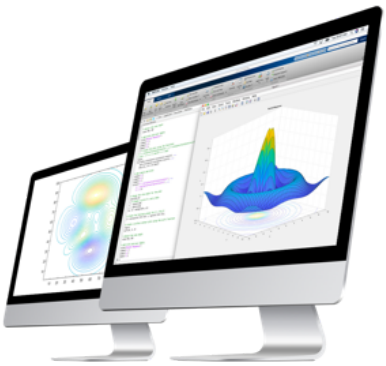
MATLAB and Simulink Online Training Programme for Mechatronics Engineering (4 CFU)



This programme is designed for Master's students in Mechatronics Engineering who want to strengthen their skills in modelling, simulation, and data analysis using industry-standard tools. Through a structured set of online courses, students will build proficiency in MATLAB programming, advanced coding and data analysis techniques, and learn to model and control dynamic physical and electrical systems with Simulink and Simscape. The programme combines theory with hands-on practice across four learning modules, enabling students to earn **4 CFU credits** while gaining practical competencies essential for robotics, automation, and control engineering.

Total estimated time commitment: approximately 47 hours of self-paced online learning.

To access the courses, students only need a MathWorks account, which can be created here: Università degli Studi di Roma "Tor Vergata" .

1 CFU - Build MATLAB Proficiency

Estimated time: ~12 hours

One credit (CFU) is obtained with the completion of the Activity in the following table.

Activity	Brief Description	Link to the Online Training and Description
Build MATLAB Proficiency	Students will gain a comprehensive foundation in MATLAB to confidently tackle more complex challenges and applications.	Build MATLAB Proficiency | Self-Paced Online Courses - MATLAB & Simulink

1 CFU - Advanced Programming Skills and Data Analysis Techniques

Estimated time: ~15 hours

One credit (CFU) is obtained with the completion of the 2 Activities in the following table.

Activity	Brief Description	Link to the Online Training and Description
Advanced MATLAB Programming Skills	Students will learn how to write clearer, more efficient, more robust, and more flexible MATLAB code	Advanced MATLAB Programming Skills | Self-Paced Online Courses - MATLAB & Simulink
Data Analysis in MATLAB	Students will learn how to analyze complex datasets in MATLAB, acquiring data management, cleaning, and analytical skills that are crucial for extracting insights from data.	Data Analysis in MATLAB | Self-Paced Online Courses - MATLAB & Simulink

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1 CFU - Modeling and Control of Dynamic Physical Systems

Estimated time: ~12.5 hours

One credit (CFU) is obtained with the completion of the 3 Activities in the following table.

Activity	Brief Description	Link to the Online Training and Description
Simulink Fundamentals	Students will apply fundamental Simulink techniques for real-life dynamic physical systems modeling.	Simulink Fundamentals | Self-Paced Online Courses - MATLAB & Simulink
Simscape Onramp	Students will learn the basics of Simscape for modeling dynamic systems in various physical domains. Use the physical network approach to quickly represent models of physical systems without explicitly deriving equations.	Simscape Onramp | Self-Paced Online Courses - MATLAB & Simulink
Control System Design with	Students will build control system design skill set in MATLAB and Simulink by	Control System Design with MATLAB and Simulink | Self-Pace

MATLAB and Simulink	creating control system objects of both linear and nonlinear systems.	d Online Courses - MATLAB & S imulink

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1 CFU - Modeling Essentials for Electrical Systems

One credit (CFU) is obtained with the completion of the 6 Activities in the following table.

Estimated time: ~7.5 hours

Activity	Brief Description	Link to the Online Training and Description
Simulink Onramp	Students will learn the basics of how to create, edit, and simulate models in Simulink. Use block diagrams to represent real-world systems and simulate components and algorithms.	Simulink Onramp | Self-Paced Online Courses - MATLAB & Si mulink
Circuit Simulation Onramp	Students will learn the basics of simulating analog electric circuits in Simscape. Use the physical network approach to simulate electrical filters and faulty power supplies, and analyze their performance in the time and frequency domains.	Circuit Simulation Onramp | S elf-Paced Online Courses - MAT LAB & Simulink
Power Electronics Simulation Onramp	Students will learn the basics of simulating power electronics converters in Simscape. Model a buck converter at varying levels of model fidelity—from an idealized behavior to a fully nonlinear model—and compare their outputs and simulation speeds.	Power Electronics Simulation Onramp | Self-Paced Online Co urses - MATLAB & Simulink
Introduction to Motor Control	Students will learn how to model an electric motor and inverter and design controllers using Voltage-by-Frequency (V/F) control and Field Oriented Control (FOC). You will develop a motor-inverter plant model and FOC.	Introduction to Motor Control | Self-Paced Online Courses - M ATLAB & Simulink

Motor Modeling with Simscape Electrical	Students will learn to create a lumped-parameter model of an electric motor using Simscape Electrical and connect it to a closed-loop controller built using Motor Control Blockset.	Motor Modeling with Simscape Electrical | Self-Paced Online Courses - MATLAB & Simulink
Simscape Battery Onramp	Students will learn the basics of simulating a simple battery management system (BMS) for safe charging/discharging in various temperatures.	Simscape Battery Onramp | Self-Paced Online Courses - MATLAB & Simulink