**Title: Data-driven Methods in Engineering**

**The course will be held online and includes a final assessment.**

The course consists of 12 hours of lectures and aims to provide the main elements related to artificial intelligence-based techniques applied to the modeling of complex dynamic systems. Specifically, the program includes:

- **Introduction to Deep Learning** (3 hours): from models of biological neurons to early neural networks, soft computing, learning algorithms and methodologies, intelligent hierarchical structures, bio-inspired architectures, and architectures of modern artificial intelligence systems (**Dr. Rundo – Prof. Tallarico, Tuesday, June 10th, 10:00 AM – 1:00 PM**);

- **Deep Learning: advances and applications** (2 hours): hybrid and perceptive AI algorithms, salience and perception, attention mechanisms, comparison between convolutional networks and transformers, reinforcement learning, and applications of artificial intelligence in the automotive, medical, and industrial sectors (**Dr. Rundo – Prof. Tallarico, Wednesday, June 11th, 10:00 AM – 12:00 PM**);;

Modules:

- **Stochastic Geometry and its applications** (2.5 hours): Point Process Theory, examples and applications to wireless communications and other areas of engineering (random sampling, sensor networks, environmental monitoring, crowd-sensing) (**Prof. Zabini, Thursday, June 12th, 10:00 AM – 12:30 PM**);

- **Data driven learning of road users' behavior** (2 hours): development of data-driven tools that predict the behavior of human road users in traffic scenarios, for autonomous driving applications (**Prof. Falcone, Thursday, June 12th, 2:00 PM – 4:00 PM**);

- **Artificial Intelligence for Stylistic Design Engineering** (2.5 hours): AI-driven stylistic applications in Automotive, Health, Industrial Mechanics, and Plant Design (**Prof. Frizziero, Monday, June 16th, 2:00 PM – 4:30 PM**);

**Teams link to join the lessons:**
[Corso Dottorato 2025 - Data-driven methods in engineering | Generale | Microsoft Teams](https://teams.microsoft.com/l/team/19%3Abph7bUPfRuui5rJO26n_maLJbPiVEdD9Chyjm2X9KgQ1%40thread.tacv2/conversations?groupId=cc6144a8-28d1-459f-a78a-5f7588523991&tenantId=e787b025-3fc6-4802-874a-9c988768f892)

**Mandatory registration (by June 5th) must be completed using the following link:**<https://forms.gle/UmEpWbgigT25CWL17>