TECHNICAL
EDUCATION
ACADEMY

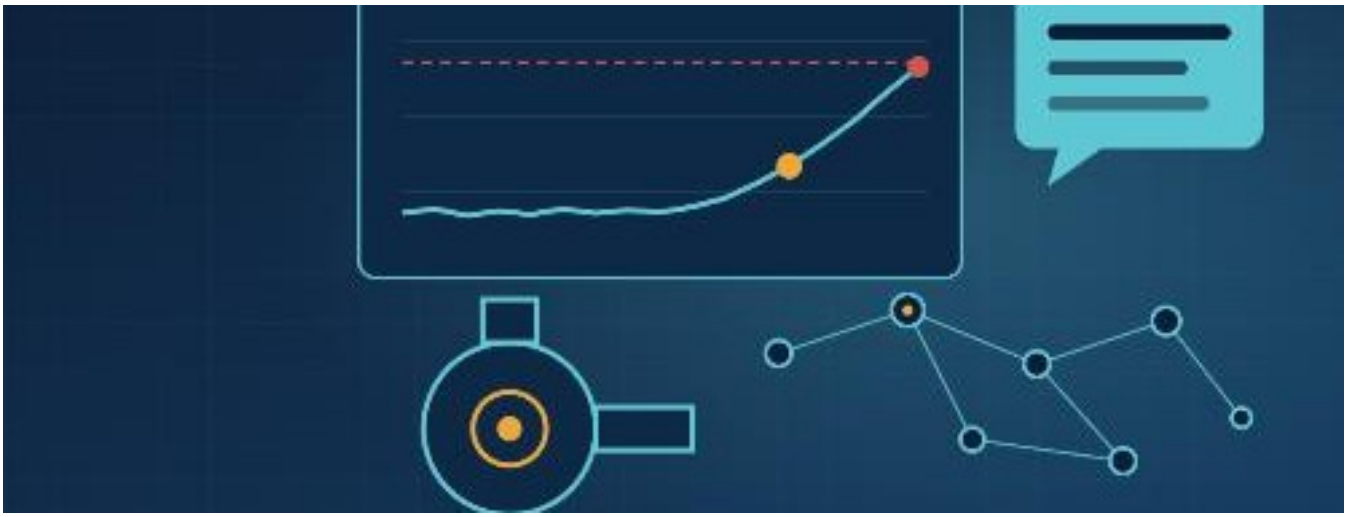
School of Computer Science

COURSE PROGRAMME

000731

Applied AI for Reliability and Maintenance Engineers: Agents, Data and Predictive Maintenance

An advanced three-day practicum for engineers who already use AI tools and want to make them dependable in operations, maintenance and reliability work.



Learn from the Best in the Business!

Course overview

Advanced level

Why take this course

An advanced three-day practicum for engineers who already use AI tools and want to make them dependable in operations, maintenance and reliability work. You will design verification into every AI task, build team prompts with structured outputs, test RAG search over OEM manuals and standards, and design maintenance agents with human approval gates. You will also learn how agents connect to plant systems through the Model Context Protocol (MCP) and how to threat-model them with the OWASP MCP Top 10. On day two you will clean a 600-record CMMS export using ISO 14224, calculate MTBF and Weibull parameters with suspensions, build and validate anomaly detection on vibration data, and test the newest model types: P&ID reading, AI inspection of images and time series foundation models. AI writes the Python code; you run it and check the results, so no programming experience is needed. Day three covers evidence-based RCA, AI governance in operating plants (ISO/IEC 42001, NIST AI RMF, IEC 61511 and IEC 62443 boundaries, the new UAE Federal Authority for AI and Data) and a 90-day pilot with an honest business case, licence and consumption costs included. You finish with a capstone on a real problem from your own plant. Materials: 42 prompt templates, verification checklists, an AI use policy template, a case pack, two training datasets and a Python lab guide with checkpoints.

Who it is for and how it helps

Reliability, maintenance, rotating equipment and asset integrity engineers, maintenance planners and superintendents, condition monitoring specialists, and digital transformation leads in oil and gas, petrochemicals, power and utilities who want to move from AI experiments to dependable daily practice.

What you will learn

- Identify the typical failure modes of LLMs in engineering work and set the right verification level for each task before starting it.
- Build reusable team prompts with system instructions, structured outputs and self-check steps, and maintain them like controlled procedures.
- Evaluate and use RAG search over OEM manuals and standards so that every answer comes with a quoted, current source.
- Design AI agents for maintenance workflows, connect them to plant systems through MCP with least-privilege tools, and threat-model them against prompt injection and the OWASP MCP Top 10.
- Profile and clean CMMS data against ISO 14224 and calculate MTBF, MTTR and Weibull parameters with censored data using AI-written Python.
- Build and validate anomaly detection on condition monitoring data, and use AI to prepare FMEA, RCM and RBI work for the team.

Course overview — continued

- Test new model types on your own data: two-stage P&ID extraction, AI inspection of images and time series foundation models compared with a simple baseline.
- Apply AI governance in an operating plant and plan a 90-day pilot with measurable KPIs and a defensible business case.

Pre-course requirements

- At least 3 years of experience in operations, maintenance, reliability or asset integrity.
- Regular use of an AI assistant at work or at home. Programming experience is not required. You need a laptop with internet access, an AI assistant approved by your company and a Google account or company Python environment for the labs.

Joining the programme

Contact the Academy and quote course code 000731 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

Read the pre-course requirements in this programme before enrolling.

Discuss your training needs

mail@tecedu.org
www.tecedu.academy

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