STA 7934 **High Dimensional Time-series** **Spring 2026**

Course Information

Time: Tue 12.50 p.m.-1.40 p.m. (Period 6) MAT0151
Thu 11.45 a.m. – 1.40 p.m. (Period 5-6) FLI0121 ,

Instructor: Dr. Sayar Karmakar

Office: 207 Griffin Floyd **E-mail:** sayarkarmakar@ufl.edu

Office Hours: TBD

Prerequisite

We will learn everything from the scratch. However, at least first year PhD level classes will be necessary. Some knowledge on martingales and estimation theory will be assumed.

Text

We will not follow any particular text but the following could be helpful for your own understanding

1. Shumway Stoffer for very basic introduction to time-series http://www.stat.ucla.edu/~frederic/415/S23/tsa4.pdf
2. Anderson. The Statistical Analysis of Time Series
3. Hall and Heyde for martinagles.
   http://www.stat.yale.edu/~mjk56/MartingaleLimitTheoryAndItsApplication.pdf

Course contents

1. Basics of time series: ACF, AR, MA models
2. Basics of time series: spectral density function
3. Multivariate time series and cointegration
4. Penalized regression background: LASSO, ridge
5. High-dimensional statistics for inference: "de-biased/desparsified" LASSO, orthogonalization and double ML, post-selection inference, knockoffs, precision-matrix debiasing (GLasso/CLIME)
6. High-dimensional VAR estimation
7. Other time-series models: factor models, etc.
8. Nonlinear time series
   (a) Mixing processes
   (b) Functional dependence

9. Inference in time series: time-varying coefficients, changepoints
10. Forecasting models: classical and modern
11. Forecast comparison frameworks
12. Beyond temporal dependence: spatial and spatiotemporal models

Course Website

Canvas course page. Please check the canvas site regularly. Most course documents and important information, including homework exercises and solutions, sample exams (if any) and special announcements, will be posted in canvas.

Mode of teaching

This class is offered completely in-person. There is a slim possibility that it might change accordingly as the situation develops.

Exams and Grades

Depending on enrollment, this class will have either

- One exam and one project/ paper presentation
- Two exams

I am leaning towards option 1. If that is the case, the exam will likely be right after spring break (check UF Acdemic calendar) with the project/presentation part taking place over the next 3/4 weeks.

- There will be 3 Homework problem sets.
- HWs, Exam 1 and Exam 2/Project/presentation will carry 30,40 and 30 percent respectively.
- Letter grade allocation

		A	91 to 100	A-	88 to $<$ 91
B+	84 to $<$ 88	B	80 to $<$ 84	B-	77 to $<$ 80
C+	74 to $<$ 77	C	70 to $<$ 74	C-	67 to $<$ 70
D+	64 to $<$ 67	D	60 to $<$ 64	D-	55 to $<$ 60
E	$<$ 55				

Lecture Attendance

Classroom lecture attendance is fully expected, even if not strictly enforced. You are responsible for learning all material presented during lecture, and any topic covered is a potential exam topic (unless otherwise stated).

Reasonable Accommodations

To request classroom accommodation, please be certain that you have made all necessary arrangements with the Dean of Students Office, and obtain from them documentation to submit to the instructor at the time of your request. A request must be made to the instructor at least one week in advance of the date for which the accommodation is requested. This course information and policies sheet can be made available in alternative formats to accommodate print-related disabilities. Contact the instructor for more information.

Academic Integrity

Please familiarize yourself with the Student Honor Code and Academic Honesty Guidelines outlined in your University of Florida Student Guide at `http://www.dso.ufl.edu/sccr/honorcode.php`.