The Hebrew University of Jerusalem

Syllabus

Time series analysis for environmental sciences - 71106

Last update 22-08-2023

HU Credits: 3

Degree/Cycle: 2nd degree (Master)

Responsible Department: Soil and Water Sciences

Academic year: 0

Semester: 1st Semester

Teaching Languages: English

Campus: Rehovot

Course/Module Coordinator: Yair Mau

Coordinator Email: yair.mau@mail.huji.ac.il

Coordinator Office Hours: By appointment

Teaching Staff:
Dr. Yair Mau,
Mr. Erez Feuer

Course/Module description:
Data analysis of time series, with practical examples from environmental sciences.

Course/Module aims:
This course aims at giving the students a broad overview of the main steps involved in the analysis of time series: data management, data wrangling, visualization, analysis, and forecast. The course will provide a hands-on approach, where students will actively engage with real-life datasets from the field of environmental science.

Learning outcomes - On successful completion of this module, students should be able to:
- Explore a time-series dataset, while formulating interesting questions.
- Choose the appropriate tools to attack the problem and answer the questions.
- Communicate their findings and the methods they used to achieve them, using graphs, statistics, text, and a well-documented code.

Attendance requirements(%):
100

Teaching arrangement and method of instruction: Frontal lectures in a computer classroom

Course/Module Content:
Data wrangling: organization, cleaning, merging, filling gaps, excluding outliers, smoothing, resampling.
Visualization: best practices for graph making using leading python libraries.
Analysis: stationarity, seasonality, (auto)correlations, lags, derivatives, spectral analysis.
Forecast: ARIMA
Data management: how to plan ahead and best organize large quantities of data. If there is enough time, we will build a simple time-series database.

Required Reading:
course website
https://yairmau.com/time-series/

Additional Reading Material:
None

Grading Scheme:
Essay / Project / Final Assignment / Home Exam / Referat 50 %
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 50 %

Additional information:
None