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COURSE BROCHURE

AI for Predictive Maintenance and Equipment Failure Forecasting Training Course

14 – 18 February 2027
Muscat

AI for Predictive Maintenance and Equipment Failure Forecasting Training Course

Ref: 17_454 **Date:** 14 – 18 February 2027 **Location:** Muscat **Fees:** 6500 GBP

AI for Predictive Maintenance and Equipment Failure Forecasting is a 1-week training course for maintenance managers, reliability engineers and asset management leads, who leave with a predictive maintenance roadmap for their own plant. Sensor-rich equipment now produces more condition signals than planners can read, so organisations that turn those signals into failure forecasts cut unplanned downtime and spares waste. The course is delivered by Jupiter Prime Training.

Why AI for Predictive Maintenance Matters Now

Three forces shape AI for predictive maintenance today: cheaper wireless sensors and edge devices, a shrinking pool of experienced technicians, and operations directors who expect maintenance budgets to show measurable reliability gains. A plant that reads its vibration, temperature and pressure trends well schedules interventions before breakdowns and holds fewer emergency spares. A plant that handles it badly drowns in false alarms, distrusts the models and returns to fixed-interval servicing. The course rests on reliability centred maintenance, failure mode and effects analysis FMEA and the P-F curve as its reference models.

Who Gains Most from AI for Predictive Maintenance

- Maintenance leads accountable for uptime and the planned-to-reactive balance
- Reliability engineers responsible for failure analysis and strategy selection
- Asset management leads who set lifecycle budgets and replacement priorities
- Condition monitoring specialists who own vibration and thermography routines
- Maintenance planners who convert alerts into scheduled work orders and parts reservations

A site reliability group gains most when its planner, reliability engineer and condition monitoring lead attend together.

AI for Predictive Maintenance Capabilities

Participants move from raw condition signals to forecasts that a planner can schedule against.

- Assess which assets justify sensor-based failure forecasting — capital allocation decisions
- Specify the sensor feeds and data quality rules a model needs — instrumentation and IT teams
- Weigh anomaly detection, classification and remaining useful life models — reliability engineering
- Calculate the cost of false alarms and missed failures to set alert thresholds — operations directors
- Design the route from a model alert to a prioritised work order and spare-parts reservation — maintenance planners

- Build a staged predictive maintenance rollout — asset management leadership

Key AI for Predictive Maintenance Terms

- Remaining useful life RUL — the estimated operating time before an asset reaches a failure state, given its current condition.
- P-F interval — the time between the point a developing failure becomes detectable and the point of functional failure.
- Anomaly detection — a modelling method that flags readings departing from an asset's learned normal behaviour without needing labelled failure examples.
- Condition monitoring — the routine measurement of parameters such as vibration, temperature or oil debris to track equipment health.
- Failure mode and effects analysis FMEA — a structured review of how each component can fail, the effect of that failure and its criticality.
- Feature engineering — turning raw sensor signals into indicators, such as RMS vibration or temperature rise, that a model can learn from.

AI for Predictive Maintenance Day by Day

Day 1: Reliability Context and Failure Behaviour

- P-F Curve and Failure Patterns — Where Prediction Adds Lead Time
- Asset Criticality Ranking — Choosing Equipment for Sensor-Based Forecasting
- FMEA Worksheets — Linking Failure Modes to Measurable Symptoms
- Maintenance Strategy Mix — Reactive, Preventive and Condition-Based Trade-Offs
- Downtime Cost Model — Framing the Business Case for Forecasting

Day 2: Sensor Feeds and Condition Data

- Vibration, Thermal and Pressure Signals — Matching Sensors to Failure Modes
- Historian and CMMS Data Extraction — Joining Readings with Work History
- Data Quality Rules — Handling Gaps, Drift and Mislabelled Failures
- Feature Engineering from Time Series — Indicators a Model Can Use
- Edge Versus Cloud Processing — Latency and Connectivity Choices

Day 3: Forecasting Models and Their Limits

- Unsupervised Anomaly Detection — Spotting Drift Without Labelled Failures
- Fault Classification Models — Naming the Likely Failure Mode
- Remaining Useful Life Regression — Estimating Time to Intervention
- Model Validation with Hold-Out Failures — Trusting Forecast Accuracy
- Explainable Alerts — Showing Technicians Why a Model Fired

Day 4: From Alert to Work Order

- Alert Threshold Tuning — Balancing False Alarms Against Missed Failures
- Alert Triage Matrix — Ranking Interventions by Risk and Urgency
- CMMS Work Order Integration — Turning Forecasts into Scheduled Jobs
- Spare-Parts Forecasting — Aligning Stores with Predicted Failures
- Reliability KPIs — MTBF, Planned Work Ratio and Alert Precision

Day 5: Practising the Predictive Maintenance Roadmap

- Pilot Asset Selection — Applying Criticality and FMEA Results
- Sensor and Data Readiness Gap Check — Applying Day Two Rules
- Model Choice per Asset Class — Applying Forecasting Trade-Offs
- Technician Adoption and Feedback Loop — Building Trust in Alerts
- Predictive Maintenance Roadmap — Staged Rollout, Measures and Owners

Applying AI for Predictive Maintenance After the Course

- Run a criticality and FMEA review on one production line to shortlist three assets for sensor-based failure forecasting.
- Back-test an anomaly detection rule against the last year of historian readings and work orders to tune alert thresholds.

AI for Predictive Maintenance Questions FAQ

What is AI for predictive maintenance and why does it matter now?

AI for predictive maintenance uses machine learning on condition data to forecast equipment failures before they happen. It matters now because sensors are cheap and unplanned downtime is costly in plants, utilities and transport fleets.

Which roles gain most from AI for predictive maintenance training?

Maintenance leads, reliability engineers, condition monitoring specialists, planners and asset management leads gain most. You benefit when you decide which assets to monitor, how alerts become jobs, or how maintenance budgets are justified.

How does AI for predictive maintenance differ from a general reliability engineering course?

AI for predictive maintenance focuses on turning sensor data into failure forecasts and alert workflows. A general reliability engineering course covers failure analysis broadly, with less attention to models and threshold tuning.

What do you bring back from AI for predictive maintenance training?

You bring back a staged rollout for predictive maintenance on your own assets. It names pilot equipment, data gaps, model choices and alert-to-work-order routing.

AI for Predictive Maintenance: The Way Forward

The predictive maintenance roadmap first informs which pilot assets receive sensors and forecasting models. Maintenance planners, reliability engineers and the operations director use it to align instrumentation spend, alert routing and spare-parts stock. After the first quarter of live alerts, revisit the threshold settings and the technician feedback loop, since that is where trust in the forecasts is won or lost.