



**LYOPHILISATION TECHNOLOGY:**  
PROCESS DEVELOPMENT  
IN PRACTICE HANDS-ON



# COURSE SCHEDULE

## Course Overview

This course offers an opportunity to combine class-based learning with a significant practical element, where approximately 40% of the time will be spent carrying out hands-on freeze drying and related analytical techniques in the laboratory. The class-based element covers the journey from formulation design and characterisation, through the fundamentals of freezing and sublimation and related Process Analytical Technology (PAT), to aspects of product analysis and Quality by Design. The laboratory-based sessions will include freeze drying microscopy, differential scanning calorimetry and impedance analysis of a simple formulation - the data are then used to create a freeze drying cycle, which is completed during the course.

### + Day One (March 19th)

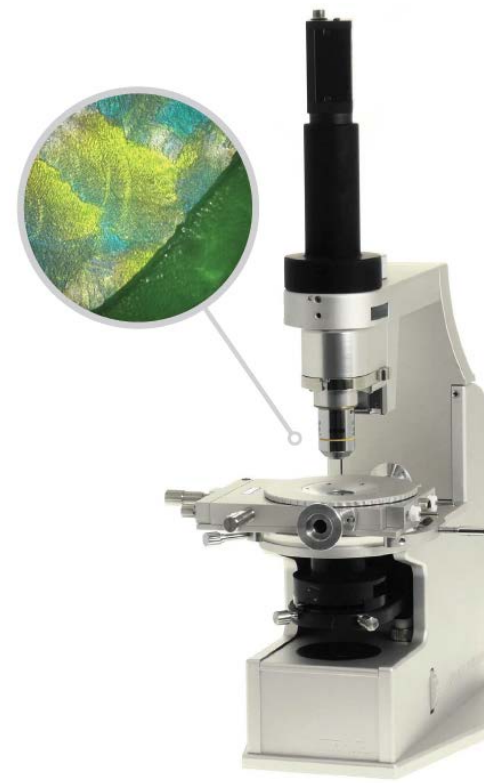
- Welcome & Course Opening
- Introduction to Freeze Drying Technology
- Freezing and Annealing
- Primary and Secondary Drying
- Fundamentals of Formulation
- Lunch (included)
- Formulation Characterisation Techniques
- Lab Session: Freeze-Drying Microscopy (Lyostat 5)
- Lab Session: Frozen State Thermal and Impedance Analysis (Lyotherm 3)

### + Day Two (March 20th)

- Classical Approach to Cycle Development
- Software-based Cycle Development - SMART® and ControLyo™
- Lab Session: Preparation, Filling, Loading, Programming, Initiating the Freeze-Drying Cycle
- Lunch (included)
- Process Analytical Technologies (PAT)
- Lab Session: Monitoring Cycle Progress, looking at freeze-dryer accessories
- Group Work (in Lab): Critical Evaluation of Lyophile Appearance

### + Day Three (March 21st)

- Lab Session: Monitoring Cycle Progress, programming Secondary Drying
- Product Analysis 1: Residual Moisture and dry-state Thermal Analysis
- Product Analysis 2: Structural and Mechanical Properties
- Lab Session: Reviewing / Terminating the Freeze-Drying Cycle
- Lunch (included)
- Lab Session: Dry State Thermal Analysis (MDSC)
- Lab Session: Residual Moisture (KF titration) and Structural Analysis (MicroPress)
- Final Q&A and Wrap-up Session





## IS THIS COURSE RIGHT FOR YOU?

*IF YOU'RE INTERESTED IN:*

- 1) Biotechnology
- 2) Pharmaceuticals
- 3) Freeze Drying Formulation and Cycle Development
- 4) Diagnostic Industries

## MEET THE EXPERTS

### + MERVYN MIDDLETON

In 2009 Mervyn graduated from the University of Portsmouth with a Bachelor's degree in Biochemistry, after which he joined Biopharma Group for 6 six years, gaining significant experience of analytical methods associated with freeze-drying cycle development and optimisation. At the beginning of 2021, Mervyn re-joined Biopharma as Senior Scientist having worked as a Team Leader in Sterile Operations at Bio Products Laboratory (BPL). Whilst working at BPL, Mervyn attained a Master's degree in Biopharmaceuticals from King's College London, having conducted a research project within the R&D department at BPL.

### + DR. KEVIN WARD

Dr Kevin Ward entered the world of freeze-drying in 1993 when he embarked on a PhD in the lyophilisation of proteins and liposomes. After working in the pharmaceutical industry and in vaccine development, he joined Biopharma in 2000. As R&D Director, he has built up a team of 9 dedicated freeze-drying scientists, worked on over 3000 projects for more than 500 client companies, developed 3 analytical instruments, run more than 200 training courses, and successfully secured funding for 15 collaborative research projects.

### + DR. EDMOND EKENLEBIE

Edmond joined Biopharma in 2014 as a Senior Scientist after receiving his a PhD from Aston University in Birmingham, UK. He also holds an MSc in Pharmaceutical Science with Management Studies from Kingston University in London. A Pharmacist since 2006, Edmond previously held managerial roles as both Locum and Superintendent Pharmacist alongside running a successful business in nutraceuticals. Dr Ekenlebie currently offers his expertise by way of consultancy, training courses and at conferences to our worldwide client base and remains heavily involved in research work.



PRICE  
**£2,660**

EARLY BIRD RATE  
**£2,261**

DEADLINE: **13TH FEBRUARY**

**19TH - 21ST MARCH, 2024**

**BIOPHARMA HOUSE**

WINNALL VALLEY ROAD, SO23 OLD,  
WINCHESTER, UK

**BOOK NOW**

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Website: [www.intelligentfreezedrying.com](http://www.intelligentfreezedrying.com)



Please note that the cost of accommodation is not included in the course fee\* and that bedroom bookings must be made by the participants.

A list of local hotels will be provided with the registration confirmation.

\*fees include morning and afternoon breaks, lunch and full lecture notes

Payment must be made in full before the start of the course to guarantee a place. Payment by BACS or credit/debit card is acceptable - please note we cannot accept payment by cheque. An invoice will be issued on receipt of booking. Payments in credit/debit card will be charged in GBP at the prevailing exchange rate as set by xe.com. An invoice will be issued on receipt of booking. Discounts are also available for academia and multiple bookings from the same company, please contact Sally Potentier at [spotentier@biopharma.co.uk](mailto:spotentier@biopharma.co.uk) for more information.

Cancellation in writing more than 5 weeks before the course start date will incur a service charge of 30% of the applicable fee. No refunds can be made for cancellation after this date. Substitutes will be accepted at any time. Transfer to another scheduled course must be made in writing and a service charge will be incurred. Full T&Cs available on request.

