

STAT 3490 Section A01  
Time Series Analysis  
Winter 2022

**Time** MWF 8:30 p.m. – 9:20 a.m.,  
Online - Zoom at least until Feb.25th  
**CRN** 50095

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**Text1:** Statistical Methods for Forecasting,  
by Abraham, B. and Ledolter, J. (1983). Published by John Wiley.  
**Text2:** FORECASTING : Principles and Practice,  
by R. J. Hyndman and G. Athanasopoulos (2021).Published by otexts,  
3rd Ed.:<https://otexts.com/fpp3>

**Web Pages** UMLearn: <http://umanitoba.ca/umlearn>

**Office Hours:** MWF 8:00 to 8:30 am. (online zoom)

If the above times are not convenient for you, please email or speak to me after class to arrange an alternate time to meet. I will do my best to return all email messages. within 24 hours.

## Evaluation

|                   |     |
|-------------------|-----|
| Test 1            | 20% |
| Test 2            | 20% |
| Assignments       | 20% |
| Final Examination | 40% |

The following are the minimum percentage grades required to receive each of the various letter grades: A<sup>+</sup> (90%), A (80%), B<sup>+</sup> (75%), B (70%), C<sup>+</sup> (65%), C (60%), D (50%).

## Exam Information

The Test 1 will be held on **Friday March 11, 2022 (8:30 am to 9:20 am)** and Test 2 will be held on **Wednesday April 13th , 2022 (8:30am to 9:20 am)**.

## **If we continue online teaching after Feb. 25th:**

Both Midterm tests and final exam will be closed book. You will be required to be on Cisco Webex or Zoom, with your camera on during the tests and exam. You will not have access to any course materials (for example, the textbook, materials that are posted on UM Learn). If statistical tables or anything else is needed, it will be provided during the test and exam. You are not allowed to use the software R or any other software during the test or exam. A calculator will be required to complete the calculations. All other resources, web browsing and communication with other individuals are strictly prohibited. Inappropriate collaboration, plagiarism, or contract cheating of any kind will be dealt with severely and forwarded to the appropriate disciplinary committee at the University of Manitoba.

The test questions will be sent to all students via a Crowdmark email. You will be expected to write your answer to each question on a sheet of paper and then take a picture or scan a copy of your images and upload them to Crowdmark. A calculator will be required to complete the calculations. Crowdmark keeps record of all page views and upload attempts. You must upload all your answers by the cut off time (submission deadline). Late submissions will not be accepted. Detailed instructions will be provided before the tests.

**Final Exam:** The final exam will be of two hours in duration and will be scheduled by the Student Records Office. The final exam will cover the whole syllabus. The exam questions will be sent to all students via a Crowdmark email. You will be expected to write your answer to each question on a sheet of paper and then take a picture or scan a copy of your images and upload them to Crowdmark. A calculator will be required to complete the calculations. Crowdmark keeps a record of all page views and upload attempts. You must upload all your answers by the cut off time (submission deadline). Late submissions will not be accepted. Detailed instructions will be provided before the exam.

## **If we go for in person teaching after Feb. 25th:**

Both Midterm tests and final exam will be closed book. Both midterms will be held in class. The final exam will be of two hours in duration and will be scheduled by the Student Records Office. The final exam will cover the whole syllabus.

**If there is a need to change any of these tools or instructions, I shall let you know well in advance.**

Should you miss one test, you will be assigned a grade of zero unless you provide valid documentation. The other test and final exam would then be worth 30% and 50%, respectively. Should you miss both tests, you will be assigned a grade of zero unless you provide valid documentation. The final exam would then be worth 80%. **There are no make up tests.** Students who miss both tests, with or without valid documentation, will be reported to the Dean's office as having completed no term tests. This will have repercussions on their ability to write a deferred exam for the course, should such a deferral be requested.

## Assignments

There will be two assignments in this course. Moreover, numerous practice problems (some with solutions) will be distributed in class. Students are strongly encouraged to try these practice problems on a regular basis.

## Supplementary Resources

The following books/papers are highly recommended for reading and extra practice.

- *Statistics and Data Analysis for Financial Engineering with R examples* (Second Edition) by Ruppert, D. and Matteson, D. (2015). Springer.
- Thavaneswaran A, Paseka A, Frank J. (2019). *Generalized Value at Risk Forecasting (May 15, 2019). Communications in Statistics Theory and Methods.*
- Jon Danielsson (2011). *Financial Risk Forecasting. Wiley Finance.* (PPT slides, Ch1,Ch2,Ch4,Ch5,Ch6).

Note that these textbooks are provided for extra reference and practice only. Coverage and notation may differ somewhat from the course notes. (Notes may cover topics that are not covered in the textbooks or vice-versa.) **Where there are any discrepancies between the way topics are covered in the course notes and in the textbook, please refer to the course notes.**

## Voluntary Withdrawal

The voluntary withdrawal date is **April 25th** (by which time you will have received your marks for the term tests).

## Academic Dishonesty

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

<http://umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html>

## Copyrighted Material

All course notes, assignments, tests, exams, practice exams and solutions are the intellectual property of your instructor or the Department of Statistics. Reproduction or distribution of these materials is strictly forbidden without their consent.

## Recording of Class Lectures

Your instructor and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from your instructor.

## Use of Electronics in the Classroom

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. A student may use technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Accessibility Services. Students should not engage in electronic messaging/posting activities (e-mail, texting, video or voice chat, social networking (e.g. Facebook)) or electronic gaming during scheduled class time.

## Class Communication

The University requires all students to activate an official University email account. Please note that all communication between your instructor and you as a student must comply with the Electronic Communication with Students Policy. Please see

[http://umanitoba.ca/admin/governance/governing\\_documents/community/electronic\\_communication\\_with\\_students\\_policy.html](http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html)

You are required to obtain and use your U of M email account for all communication between yourself and the university.

## Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

<http://umanitoba.ca/student/saa/accessibility/>

## ROASS Schedule A

Schedule A of the Responsibilities of Academic Staff with regards to Students (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. Schedule A will be posted on your instructor's UMLearn page.

## Course Outline

This course will cover some topics in time series analysis. After briefly reviewing the standard regression theory, the theory and application of time series techniques will be studied. Topics will be selected from the following list (and with luck, will include them all):

- The Regression Model and Exponential Smoothing in Forecasting (Ch. 2 &3)
- Stationary and Non-Stationary Time Series Models (Ch. 3 &4)
- ARIMA Models Forecasting, Model Identification, Parameter Estimation, etc. (Ch. 5)
- Seasonal Time Series Models (Ch. 6)
- Nonlinear time series models, GARCH Models and GAS models.
- Financial Risk Forecasting and Applications