

***Introductory***

**Algorithmics** (Alberto Lluch Lafuente, 20h)

**Basic Numerical Linear Algebra** (Luigi Brugnano, 20h)

**Computer Programming and Methodologies** (Michele Loreti, 20h)

**Formal Methods for Computer Science** (Valerio Senni, Rocco De Nicola, 20h)

**Optimal Control** (Giorgio Gnecco, 20h)

**Essentials of Calculus** (20 h, Alex Petersen, Orion Penner, ECON)

**Foundations of Probability Theory** (20h, Irene Crimaldi, ECON)

**Introduction to Mathematical Statistics and Stochastic Processes** (20h, Irene Crimaldi, ECON)

prerequisites: Foundations of Probability Theory

**Management (Basics)** (10 h, Massimo Riccaboni)

**Introduction to Networks Theory** (10 h, Guido Caldarelli)

***Advanced***

**Cloud computing for big data analysis** (20 h, Claudio Lucchese, Fabrizio Silvestri, Nicola Tonellotto)

**Complex Systems and Data Crunching** (20 h , Alessandro Chessa, Guido Caldarelli)

**Computational Finance** (Michele Bonollo, 20 h)

**Computational Contact and Fracture Mechanics** (Marco Paggi, 20 h)

**Convex Optimization** (20h, Alberto Bemporad, Panagiotis Patrinos)

**Large Scale Image Analysis for Natural and Life Sciences** (20h, Sotirios Tsaftaris , Dharmakumar)

**Machine Learning and Pattern Recognition** (Sotirios Tsaftaris, 20h)

**Management** (Massimo Riccaboni, 10h)

**Mobile and online social networking** (20 h, Andrea Passarella, Claudia Boldrini)

**Model Checking** (20h, Alberto Lluch lafuenta, Prof TBD)

**Modelling and Verification of Reactive Systems** (20h, Rocco De Nicola)

**Model Predictive Control** (Alberto Bemporad, 20h)

**Networks Theory** (20h , Guido Caldarelli, Massimo Riccaboni)

**Numerical Methods for the Solution of PDEs** (Marco Paggi, 20 h)

**Principles of Concurrent and Distributed Programming** (Rocco De Nicola, 20h)

**Quantitative Finance** (Roberto Renò, 20h)

**Software Engineering and Service-Oriented Systems** (20 h, Francesco Tiezzi, Martin Wirsing)

**Timed automata and logics for real-time systems** (20 h, Luca Aceto)

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**Advanced Topics of Computer Science** (40 h, Rocco De Nicola + CNR TBD + external TBD)

**Advanced Topics of Control Systems** (20 h, Alberto Bemporad + TBD)

**Advanced Topics of Image Analysis** (Sotirios Tsaftaris, 20h)

**Advanced Topics of Management Science** (40 h, Massimo Riccaboni, Guido Caldarelli, Andrea Gabrielli)

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***From ECON and MDCH***

**Game Theory** (30 h, Nicola Dimitri, ECON)

**Econometrics 1** (40 h, Cristina Tealdi, Marco Leonardi, ECON)

**Econometrics 2** (30 h, Carla Rampichini, Valentina Tortolini, Elefterios Ioannis, ECON)

**Introduction to Stochastic control theory and applications** (20 h, Andrea Vindigni, Simone Scotti, ECON)

**Management of Complex Systems: approaches to problem solving** (40 h, Andrea Zocchi, Dario Cacciatore, MDCH)

***“Long Seminars” and Lab.***

**Statistics Lab** (10h, Rodolfo Metulini, ECON)

prerequisites: “Foundations of Probability Theory” and “Introduction to Mathematical Statistics and Stochastic Processes”

**Ethics and Research: Objectivity, neutrality and values in sciences** (10 h, Stefano Gattei)

**Scientific writing, Dissemination and Evaluation** (8 h, Luca Aceto)

**Intellectual property and management of research** (15 h, Marco Paggi)