



UNIVERSITÀ DI PISA
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE
Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

**"DESIGN OF EXPERIMENTS AND LINEAR MODELLING:
Statistical concepts and R programming"**

Dr. Nevio Dubbini

CEO di MININGFUL STUDIO S.R.L. SEMPLIFICATA UNIPERSONALE
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Short Abstract:

This course aims to provide attendants with statistical tools for handling data collection, base statistical testing and linear modeling, including ANOVA, non-parametric tests and Linear Regression framework.

The course is focused on solving the major problems and difficulties encountered during the analysis of data collected from open field experiments, therefore subject to high variability due to factors that are not always controllable or measurable, data loss, difficulty of replication of experiments over time and large and variable surfaces.

The course will consist of classes explaining the theory and practical exercises related to the applications, by using the statistical software R. Attendants will be provided with sample code in R notebooks. Attendants can then use the codes provided to test, replicate and adapt the statistical models presented during the lectures to their own data.

Course Contents in brief:

Proposal for 6 lectures, 3 hours each, divided into theory and practice

- Descriptive statistics, centrality and variability measures
- Sampling methods
- Principles of Design of Experiments
- Hypothesis testing
- ANOVA and Contrasts
- Linear Regression and Post hoc tests

Total of hours of lecture: 18

References:

[1] Dalgaard P., *Introductory Statistics with R*, Springer (2008)

CV of theTeacher

Nevio Dubbini is a Ph.D. in Applied Mathematics, having always worked in strongly interdisciplinary contexts. He collected multiple experiences in this interdisciplinary endeavor, ranging from Engineering to Cultural Heritage, from Agronomy to Medicine. Nevio combines technical competences with result-oriented, team-working skills, and international networking experience, developed also within his research work. He currently run Miningful Studio, a company operating in the area of Data Science, AI, and Statistics. Our modus operandi regularly include working with R and deliver results within notebooks and shiny custom developed web apps.

Skills

- Expertise: Statistics, Machine learning, Data science, Neural Network, Pattern recognition, Simulation, Mathematical modelling, Predictive modelling, Scientific computing, Algorithms, Big data
- Programming: R and R-API supported languages, Python and Python-API supported languages, Matlab, SQL, Excel, Spss, Stata
- Reporting: Report, slide, presentations in Latex, Word, Powerpoint, Beamer, Tableau, Shiny
- Soft skills Problem solving, Organizational skills, Efficiency, Creative thinking, Result-oriented, Public speaking Team-working, International networking
- Languages English, Italian

Education

- Jan'06 - Jun'10: PhD in Applied Mathematics (Control Engineering), Mathematics department, University of Pisa, Title: Left invertibility of I/O quantized systems - IFS, number theory, cryptography, algorithms. Supervisors: Prof. Antonio Bicchi, Prof. Benedetto Piccoli.
- Jan'09 - Sep'09: Fellowship, Research center "E. Piaggio", University of Pisa, Italy, Analysis and control of hybrid logical-dynamical systems.

- Feb'05: Laurea (Master's Degree) in Mathematics, cum laude, University of Pisa, Title: Dynamical systems and computable information. Supervisor: Prof. Vieri Benci.

Work career (very short version)

- 2010-2012: Clinical Biochemistry and Molecular Biology lab, University of Pisa, Italy (postdoc), fMRI time series analysis; Mathematical models for human brain activations and connectivity, brain images processing.
- 2012-2013: Mathematics Department, University of Pisa, Italy (postdoc), Statistical and mathematical modelling, algorithms and simulations, relative to Archaeological potential, Predictive archaeology, Archaeological maps and images processing.
- 2013-2017: Professional data scientist, Statistics, Machine Learning, Algorithms and Mathematical Models for business and scientific research
- 17-present: CEO of Miningful Studio, company operating in the area of Data Science, Artificial Intelligence, Machine Learning for business and scientific research.

Room and Schedule

- 20/01/2021, 9:30 - 12:30
- 27/01/2021, 9:30 - 12:30
- 03/02/2021, 9:30 - 12:30
- 10/02/2021, 9:30 - 12:30
- 17/02/2021, 9:30 - 12:30
- 24/02/2021, 9:30 - 12:30