



Course Programme

- **Module 1: Fundamentals & Classical Control (Full Day)**
 - **Introduction to Process Control in Pharma Manufacturing**
 - **Process Dynamics and Modelling**
 - Understanding process behaviour
 - Identifying **FOPDT (First-Order Plus Dead Time)** models
 - Practical exercise: modelling pharmaceutical unit operations
 - **Feedback Control**
 - Fundamentals of **feedback control**
 - **PID control design** and **tuning methods**
 - Practical exercise: Implementing and tuning PID controllers in a **virtual plant**
- **Module 2: Advanced Control (Half Day)**
 - **Why go beyond PID?**
 - Limitations of classical control in modern pharma manufacturing
 - Need for advanced control to enable continuous manufacturing
 - **Intro to Model Predictive Control (MPC)**
 - **Hands-on simulation session**
 - Implementing MPC on the same virtual plant
 - Comparing **MPC vs. PID** performance for multivariable systems

Information

 Time and Date: 9:00 – 16:00 **23rd April 2026**
9:00 – 13:00 **24th April 2026**

 Place: **Faculty of Pharmaceutical Sciences**
Ottergemsesteenweg 460, Ghent, Belgium

 Contact: Mark.Gontsarik@UGent.be

Course Description

Pharmaceutical manufacturing is undergoing a paradigm shift, evolving from **Quality by Design (QbD)**, where quality is built into the process during development to **Quality by Control (QbC)**, where advanced control strategies and real-time monitoring actively ensure product quality during production.

This intensive 1.5-day course, given by experts from **Dynamical Systems and Control (DySC) lab**, provides a practical and scientifically grounded framework for modern process control and optimization in pharmaceutical manufacturing.

Participants will gain hands-on experience using a virtual plant simulation environment, where they will design, test, and evaluate different control strategies in a safe, risk-free setting.

Target Audience

- Researchers and operators with no prior experience in process modeling or control.
- Process engineers, quality professionals, control engineers, and R&D scientists working in pharmaceutical manufacturing.
- Professionals seeking a refresher on process identification and control principles.

