

AI for Control

Dates and time

12-10-2026

19-10-2026

26-10-2026

02-11-2026

from 13.45-16.00 hrs

Course location

Cursus- en vergadercentrum Domstad, Utrecht

ECTS

3 ECTS if the homework is completed successfully

1 ECTS for auditing the course

Lecturers

Dr. Anahita Jamshidnejad

Dr. Luca Laurenti

Objective

To understand how learning-based methods can be integrated with model-based control, especially Model Predictive Control (MPC) in order to achieve safe, robust, and data-efficient decision-making under uncertainty. After completing the course, participants will be able to analyze and design MPC-guided learning-based control frameworks, and critically assess the associated safety, robustness, and performance guarantees.

Contents

Week 1: Foundations of MPC and tube-based formulations

Week 2: MPC-guided and learning-enhanced control frameworks

Week 3: Gaussian processes-based control

Week 4: Data-driven control with unknown distributions, including conformal prediction and distributionally robust formulations

Course materials

Lecture slides and references indicated per lecture

Prerequisites

Prior exposure to MPC and convex optimization, plus basic probability and linear systems theory

Homework assignments

Two take-home exams consisting of various problems

