# *Ad hoc* course announcement

Title: **IoT Data Analysis**

Lecturer: **Prof. Raffaele Della Corte**

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CV*: Raffaele Della Corte (Ph.D.) received his MSc degree in Computer Engineering in 2012, and the PhD degree in 2016 from the Federico II University of Naples, Italy, where he is currently an Assistant Professor. His research interests include data-driven failure analysis, on-line monitoring of software systems, and security.*
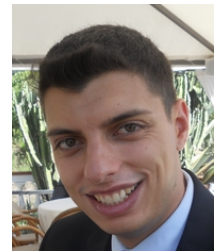
Credits: **4**

Overview

This course will present advances on Data Analysis with emphasis on its adoption in the Internet of Things environments, where vast amounts of data are generated from multiple and heterogeneous data sources.

The course will provide the students with the concepts and advanced techniques for analyzing field data (such as computer logs, event trace, system level metrics, IoT data) to understand the behavior of an IoT system from a dependability point of view. The course puts the basis for the development of analysis frameworks the students can leverage in their own research field.

The final assessment will require students to prepare a good quality presentation about the potential application of the provided Data Analysis concepts and techniques to their research activities. Student's presentations will take place in the last lesson. Details about the presentation format and schedule will be given during the course.

Schedule

Lecture	Date	Time	Room	Topics	Lecturer
1	Feb. 08, 2024	10:30 – 12:30	C2A	IoT overview	Prof. Raffaele Della Corte
2	Feb. 09 2024	10:30 – 12:30	C2A	Data Analysis concepts	Prof. Raffaele Della Corte
3	Feb. 15, 2024	10:30 – 12:30	C2A	Data sources: from computer logs to IoT data	Prof. Raffaele Della Corte
4	Feb. 16, 2024	15:30 – 17:30	C2A	Data analysis and anomaly detection in IoT (part 1)	Prof. Raffaele Della Corte
5	Feb. 22, 2024	10:30 – 12:30	C2A	Data analysis and anomaly detection in IoT (part 2)	Prof. Raffaele Della Corte
6	Feb. 23, 2024	10:30 – 12:30	C2A	Monitoring infrastructures for IoT and CPS systems	Prof. Raffaele Della Corte
	Mar. 01, 2024	14:30 – 18:30	C2A	Assessment Test	Prof. Raffaele Della Corte

Content details

Lesson 1 - IoT overview. Introduction to the Internet of Things context. The IoT/OpenFog consortium reference architecture. Edge, Fog and Cloud computing. Industrial IoT (IIoT). Requirements and Constraints in IoT environment.

Lesson 2 - Data Analysis concepts. The data analysis process and objectives. The role of data in IoT environments. Challenges of data analysis in IoT systems.

Lesson 3 - Data sources: from computer logs to IoT data. Introduction to the main data sources for dependability analysis and data collection techniques. Direct and Indirect monitoring. Event logging, tracing, source code instrumentation, MQTT-based sensor data collection.

Lesson 4 and 5 - Data analysis and anomaly detection in IoT. From Time series analysis to Field failure data analysis. Stream processing, data mining and Machine Learning techniques in IoT environments.

Lesson 6 - Monitoring infrastructures for IoT and CPS systems. Multi Agent Systems and Event-driven solutions.

Assessment. The lesson is dedicated to the final assessment.

By 19th January 2024, participants are requested to join the following MS Teams group:

https://teams.microsoft.com/l/team/19%3aJbvyf0UMvKsxVruFylVI4Nae5bhqqwIhZMe2FGsOM9I1%40thread.tacv2/conversations?groupId=fe0d2607-212d-4abf-8a92-ba972b421d4a&tenantId=2fcfe26a-bb62-46b0-b1e3-28f9da0c45fd

Once accepted in the Teams group, students have to fill the following .xlsx file with their information (i.e., Student name and surname, e-mail, name of the PhD course, PhD cycle):

https://communitystudentiunina.sharepoint.com/:x:/s/IoTDataAnalysis-ITEEA.A.2023-24/EXLbGuHnfxtGtJzMKNujA-ABiiFTyJ81oqaYTfNsTar-SQ?e=dMQLix

The course is conducted on-site. However, students pursuing their PhD period abroad (for research purposes) have the option to request remote attendance for classes via MS Teams.

For information: Prof. Raffaele Della Corte (DIETI, UniNA) – raffaele.dellacorte2@unina.it