

STA 4853
Time Series and Forecasting Methods
Spring 2024

Lectures: Monday and Wednesday 3:05PM–4:20PM in Room OSB 108.

Instructor:

Fred W. Huffer
Room 209C Stat Dept (OSB or Rogers Building)
Office hours: Monday and Wednesday 1:50PM–2:50PM
(or by appointment either in person or by Zoom)
e-mail address: huffer@stat.fsu.edu
(Put “STA 4853” somewhere in the subject line of all messages to me.)

Teaching Assistant:

Younghwan Cho
e-mail address: ybcho@fsu.edu
Send e-mail to ask questions or arrange an appointment

Text: None

Course Objectives:

This course discusses time series models including autoregressive models, moving-average models, general ARIMA models, dynamic regression models, and (time permitting) ARCH/GARCH models, and spectral analysis. These models have been widely applied to data in many fields. You will learn how to build time series models and how to apply the models to real world problems.

This course will use SAS as the computing environment, but no prior experience with SAS is assumed. We will use SAS Studio, which is available over the web via any browser. But if you have convenient access to SAS in some other way, you are free to use it. A class enrollment link will be e-mailed to you soon.

Prerequisites:

STA2122, STA2171, QMB 3200 or equivalent. Some general knowledge of computer use. Familiarity with the basic ideas of statistics and probability including sample mean, sample standard deviation, expected value, variance, the normal distribution, independence, hypothesis tests, and confidence intervals. Some prior exposure to covariance, correlation, and simple and multiple regression is useful, but not mandatory (since these topics will be discussed in lecture).

Topics:

- Covariance, Correlation, Independence
- Regression
- ARIMA models
- Model identification
- Model checking
- Estimation and forecasting
- Regression models with ARMA errors and lagged inputs
- Rational distributed lag models
- Intervention analysis
- Intervention and outlier Detection
- ARCH/GARCH models (time permitting)
- Spectral analysis (time permitting)

Grading Policy:

There will be two in-class tests (a mid-term and a final) which are equally weighted in determining your test average.

There will be several homework assignments which are equally weighted in determining your homework average. It is important to turn in all of the homework assignments (since there are not that many).

Your course total will be computed using the weights:

- 50% Test average
- 50% Homework average

Your course total will be used to determine your letter grade.

The grade cutoffs will be 90.0% for A, 87.0% for A-, 84.0% for B+, 80.0% for B, 77.0% for B-, 74.0% for C+, 70.0% for C, 67.0% for C-, 57.0% for D. These may be subject to **downward** adjustment.

The final exam is **not** cumulative, but only covers the second half of the course. Tests will **not** require writing SAS programs or commands, but may require interpretation of SAS output, and understanding of the SAS syntax for specifying ARIMA and transfer function models.

Test Dates (tentative):

Test #1 on Wednesday, March 6 from 3:05PM to 4:20PM (in OSB 108)

Test #2 on Thursday, May 2 from 3:00PM to 5:00PM (in OSB 108)

Web Page:

Handouts, homeworks, and examples will be posted at:

<http://ani.stat.fsu.edu/~huffer/mordor/timeseries>

This address must be typed completely; you cannot get there by clicking on a series of links. The posted files are pdf files and require Acrobat Reader to read and print them.

Required Syllabus Statements

University Attendance Policy

Excused absences include documented illness, deaths in the family, and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid written excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of student's academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "... be honest and truthful and ... [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>)

Academic Success

Your academic success is a top priority for Florida State University. University resources to help you succeed include tutoring centers, computer labs, counseling and health services, and services for designated groups, such as veterans and students with disabilities. The following information is not exhaustive, so please check with your advisor or the Department of Student Support and Transitions to learn more.

Americans With Disabilities Act

Florida State University (FSU) values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive, and welcoming. FSU is committed to providing reasonable accommodation for all persons with disabilities in a manner that is consistent with the academic standards of the course while empowering the student to meet the integral requirements of the course.

Students with disabilities needing academic accommodation should:

- (1) register with and provide documentation to the Office of Accessibility Services; and
- (2) request a letter from the Office of Accessibility Services to be sent to the instructor indicating the need for accommodation and what type; and,
- (3) meet (in person, via phone, email, skype, zoom, etc...) with each instructor to whom a letter of accommodation was sent to review approved accommodations.

Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services has been provided.

This syllabus and other class materials are available in an alternative format upon request.

For the latest version of this statement and more information about services available to FSU students with disabilities, contact the:

Office of Accessibility Services

874 Traditions Way

108 Student Services Building

Florida State University

Tallahassee, FL 32306-4167

(850) 644-9566 (voice)

(850) 644-8504 (TDD)

oas@fsu.edu

<https://dsst.fsu.edu/oas>

Confidential campus resources

Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

Victim Advocate Program

University Center A, Room 4100

(850) 644-7161, Available 24/7/365,

Office Hours: M-F 8-5

<https://dsst.fsu.edu/vap>

Counseling and Psychological Services (CAPS)

Florida State University's Counseling and Psychological Services (CAPS) primary mission is to address psychological needs and personal concerns, which may interfere with students' academic progress, social development, and emotional well-being. The following in-person and virtual (tele-mental health) services are available to all enrolled students residing in the state of Florida:

1. Individual therapy
2. Group therapy

3. Crisis Intervention
 4. Psychoeducational and outreach programming
 5. After hours crisis-hotline
 6. Access to community providers for specialized treatment
- Call 850-644-TALK (8255) for more information on how to initiate services.

Counseling & Psychological Services
250 Askew Student Life Building
942 Learning Way
Tallahassee, Florida 32306
Phone: 850-644-TALK (8255)
Walk-in and Appointment Hours:
M-F 8 am – 4 pm

Services at UHS are available to all enrolled students residing in Florida:

The mission of University Health Services (UHS) is to promote and improve the overall health and well-being of FSU students. UHS provides a coordinated continuum of care through prevention, intervention, and treatment. Services include general medical care, priority care, gynecological services, physicals, allergy injection clinic, immunizations, diagnostic imaging, physical therapy, and a medical response unit. The Center for Health Advocacy and Wellness (CHAW) assists students in their academic success through individual, group, and population-based health and wellness initiatives. Topics include wellness, alcohol and other drugs, hazing prevention, nutrition and body image, sexual health, and power based personal violence prevention. For more information, go to uhs.fsu.edu.

University Health Services
Health and Wellness Center
960 Learning Way
Tallahassee, Florida 32306
Hours: M-F, 8 am – 4 pm
Phone: 850-644-6230

Suggested Syllabus Statements

Free Tutoring from FSU

On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options – see <http://ace.fsu.edu/tutoring> or contact tutor@fsu.edu. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

Statement on Public Health Protocols

Classes are expected to continue to meet in person this semester. If necessary, however, we will shift to remote instruction. There are currently no mask mandates in place at FSU, but it is likely that not everyone in the class will feel the same way about public health protocols. Some members of our community remain more at risk than others. We encourage everyone to be patient with one another while we navigate these ongoing challenges.

While the Covid and M-pox pandemics are receding, in order to continue meeting in person, we must all work together as a community to protect one another and to promote our shared health and safety in indoor spaces. FSU will continue to monitor all public health issues. Whatever happens, we are committed to helping you learn the material thoroughly and stay on schedule with your degree program. You can find up-to-date guidance at: <https://uhs.fsu.edu/coronavirus>

Statement for Classes Subject to HB233 Recording

In this class, consistent with state law and university policy, students are permitted to make recordings of class lectures for personal use only. As noted, sharing, posting, or publishing classroom recordings may subject you to honor code violations and legal penalties associated with theft of intellectual property and violations of other state laws. Moreover, students and educators have expressed concern that recording classroom activities may negatively impact the learning experience for others, especially in classes that involve questions, discussion, or participation. To protect a learning environment in which everyone feels free to experiment with ideas, we ask you to refrain from recording in ways that could make others feel reluctant to ask questions, explore new ideas, or otherwise participate in class. Students must monitor their recordings so that they do not include participation by other students without permission. Students with disabilities will continue to have appropriate accommodations for recordings as established by the Office of Accessibility Services.

Statement for Courses Not Subject to HB233 Recording

In this class, consistent with state law and university policy, you may not make recordings of classroom activities without the permission of the instructor. This policy applies to both audio and video recordings.