The George Washington University
Department of Statistics

STAT 4181-10
SPRING 2024

Course Topic:	**Applied Time Series Analysis**
CRN	**90940**
Classes:	Mondays and Wednesdays
Meeting Time:	03:45 PM.- 05:00 PM
Classroom:	1957 E 212
Instructor:	**Dr.Srinivasan Balaji**
Office address:	Suite 767, Rome Hall
Telephone:	(202) 994-3383
Email:	balaji@gwu.edu
Office hours:	Mondays 1 PM to 2 PM and Wednesdays 6 PM – 7 PM

Text:

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

Supplementary Texts:

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

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

Forecasting: principles and practice by R.J. Hyndman, & G. Athanasopoulos, 3rd edition, OTexts, 2021.

Course Description: The course would cover the following topics: Introduction to Forecasting, Basic Statistical concepts, Simple and Multiple linear regression, Time Series regression, Exponential smoothing methods, Autoregressive and Moving average processes, ARIMA models such AR(p), MA(q), ARMA(p,q), ARIMA (p,d,q), White noise processes, Spectral analysis, ARCH and GARCH models. We will cover both theory and applications and 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. Some relevant materials will also be sent by email to the students. Emails will be sent as a follow-up whenever materials are posted in the blackboard.

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 6, 2024
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