UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

DIPARTIMENTO DI INGEGNERIA INDUSTRIALE

SCUOLA POLITECNICA E DELLE SCIENZE DI BASE

PHD COURSE IN INDUSTRIAL ENGINEERING (A.Y. 2024/2025)

CURRICULUM ENGINEERING MANAGEMENT, QUALITY AND DATA SCIENCE FOR TECHNOLOGY

STATISTICAL PROCESS MONITORING OF HIGH-DIMENSIONAL ENGINEERING DATA

(24 hours / 6 CFU - SSD: STAT-01/B)

Antonio Lepore, Christian Capezza

www.sfere.unina.it

AIM OF THE COURSE: Training on the application (illustrated through open-source statistical software environment R and the `funcharts` R package) of statistical process monitoring of complex engineering data for decision-making. Every student must choose a data analysis project gathered during the course and develop it by working in a team. In this way, students will have the opportunity to improve their ability to recognize and implement the most suitable statistical techniques for the problem at hand, as well as to communicate relevant results and the impact of their analysis also to non-statisticians.

The course is organized in the following two modules:

- Univariate and Multivariate Statistical Process Monitoring (3 CFU) - **A. Lepore** (12 hours)
- Statistical Process Monitoring of Functional Data (3 CFU) - **C. Capezza** (12 hours)

LESSON CALENDAR:

MODULE Univariate and Multivariate Statistical Process Monitoring

- Monday, 3 February 2025 (A. Lepore) 10:00-13:00; Room E, P.le Tecchio
- Thursday, 6 February 2025 (A. Lepore) 10:00-13:00; Room E, P.le Tecchio
- Monday, 10 February 2025 (A. Lepore) 10:00-13:00; Room E, P.le Tecchio
- Friday, 14 February 2025 (A. Lepore) 10:00-13:00; Room E, P.le Tecchio

MODULE Statistical Process Monitoring of Functional Data

- Monday, 17 February 2025 (C. Capezza) 10:00-13:00; Room E, P.le Tecchio
- ~~Thursday~~, ~~20~~ Wednesday, 19 February 2025 (C. Capezza) 10:00-13:00; Room E, P.le Tecchio
- Monday, 24 February 2025 (C. Capezza) 10:00-13:00; Room E, P.le Tecchio
- Thursday, 27 February 2025 (C. Capezza) 10:00-13:00; Room E, P.le Tecchio

DETAILS: The course must be attended in person and held in English. The final examination will consist of the presentation and discussion of a data set – chosen by the student – on which at least one of the methods presented in the course will be applied.

HOW TO ENROLL THE COURSE: Students interested in this course can enroll by filling out the form available here before 31 January 2025.

MAIN REFERENCES

- Montgomery, D.C. (2012). Introduction to Statistical Quality Control. John Wiley & Sons.
- Johnson, R.A. & Wichern, D.W. (2007) Applied Multivariate Statistical Analysis, Pearson.
- Ramsay, J.O. & Silverman, B.W. (2005) Functional Data Analysis, Springer.

INSTRUCTORS

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