

**THE GEORGE WASHINGTON UNIVERSITY**  
**Department of Statistics**

**STAT 4181: Applied Time Series Analysis**  
**SYLLABUS**

**Course and Contact Information**

Course: STAT 4181-10 Applied Time Series Analysis (CRN: 20896)

Semester: Spring 2025

Meeting Time: Tuesday and Thursday, 3:45 – 5:00pm

Location: Rome Hall, Room 350

**Instructor**

Name: Joshua Landon

Campus Address: Rome Hall, Room 756

Phone: 202-994-7851

E-mail: [jlandon@gwu.edu](mailto:jlandon@gwu.edu)

Office hours: 1 – 3pm on Tuesday and Thursday, and by appointment, either in person or remotely at <https://gwu-edu.zoom.us/j/3217834899>

**Graduate Teaching Assistant**

Samuel Homan [shoman8@gwu.edu](mailto:shoman8@gwu.edu)

Office hours: Rome Hall, Room 751, 2:30 – 4:30pm on Wednesday

**Bulletin Course Description**

Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate time series. Estimation of spectral density functions, white noise tests, and tests for periodicities. Theory and applications using statistical software.

**Prerequisites**

STAT 2118 or equivalent, and familiarity with R

## Learning Outcomes:

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

1. Build models for time series data incorporating trends, seasonality and autocorrelation.
2. Identify and estimate Box-Jenkins ARIMA models.
3. Generate predictions and prediction intervals using these models.
4. Implement these models using R.

## Required Textbook

Author	Title	Edition
Bowerman et al.	Forecasting, Time Series, and Regression	4th

Students are expected to be familiar with the material on regression in Chapters 3-5. This course will cover Chapters 6 through 12 from the text, and then some additional topics in Financial Time Series (e.g., ARCH and GARCH models) and Spectral Analysis will also be covered.

## Average minimum amount of independent, out-of-class, learning expected per week:

Over 15 weeks, students will spend 2.5 hours (150 minutes) per week in lecture. Homework assignments and other out-of-class work is estimated at around 5 hours per week (75 hours for the semester) and includes a 2-hour final exam for which approximately 10 hours of review is assumed.

## Grading

- Homeworks (40%)
- Midterm Exam (30%)
- Final Exam (30%)

Homeworks will be assigned every week. Exams will be closed-book and closed-notes, but a one-page “cheat sheet” will be allowed.

## Software

R will be the computing packages used in this class.

To download R, go to: <https://www.r-project.org/>

It is also recommended to download R-Studio: <https://www.rstudio.com/products/rstudio/download/>

## University policies

### Academic Integrity Code

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the [Code of Academic Integrity](#). If you have any questions about whether particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you should contact Conflict Education and Student Accountability (CESA) to learn more about your rights and options in the process. Consequences can range from failure of assignment to expulsion from the University and may include a transcript notation. For more information, refer to the CESA website at [students.gwu.edu/code-academic-integrity](http://students.gwu.edu/code-academic-integrity) or contact CESA by email [cesa@gwu.edu](mailto:cesa@gwu.edu) or phone 202-994-6757.

### University policy on observance of religious holidays

Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see [provost.gwu.edu/policies-procedures-and-guidelines](http://provost.gwu.edu/policies-procedures-and-guidelines).

### Use of Electronic Course Materials and Class Recordings

Students are encouraged to use electronic course materials, including recorded class sessions, for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) if you have questions or need assistance in accessing electronic course materials.

## Academic support

### Academic Commons

[Academic Commons](#) is the central location for academic support resources for GW students. To schedule a peer tutoring session for a variety of courses visit [go.gwu.edu/tutoring](http://go.gwu.edu/tutoring). Visit [academiccommons.gwu.edu](http://academiccommons.gwu.edu) for study skills tips, finding help with research, and connecting with other campus resources. For questions email [academiccommons@gwu.edu](mailto:academiccommons@gwu.edu).

## **GW Writing Center**

GW Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at [gwu.mywconline](http://gwu.mywconline).

## **Support for students in and outside the classroom**

### **Disability Support Services (DSS) 202-994-8250**

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) to establish eligibility and to coordinate reasonable accommodations.

### **Student Health Center 202-994-5300, 24/7**

The Student Health Center (SHC) offers [medical](#), [counseling/psychological](#), and [psychiatric](#) services to GW students. More information about the SHC is available at [healthcenter.gwu.edu](http://healthcenter.gwu.edu). Students experiencing a medical or mental health emergency on campus should contact GW Emergency Services at 202-994-6111, or off campus at 911.

## **GW Campus Emergency Information**

GW Emergency Services: 202-994-6111

For situation-specific instructions, refer to [GW's Emergency Procedures guide](#).

### **GW Alert**

GW Alert is an emergency notification system that sends alerts to the GW community. GW requests students, faculty, and staff maintain current contact information by logging on to [alert.gwu.edu](http://alert.gwu.edu). Alerts are sent via email, text, social media, and other means, including the Guardian app. The Guardian app is a safety app that allows you to communicate quickly with GW Emergency Services, 911, and other resources. Learn more at [safety.gwu.edu](http://safety.gwu.edu).

### **Protective Actions**

GW prescribes four protective actions that can be issued by university officials depending on the type of emergency. All GW community members are expected to follow directions according to the specified protective action. The protective actions are Shelter, Evacuate, Secure, and Lockdown (details below). Learn more at [safety.gwu.edu/gw-standard-emergency-statuses](http://safety.gwu.edu/gw-standard-emergency-statuses).

### **Shelter**

- Protection from a specific hazard
- The hazard could be a tornado, earthquake, hazardous material spill, or other environmental emergency.
- Specific safety guidance will be shared on a case-by-case basis.

#### **Action:**

- Follow safety guidance for the hazard.

### **Evacuate**

- Need to move people from one location to another.
- Students and staff should be prepared to follow specific instructions given by first responders and University officials.

#### **Action:**

- Evacuate to a designated location.
- Leave belongings behind.
- Follow additional instructions from first responders.

### **Secure**

- Threat or hazard outside of buildings or around campus.
- Increased security, secured building perimeter, increased situational awareness, and restricted access to entry doors.

#### **Action:**

- Go inside and stay inside.
- Activities inside may continue.

### **Lockdown**

- Threat or hazard with the potential to impact individuals inside buildings.
- Room-based protocol that requires locking interior doors, turning off lights, and staying out of sight of corridor window.

#### **Action:**

- Locks, lights, out of sight
- Consider Run, Hide, Fight
- **Classroom emergency lockdown buttons**  
All classrooms have been equipped with classroom emergency lockdown buttons. If the button is pushed, GWorld Card access to the room will be disabled, and GW Dispatch will be alerted. The door must be manually closed if it is not closed when the button is pushed. Anyone in the classroom will be able to exit, but no one will be able to get in.