAL COURSE INFORMATION

- SS4861B/SS9861B: Time Series
- 2017–2018 Winter term (January 8 – April 11, 2018)
- Lecture room WSC 240
- MWF 2:30-3:30 pm
- Reading week February 19–23, 2018 (no lectures)

Requirements

- Antirequisites: former SS3861A/B
- Prerequisites: a minimum mark of 60% in both SS3858A/B and SS2864A/B.

Unless you have either the requisites for this course or written special permission from your Dean 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.

2. INSTRUCTOR INFORMATION

- Ričardas Zitikis
- zitikis@stats.uwo.ca
- Office WSC 274
- <http://www.stats.uwo.ca/faculty/zitikis/main.htm>

When contacting by email, students must use their Western (@uwo.ca) email addresses

3. COURSE DESCRIPTION

Objectives

- Study of time series models and their analysis
- Enhancement of statistical intuition and technical prowess
- Increased confidence when facing statistical challenges
- Auxiliary preparation to meet actuarial (e.g., SOA) and PhD requirements

Topics

- Time series models (AR, MA, ARIMA, ARCH, GARCH, etc.), dynamic regression, model building, forecasting, applications in econometrics, finance, business, and other areas.

Learning outcomes

- A bird's view of time series
- Familiarity with time-series models, techniques, and methods of analysis

¹To accommodate feedback from students and administrators, the course outline is subject to revision until the first class in January. This version was prepared on **January 2, 2018**.

4. COURSE MATERIALS

The following textbook will guide my lectures

- McNeil, A.J., Frey, R. and Embrechts, P. (2015). *Quantitative Risk Management: Concepts, Techniques and Tools*. (Revised Edition.) Princeton University Press, Princeton, NJ. (<https://press.princeton.edu/titles/10496.html>)

My inspiration will particularly come from these chapters

- Chapter 4: Financial Time Series
- Chapter 3: Empirical Properties of Financial Data
- Chapter 6: Multivariate Models
- Chapter 14: Multivariate Time Series
- Chapter 9: Market Risk

Occasionally, we may study some of these slides

- <http://qrmtutorial.org/slides>

We may even analyze (or at least keep in mind the existence of) the R code posted here

- <http://qrmtutorial.org/r-code>

Secondary (not required) study resources

- Brockwell, P.J. and Davis, R.A. (2002, or another edition). *Introduction to Time Series and Forecasting*. Springer, New York.
- Brockwell, P.J. and Davis, R.A. (1991). *Time Series: Theory and Methods*. Springer, New York.
- Box, G.E.P., Jenkins, G.M., Reinsel, G.C., and Ljung, G.M. (2015). *Time Series Analysis: Forecasting and Control* (5th Edition). Wiley, New York.

Students should check OWL (<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. Students are responsible for checking OWL on a regular basis.

5. METHODS OF EVALUATION

The overall course grade will be calculated as listed below (>15% by March 4, 2018):

- Training assignments: 0% (once a week I will post several practice problems, whose solutions will be posted in a week, together with another set of practice problems)
- Midterm exam 1: 20% (during the last class of January)
- Midterm exam 2: 20% (during the last class of February)
- Take-home computing and writing skills: 10% (problems will be announced during the first seven days of March; individually written essays to be handed in on March 21; no group work; hand-written essays will automatically lose 5%)
- Final exam: 50% (TBA, during the April 14–30 examination period)

No make-up exams, except for the final exam. The percentage of any *legitimately*² missed midterm will be appended to the next evaluation (midterm or final exam, whichever comes next).

²Legitimacy must be determined by a counsellor.

6. ACCOMMODATION AND ACCESSIBILITY

If documentation (medical or otherwise) is required, it can only be collected by the student's Dean's Office/Academic Counselling unit.

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in WSC 140, and can be contacted at scibmsac@uwo.ca

For further information, please consult the university's medical illness policy at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

If you miss the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam.

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html)

7. 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.

No electronic devices will be permitted on tests and exams.

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

8. SUPPORT SERVICES

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 Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

The policy on Accommodation for Students with Disabilities can be found here:

www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here:

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

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 for a complete list of options about how to obtain help http://www.health.uwo.ca/mental_health

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