Ph.D. programme in Civil Systems Engineering

Mathematical Modeling in MATLAB

Dr. Maria Rosaria Mattei

Credits: 3 CFU
Number of hours: 18 frontal hours
Date: 06-14-21/05/24, 04-12-17/06/2024

Objectives: The course aims to provide students with a solid foundation in using MATLAB software for modeling and data analysis purposes. Students will acquire skills for data analysis and implementation of algorithms to solve specific problems within their research field. They will develop problem-solving skills and familiarity with MATLAB tools that could be applied in various academic and professional contexts.

Course programme: The course will cover both basic and advanced features of MATLAB, including concepts such as fundamental data types (vectors, matrices, cells), operators, loops, string manipulation, file handling, and graphical plots. Additionally, the course will cover advanced concepts like interpolation and numerical integration of ordinary differential equations.

Teaching materials: Lecture notes and/or indication of websites provided by the Teacher.

Assessment methods: Final interview

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Lectures Program

N	Date	Schedule	Duration	Topic / Teacher
1	06/05/24	10:30 - 13:30	3 hours	Introduction to MATLAB, Variable and File Name, Vectors and Matrices, Random Numbers, Array Operation, Syntax/Commands, Examples.
2	14/05/24	10:30 - 13:30	3 hours	Two- and Three-Dimensional Plotting, Scripts, Syntax/Commands, Examples.
3	21/05/24	10:30 - 13:30	3 hours	Relational Expressions, Programming in MATLAB, Conditional Statement definition, Syntax/Commands, Examples.
4	04/06/24	10:30 - 13:30	3 hours	Loop Statements, User-Defined Functions, Syntax/Commands, Examples.
5	12/06/24	10:30 - 13:30	3 hours	Polynomials, Fitting, Interpolation and splines fitting, Import and manipulate data files, Syntax/Commands, Examples.
6	17/06/24	10:30 - 13:30	3 hours	Solving algebraic equations, Numerical integration of ordinary differential equations, Syntax/Commands, Examples.

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