JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Bioprocess Manufacturing Data Analytics Training Course

3 – 7 January 2027
Muscat

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Bioprocess Manufacturing Data Analytics Training Course

Ref: 3053_115879 **Date:** 3 – 7 January 2027 **Location:** Muscat **Fees:** 6500 GBP

Bioprocess Manufacturing Data Analytics is a 1-week training course for bioprocess engineers, scientists and manufacturing staff who turn fermentation and cell culture records into a bioprocess data analysis plan for their site. Biologics, enzymes and fermented ingredients now run on dense streams of online sensor, batch record and laboratory results, and the plants that read those streams well release consistent lots with fewer surprises. Jupiter Prime Training runs this course for people who own that evidence.

Why Bioprocess Manufacturing Data Analytics Matters Now

Three forces shape bioprocess manufacturing data analytics today. Plants log dissolved oxygen, pH, feed and off-gas readings every few seconds, far beyond manual review. Quality units expect batch release decisions to rest on traceable, trended evidence rather than single end-of-run values. Process owners must lift titre without new equipment. Handled well, drifting runs are caught early; handled badly, failed lots repeat.

Who Gains Most from Bioprocess Manufacturing Data Analytics

- Upstream specialists responsible for seed trains, bioreactor runs and feed strategies
- Downstream specialists who track recovery, purification yield and impurity clearance
- Laboratory analysts who generate titre, cell density, metabolite and product quality results
- Quality reviewers who assess batch records and recommend lot disposition
- Manufacturing support staff who run deviation investigations and process improvement studies

A cross-functional group from one production suite gains most, agreeing one shared batch dataset.

Bioprocess Manufacturing Data Analytics Capabilities

Participants practise reading time-series bioreactor traces, laboratory assays and batch genealogy together.

- Assemble a batch-aligned dataset joining sensor traces, assay results and material genealogy — investigation leads
- Assess data completeness, timestamp alignment and assay variability before analysis — quality reviewers
- Build golden batch envelopes and trajectory comparisons for critical parameters — upstream process owners
- Apply multivariate batch monitoring to flag drifting runs in real time — shift supervisors
- Test which process parameters explain titre and purity differences between lots — improvement sponsors
-

Communicate batch release evidence as trended, traceable summaries — the quality unit

Key Bioprocess Manufacturing Data Analytics Terms

- Critical process parameter — a process input whose variation measurably affects a product quality attribute and must therefore be controlled and trended.
- Golden batch — a reference trajectory built from well-performing runs, used to judge whether a new run is behaving normally.
- Batch alignment — adjusting runs of different lengths onto a common time or maturity axis so their traces can be compared fairly.
- Titre — the concentration of product made in a bioreactor, a central measure of upstream yield.
- Batch genealogy — the traceable record linking each lot to its seed vials, media lots, equipment and earlier process steps.
- Soft sensor — a calculated estimate of a hard-to-measure variable, such as biomass, derived from routine online signals.

Bioprocess Manufacturing Data Analytics Day by Day

Day 1: Bioprocess Data Landscape and Sources

- Bioreactor Sensor and Historian Streams — Which Signals Describe Each Run
- Electronic Batch Records and Manual Entries — Trusting Recorded Process Events
- Laboratory Assay Results and Sampling Plans — Matching Samples to Process Time
- Batch Genealogy and Material Traceability — Linking Lots to Raw Materials
- Critical Process Parameters and Quality Attributes — Choosing What to Trend

Day 2: Preparing Fermentation and Cell Culture Datasets

- Timestamp Alignment and Batch Phase Markers — Comparing Runs of Unequal Length
- Missing Values, Sensor Drift and Outliers — Deciding What to Correct or Exclude
- Assay Variability and Measurement Error — Separating Process Change from Noise
- Feature Extraction From Time-Series Traces — Summarising Runs into Comparable Indicators
- Batch-Aligned Analysis Tables — Building One Shared Source for Reviewers

Day 3: Monitoring Batch Trajectories

- Golden Batch Envelopes — Judging Whether a Live Run Is on Track
- Control Charts for Batch Indicators — Spotting Shifts Across Consecutive Lots
- Multivariate Batch Monitoring Scores — Detecting Drift Hidden in Many Signals
- Soft Sensors for Biomass and Metabolites — Estimating Unmeasured States Between Samples
- Alarm Limits and Escalation Rules — Deciding When Operators Intervene

Day 4: Explaining Yield and Consistency

- Regression on Process Parameters — Explaining Titre Differences Between Lots
- Upstream and Downstream Yield Linkage — Locating Where Product Is Lost
- Root Cause Evidence for Deviations — Supporting Investigation Conclusions With Trends
- Design of Experiments Results Review — Confirming Parameter Ranges Before Change
- Batch Release Evidence Summaries — Supporting Lot Disposition With Traceable Data

Day 5: Practising the Bioprocess Data Analysis Plan

- Site Dataset Inventory and Gap Review — Applying Day One Source Mapping
- Preparation Rules for the Shared Batch Table — Applying Day Two Cleaning Choices
- Monitoring and Escalation Design for One Product — Applying Day Three Methods
- Yield Improvement Hypotheses and Test Order — Applying Day Four Explanatory Analysis
- Bioprocess Data Analysis Plan — Agreeing Scope, Owners and Review Rhythm

Applying Bioprocess Manufacturing Data Analytics After the Course

- Build a golden batch envelope for one product and share it with shift supervisors.
- Lead a regression review of titre against critical process parameters and present the strongest signals to the process owner.

Bioprocess Manufacturing Data Analytics Questions FAQ

What is bioprocess manufacturing data analytics and why does it matter now?

It is the practice of joining sensor, batch record and laboratory data to explain and control fermentation and cell culture runs. It matters now because plants log far more data than reviewers can read, while quality units expect release decisions to rest on trended, traceable evidence.

Which roles gain most from bioprocess manufacturing data analytics?

Upstream and downstream specialists, laboratory analysts, quality reviewers and manufacturing support staff gain most. Each owns part of the batch evidence.

How does bioprocess manufacturing data analytics differ from a general data analysis course?

It is built around batch processes rather than business reporting. You work with time-series bioreactor traces, assay variability, batch alignment and lot genealogy, each tied to yield or release decisions.

What do you bring back from bioprocess manufacturing data analytics training?

You bring back a bioprocess data analysis plan for your own product. It sets out sources, preparation rules, monitoring envelopes, escalation limits and first yield questions, with owners.

Bioprocess Manufacturing Data Analytics: The Way Forward

The bioprocess data analysis plan first informs which product and which critical parameters receive live trajectory monitoring. Process owners, laboratory leads and quality reviewers use it to share one batch dataset and one set of limits. After the first campaign, revisit the alignment rules and alarm limits that real runs show to be too loose or strict.