



The department of Excellence DII organizes
a short course for PhD program in Industrial Engineering at Federico II on

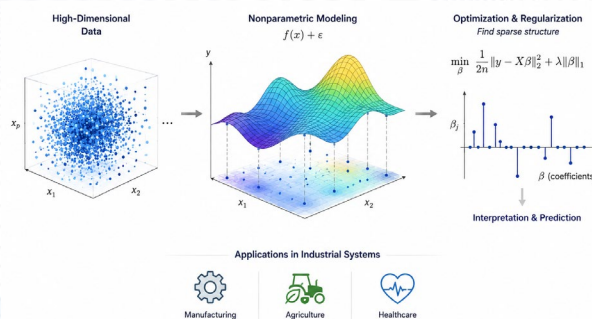
High-Dimensional and Nonparametric Data Analytics for Industrial Systems

Prof. **Mostafa Reisi Gahrooei**, Federico II Visiting Professor

Associate Professor at the Department of Industrial and Systems Engineering, University of Florida, Gainesville, FL

October 5th-November 3rd 2026

Scuola Politecnica e delle Scienze di Base, Aula MUNDUS, II Floor, Building 10, via Claudio 21, 80125 Napoli (Italia)



Course contents

This course covers fundamental theories and methods in high-dimensional data analytics with an emphasis on applications in industrial and systems engineering, including manufacturing, agriculture, and healthcare. Topics include statistical learning and nonparametric modeling techniques (e.g., polynomial regression, spline methods, and kernel-based approaches), multichannel and structured data analysis, regularization methods for high-dimensional data, dimensionality reduction, and optimization algorithms for data-driven modeling, including first-order methods, second-order methods, and the Alternating Direction Method of Multipliers (ADMM). The objective of this course is to provide students with the theoretical foundations and computational tools for analyzing and modeling high-dimensional data that arise in modern data-rich engineering systems. Upon successful completion of the course, students will be able to explain the opportunities and challenges associated with high-dimensional data analysis; apply statistical learning and nonparametric modeling techniques to analyze complex, high-dimensional datasets; formulate and solve optimization problems for high-dimensional data modeling using modern optimization algorithms.



Lecturer



Education: 2015 - 2019 Ph.D. in Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA; specialization in System Informatics and Control, minor in Machine Learning. 2018 M.S. in Computational Science and Engineering, Georgia Institute of Technology. 2012 M.S. in Applied Mathematics and 2011 M.S. in Civil and Environmental Engineering, Southern Illinois University Edwardsville. 2008 B.S. in Civil and Environmental Engineering, Isfahan University of Technology, Isfahan, Iran.

Editorial Service: Associate Editor of Technometrics; Associate Editor of IIEE Transactions; Guest Associate Editor for IIEE Transactions Special Issue.

Research Grants: National Science Foundation grants including Multi-Agent Adaptive Data Collection for Automated Post-Disaster Rapid Damage Assessment; Connected Federated Farms: Privacy-Preserving Cyber Infrastructure for Collaborative Smart Farming; and Dynamic Disruption Prediction System for Transportation Networks. Additional funded projects supported by NOAA, KBR Inc., UF BRAIN Center, UF Foundation, UF Informatics Institute, and ISE CRSF seed fund.

Teaching Experience: University of Florida: Operations Research II; Advanced Quality Management and Engineering for Business Processes; High Dimensional Data Analytics; Applied Probability Methods in Engineering; Industrial Quality Control; Mathematical Foundations for Applied Data Science.

Georgia Institute of Technology: Methods for Quality Improvement; Basic Statistical Methods; Statistical Methods; Six Sigma; Nonparametric Statistics.

Southern Illinois University Edwardsville: College Algebra; Differential Equations Lab.



Detailed Course Programme

Monday Oct 5th, 2026 Aula MUNDUS	11:00-11:30:	Welcome and greetings from the Department of Industrial Engineering (DII): prof. Antonio Lanzotti Chair of the DII Excellence Teaching Committee (CODEC)
	11:30-13:00:	Introduction to high-dimensional data and related challenges.
Monday Oct 5th, 2026 Aula MUNDUS	14:30-16:30:	Linear regression and generalized linear regression for high-dimensional data analysis.
Monday Oct 12th, 2026 Aula MUNDUS	11:00-13:00:	Local regression and kernel regression: discussion of nonparametric modeling choices.
Monday Oct 12th, 2026 Aula MUNDUS	14:30-16:30:	Review of the basics of convex optimization for data-driven modeling.
Monday Oct 19th, 2026 Aula MUNDUS	11:00-13:00:	Large-scale optimization algorithms.
Monday Oct 19th, 2026 Aula MUNDUS	14:30-16:30:	Regularization for high-dimensional data: ridge, lasso, adaptive/group lasso, non-negative garrote and rank penalties.
Tuesday Oct 20th, 2026 Aula MUNDUS	11:00-13:00:	Dimensionality reduction including tensor decomposition; applications in prognostics, fault detection and monitoring; summary/discussion.
Tuesday Nov 3rd, 2026 Aula MUNDUS	11:00-13:00:	Final Test.

⚠ The course is in person only; registration is required at this [link](#).

Additional Info

The official language will be English. Lessons will include in-class activities.

In-person participation in the course and successful completion of the final test will give

- **PhD students** the right to **4 CFU**.
- **Master's degree students** the right to **2 CFU** in other knowledge.

Acknowledgments

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