Alta Scuola Politecnica
15th cycle - Winter School 2020

Digital twins: how digitalization and data will change industry, cities and everyday life

Coordinator	Paolo Rocco
Co-Coordinator	Giambattista Gruosso
Tutors	Ruggero Colombari, Elettra D'Amico, Alessandro Destefanis, Francesco Milone, Andrea Panelli

The Winter School this year will be centered on the concept of digital twin, intended as an alter ego of the subject. The School will address the application scenarios of industry (alter ego of a machine), of our living environment (alter ego of the building or of the city), and of the citizen with reference to the healthcare domain (alter ego of the patient). Foundations on data science and big data management, as well as discussions of social and ethical aspects of digitalization of lives and work, will complete the program.
Due to the COVID 19 emergency, the School will be completely held at distance, enjoying an innovative format. Specifically, the School will be organized **around three moments**:

May 11th - May 17th
Self learning by students based on pre-recorded lectures

During this week, students will have the opportunity to download lectures pre-recorded by the Faculties of the School. Each lecture will last between 45' and 60'.
The list of lectures and lecturers follows:

Technologies and architectures for data science and big data management
Elena Baralis, Politecnico di Torino, Dep. of Control and Computer Engineering

Data usage for smart cities
Marco Brambilla, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering *13.10Lunch*

Digital Open Urban Twins
Matteo Robiglio, Politecnico di Torino, Dep. of Architecture and Design

Digital Building Twin
Anna Osello, Politecnico di Torino, Dep. of Structural, Geotechnical

Integration of multimodal information in health: towards the concept of digital twin
Sergio Cerutti, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering

Artificial intelligence and data science in healthcare
Gabriella Balestra, Politecnico di Torino, Dep. of Electronics and Telecommunications

mHealth and self-tracking: welcome to real-word Data
Enrico Caiani, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering

Industry 4.0: smart products, smart process and new business models
Marco Taisch, Politecnico di Milano, School of Management of Politecnico di Milano

Digital twins in industry
Giambattista Gruosso, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering

Data generation: the Internet of Things
Matteo Cesana, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering   *12:30*

Data usage in industry: the intelligent robotics
Paolo Rocco, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering

The transformation of work
Paolo Neirotti, Politecnico di Torino, Dep. of Management and Production Engineering

Digital moral twin: embracing active responsibility in an active way
Viola Schiaffonati, Politecnico di Milano, Dep. of Electronics, Information and Bioengineering

Four thematic meetings will be organized with Professors of the School through the Microsoft Teams platform. Students will have the opportunity to engage in discussions with Professors on the topics of their lectures.
Two experts from industry will participate in the meetings:

Fabrizio Ferro, PTC
Simone Marchetti, Oracle

Schedule of the meetings is as follows:

Wednesday, May 20th, 17:00-19:00
Digital Twin for Smart Cities
Elena Baralis, Marco Brambilla, Anna Osello, Matteo Robiglio

Friday, May 22th, 17:00-19:00
Digital Twin for Healthcare
Gabriella Balestra, Enrico Caiani, Sergio Cerutti

Monday, May 25th, 17:00-19:00
Digital Twin for Industry
Matteo Cesana, Giambattista Gruosso, Paolo Rocco, Marco Taisch

Wednesday, May 27th, 17:00-19:00
Social and Ethical Aspects
Paolo Neirotti, Viola Schiaffonati

From May 18th on
Project works

Students will attend at their project work for the School using the Microsoft Teams platform divided in (virtual) groups and supervised by five tutors. The activities of the project work will be related to the theme of the School, possibly with specific reference to the use of digital twins for the sanitary emergency and the post-coronavirus lives.