

## DA 513

### TIME SERIES ANALYSIS

**Instructor:** Özgür Asar

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#### Course schedule

**Term:** Spring Term, 2022-2023 Academic Term

**Start/End:** 28 January – 15 March, 2023

**When:** Wednesday 19:00 - 22:00, Saturday 09:00 - 12:00

#### Course Description and Outline

This course covers the following methods for analysis of time series data:

- Visualisation and exploratory methods: graphical methods, autocorrelation and partial autocorrelation functions
- Concepts and tests for stationarity and white noise
- Seasonality
- Smoothing methods
- Moving average, autoregressive methods
- Forecasting with time series data
- Seasonal models
- Multivariate time series models, vector models
- Machine learning methods for time series analysis

#### Course Format

Lectures will be supported with computational methods and programming work using Python. You are expected to work with Jupyter Notebooks during the course. All submissions (assignments, take-home etc.) must be in the .ipynb format uploaded to SUCourse+ as Jupyter Notebooks. File name convention for uploads is lastname\_firstname\_hw#.ipynb.

#### Course Notes

Course lectures will be uploaded to SUCourse+ in the pdf format. Python notebooks we use in class will also be available on SUCourse+, so you can download and practice on them.

## **Textbooks**

Changquan Huang, Alla Petukhina (2022) Applied Time Series Analysis and Forecasting with Python. Springer.

## **Assessment**

Midterm (35%)

Final (40%)

Homeworks (25%)

## **Software**

We will use Python and its relevant libraries (Numpy, Scipy, stasmodels, scikit-learn) throughout the course (exercises, homework assignments and exams).

## **Course communication**

Course-related announcements will be communicated through SUCourse+. Lectures, handouts, solution sets and Python Notebooks will be posted on SUCourse+. E-mail is my preferred way of communication if you need to reach me as I happen to check my mail on a regular basis.

## **Collaboration**

You are more than welcome, and even encouraged to discuss the problems in your homework assignments with your fellow classmates. You are, however, expected to submit your own work prepared in your own words. You are also expected to comply with the ethical standards of the university and stay away from any sort of dishonesty (cheating, copying somebody else's work, etc.).

## **Disclaimer**

This is a tentative syllabus which is subject to change. Any changes in the syllabus will be announced via email or SUCourse+, or you'll be notified in class.