BUT HIGHLY RECOMMENDED

Prof. Nicola Cenni (Università di Padova)

Introduction to time series analysis in Geosciences

75% ATTENDANCE MINIMUM

Introduction to time series analysis in Geosciences

(Lecturer: Prof. Nicola Cenni)

The monitoring of a geological and geophysical phenomena produces one o more time series. These series should be analyzed in order to estimate the parameters that characterize the time evolution of these processes. The values of these parameters are used as input at the models that reproduce these phenomena or as comparison to verify if the model reproduce the observations. Therefore a correct time series analysis is fundamental to develop a correct geological/geophysical model. This course would like to describe briefly the principal methods adopted to estimate the fundamental parameters (e.g.,mean, root mean square) from a time series. During the course will be explained briefly the statistical meaning and the methods adopted to estimate these values and possible practical problems during their evaluation. The free software R will be also discussed during the course and some simple R codes about the statistical arguments treated will be shown and explained. The procedure to analyze the time series of some different geophysical observations (GPS, piezometric level, compaction and others….) will be discussed and shown. In particular, the analysis methods of a GPS time series will be argued and it will show the characteristics of these series. The general contents of the course are:

1)The fundamental values: mean, Root Mean Square, medium (mediana) weighted or not weighted
2)Autocorrelation and Correlation (Cluster analysis)
3)Least Square Method
4)Moving Window Methods
5)Spectral analysis (FFT, DFT, and Lomb Scargle method)
6)Stationary Models (ARMA)
7)GPS/GNSS time series: characteristics and problems.

SCHEDULE: June30- July 9- see SCHEDULE for details
LOCATION: telematic due to COVID-19 emergency

Introduction to time series analysis in Geosciences

Schedule II semester 2019-2020

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
				MAY 1	2	3
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
4	5	6	7	8	9	10
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
11	12	13	14	15	16	17
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
18	19	20	21	22	23	24
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
24	26	27	28	29	30	31
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
JUNE 1	2	3	4	5	6	7
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8	9	10	11	12	13	14
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
15	16	17	18	19	20	21
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
22	23	24	25	26	27	28
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
29	30	JULY 1	2	3	4	5
	CENNI 14.00-16.00	CENNI 14.00-16.00	CENNI 14.00-16.00			
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6	7	8	9	10	11	12
	CENNI 14.00-16.00	CENNI 14.00-16.00	CENNI 14.00-16.00			
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
13	14	15	16	17	18	19
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
20	21	22	23	24	25	26