

The George Washington University  
Department of Statistics

STAT 4181-10  
Spring 2023

**Course Topic:** Applied Time Series Analysis  
**CRN** 61026  
**Classes:** Mondays and Wednesdays  
**Meeting Time:** 03:45 PM.- 05:00 PM  
**Classroom:** TOMP 301  
**Instructor:** Dr.Srinivasan Balaji

**Office address:** Suite 767, Rome Hall  
**Telephone:** (202) 994-3383  
**Email:** balaji@gwu.edu  
**Office hours:** Mondays and Wednesdays 1:00 PM to 2:00 PM

**Text:**

*Time Series Analysis and Forecasting* by D. C. Montgomery, C.L.Jennings, and . M.Kulahci, 2<sup>nd</sup> Edition, Wiley Series in Probability and Statistics, 2016.

**Supplementary Texts:**

*Introductory Time Series with R* by Paul Cowpertwait, and Andrew Metcalfe, Springer, 2009.

*Forecasting, Time Series, and Regression* by Bruce Bowerman, Richard O'Connell, and Anne Koehler, 4<sup>th</sup> Edition, Thomson Learning, 2005.

**Course Description:** The course would cover the following topics: Introduction and Statistical background for forecasting, Regression analysis, Time Series regression models, Exponential smoothing methods, Autoregressive processes, ARIMA models. AR(p), MA(q), ARMA(p,q) and White noise processes, Spectral analysis, ARCH and GARCH models. We will cover both theory and applications and also will use statistical packages such as R.

**Remark:** We may also be using the statistical package StatistiX in addition to R. Students have the flexibility to use either of them for the assignments and exam.

**Prerequisites:** Students are expected to have taken a first course in Statistics such as STAT 1051 or 1053 and also a course in regression such as STAT 2118.

Lectures: Lecture notes and other related materials will be posted on blackboard. The lecture notes will be based on the chapter-wise topics from the text.

### Learning Outcomes

As a result of completing this course, students will be able to:

- 1. Formulate time series models,**
2. Build regression models with real life data,
3. Analyze time series data using R,
4. Have a working knowledge of ARIMA and related processes, autocovariance, autocorrelation and partial autocorrelation functions.

## Testing and Exams

There will be a midterm exam and final exam for the class. Both are closed book exams. There will be graded homework assignments and quizzes throughout the course. Quizzes can be either in-person or through blackboard. Announcements will be given much ahead of time. There will also be a final project and a presentation towards the end of the course.

### Grading Policy:

Midterm (20%)- Midterm Exam on Wednesday, March 8, 2023  
Final (25%) – Final Exam during the final exam week  
Quizzes – 15%  
Homework Assignments - 25%  
Final Project – 15%

**Workload:** It is expected that the student will spend about 5-6 hours a week studying and preparing for the class. This time may be evenly split between writing solutions to homework problems and reading in the textbook.

**Class Policy:** Late work: Will not be accepted. No make-up exams.

**Blackboard:** Communication will be through blackboard. If new materials are posted in the blackboard, an email will be sent to students using blackboard.

University Policies

**Academic Integrity:** I support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: <https://studentconduct.gwu.edu/code-academic-integrity>

Any case of the slightest hint of cheating will be prosecuted to the fullest extent of the university Academic Integrity Policy. You will receive an automatic F, and the case will be taken to the proper administrative channels.

**Support for students outside the classroom:**

*DISABILITY SUPPORT SERVICES (DSS)*

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to:

<http://gwired.gwu.edu/dss/>

*UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300*

The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:

- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals

See <https://healthcenter.gwu.edu/counseling-and-psychological-services>

**Security:** In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

