PhD DISG

Director
Patrizia Trovalusci

Sapienza Università di Roma
PhD Program in
Structural and Geotechnical Engineering

**February 20, 22, and 23, 2024 – 10:00am-1:00pm**


## Prof. Vincenzo Gattulli

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# Reverse Engineering: fundamentals, models, monitoring, digital twins

Reverse engineering (or sometimes back-engineering) is a process that is designed to extract enough data from a product or a construction and then to be able to reproduce that product or to renovate it. In this context, this 3 days course is aimed at proposing a general framework for interacting methodologies used to digitally describe existing construction for different aims such as structural safety evaluation, management, new functionalization, monitoring and retrofitting. Starting from basics in structural dynamics the flow of data coming from vibration measurements and their treatment is presented as an archetypal use of observations of the given product. The key ingredients of structural identification are introduced such as: principles of direct and inverse dynamics, output-only parametric identification and strategies of model updating. Then, issues related to the creation of advanced integrated modelling are considered, such as: 3D point cloud to building information modelling (3DPCM-to-BIM) and building information modelling to finite element modelling (BIM-to-FEM). Finally, innovative use of data coming from different sources (vibration measurements, image processing, satellite interferometry) within an integrated monitoring environment are presented as fundamental steps for the realization of digital twins of products and constructions in changing environment.

Program:
https://phd.uniroma1.it/web/course---reverse-engineering-fundamentals-models-monitoring-digital-twins_ns5702EN_EN.aspx

Registration form:
https://forms.gle/truxkc1jvcgYZwMAA

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