



***FREEZE DRYING TECHNOLOGY:***  
*PRODUCT, PROCESS  
AND SYSTEMS*

**9TH - 11TH MAY, 2023  
AMSTERDAM  
THE NETHERLANDS**



# COURSE SCHEDULE

## DAY ONE

### Course Overview

This course provides a comprehensive insight into a wide range of elements in freeze drying, including details on the concepts and practical aspects of each step of the process, principles and methodologies for formulation development and characterization. Additionally, it covers approaches to cycle development and scale-up including Quality by Design, fundamental equipment features of refrigeration, vacuum and control systems i.e. PAT tools, and aspects of troubleshooting, maintenance and qualification.

### + Day One (9th May)

- Welcome & Course Opening
- Introduction to Freeze Drying Technology
- Freezing and Annealing
- Break
- Freeze Dryer Systems 1 – Refrigeration
- Lunch
- Primary and Secondary Drying
- Freeze Dryer Systems 2 – Stoppering
- Break
- Concepts of Formulation
- Freeze Dryer Systems 3 – Condensers

### + Day Two (10th May)

- Formulation Characterization
- Vacuum Systems
- Break
- Temperature Measurement & Calibration
- Lunch (included)
- Cycle Development & Scale-Up
- Validation & Qualification Systems
- Break
- SMART & ControlLyo Technology
- Workshop

### + Day Three (11th May)

- Maintenance Strategy for Freeze Dryers
- QbD in Freeze Drying
- Break
- Sterilization Systems
- Containers, Stoppers & Barrier Technology
- Lunch
- Freeze Dried Product Analysis
- CIP Systems
- Workshop 2 (Introduction)
- Refreshments
- Workshop 2 (Conclusion)
- Course Ends





