

Predictive Maintenance Specialist

The Predictive Maintenance Specialist plays a critical role in the automotive industry by leveraging data analysis, machine learning, and condition-monitoring technologies to anticipate equipment failures and optimise asset reliability. Their primary activities include collecting and interpreting sensor data (e.g. vibration, temperature, pressure), applying statistical models and predictive algorithms, and integrating IIoT-enabled platforms into maintenance workflows. By identifying patterns and anomalies, they help prevent unexpected breakdowns, minimise downtime, and extend the lifecycle of critical assets.

Key responsibilities involve developing and refining predictive maintenance models, coordinating maintenance strategies with engineering and operations teams, and ensuring accurate reporting and communication of diagnostic results. Essential competences span digital skills (data analytics, statistical modelling, IIoT platforms), sector-specific expertise (condition monitoring, reliability engineering, maintenance optimisation), green competences (sustainable maintenance practices and energy-efficient interventions), and soft/transversal abilities (communication, teamwork, attention to detail, statistical analysis).

ESCO Mapping

<https://esco.ec.europa.eu/select-language?destination=/node/1>

ID	NAME	Concept URI
2152.1.13	Predictive Maintenance Expert	http://data.europa.eu/esco/occupation/8edd8bff-cb59-4c9c-ab0f-59e77d18be48

Context

EQF Level	5/6
Departments	Production and Maintenance

ID	Name	Type	Description	Level	ESCO
C008	Optimise energy-efficient maintenance	Skill	Apply predictive maintenance strategies to reduce energy consumption and improve equipment efficiency. - Analyse energy consumption trends using predictive models - Identify inefficient equipment operations through sensor data - Recommend interventions to reduce energy waste - Configure predictive tools to optimise energy usage - Support corporate energy-saving initiatives through predictive insights	3	
C009	Sustainable asset lifecycle management	Knowledge	Understand how predictive maintenance supports longer equipment lifespans and circular economy practices. - Explain how predictive interventions extend asset lifecycle - Recommend refurbishment over replacement when feasible - Identify opportunities to reuse or recycle components - Support planning for sustainable spare parts management - Promote circular economy principles in predictive maintenance	2	
C010	Reduce emissions in maintenance	Skill	Use predictive diagnostics to prevent failures that cause emissions, waste, or environmental risks. - Monitor equipment parameters to detect conditions leading to excess emissions - Apply predictive methods to reduce unplanned downtime and related waste - Support compliance with environmental performance standards - Collaborate with sustainability teams to implement eco-innovations - Document environmental improvements enabled by predictive practices	3	

ID	Name	Type	Description	Level	ESCO
C06 5	Use data analysis tools	Skill	Use advanced data analysis and visualisation tools to process, interpret, and present maintenance insights. ▪ Apply Python, Excel, or Power BI to process large datasets ▪ Integrate IIoT sensor data into analysis workflows ▪ Use machine learning libraries to predict failures ▪ Visualise findings with Tableau or Power BI dashboards ▪ Detect anomalies and patterns supporting predictive strategies	3	
C06 6	Statistical modelling	Knowledge	Understand and apply statistical modelling methods to forecast equipment failures and optimise maintenance planning. ▪ Employ regression, time-series, and other models to detect operational patterns ▪ Evaluate model accuracy using historical and real-time data ▪ Interpret statistical results to support decision-making ▪ Update and refine models continuously to improve predictive reliability	3	
C06 7	Maintenance scheduling tools	Knowledge	Use CMMS/EAM tools to integrate predictive insights into maintenance scheduling and optimise workflows. ▪ Manage maintenance plans within CMMS or EAM systems ▪ Register technical and economic data into digital records ▪ Automate scheduling using predictive insights ▪ Monitor performance history and update task planning accordingly ▪ Analyse scheduling data to optimise resource allocation	2	
C06 8	Operate IIoT-enabled platforms	Skill	Configure and operate IIoT-enabled maintenance platforms to support real-time monitoring and predictive diagnostics.	2	

ID	Name	Type	Description	Level	ESCO
			▪ Integrate IIoT devices with automation and CMMS systems ▪ Monitor live sensor data to identify anomalies ▪ Configure IIoT platforms for optimal data flow ▪ Ensure connectivity between field devices, tablets, and central systems ▪ Collaborate with teams to implement IIoT solutions		

Soft Skills

ID	Name	Type	Description	Level	ESCO
C127	Communication	Knowledge	Apply effective communication strategies to convey predictive maintenance insights to varied audiences. ▪ Explain complex predictive models to non-technical stakeholders ▪ Present predictive results using clear reports and visualisations ▪ Engage in active listening to capture operational needs ▪ Document predictive procedures and findings for knowledge sharing ▪ Facilitate collaboration across engineering, data science, and operations teams	2	Link
C128	Work in teams	Skill	Collaborate with multidisciplinary teams to implement predictive maintenance strategies effectively. ▪ Share expertise and insights with colleagues to enhance team performance ▪ Participate in joint troubleshooting sessions ▪ Support engineers and data scientists in model deployment ▪ Contribute actively in meetings with constructive suggestions ▪ Foster cooperative relationships across departments	2	Link

ID	Name	Type	Description	Level	ESCO
C13 6	Coordinate teams	Skill	Coordinate and supervise maintenance teams to ensure safe and efficient predictive interventions. - Assign tasks according to team skills and workload - Supervise predictive maintenance activities in compliance with safety and quality standards - Guide junior staff during data collection and diagnostics - Plan and schedule interventions to align with production goals - Provide technical feedback during operations	3	Link
C13 0	Attention to detail	Knowledge	Ensure accuracy and precision in data analysis, model validation, and predictive reporting. - Review high-resolution sensor and performance data to detect subtle anomalies - Validate predictive outputs against equipment behaviour - Ensure clarity and integrity of predictive documentation - Maintain oversight of equipment for gradual deviations - Verify accuracy of inputs and outputs used in models	2	Link

Transversal Competences

ID	Name	Type	Description	Level	ESCO
C17 3	Perform statistical analysis and interpretation	Skill	Apply statistical methods to analyse large datasets, interpret trends, and support predictive decision-making. - Apply statistical tests (e.g. regression, correlation, ANOVA) to detect patterns in operational data - Interpret variability in sensor data to identify anomalies - Use statistical models to forecast equipment behaviour	3	

ID	Name	Type	Description	Level	ESCO
			▪ Communicate findings clearly to engineers and stakeholders ▪ Support optimisation of predictive maintenance schedules through data-driven insights		

Sector Specific

ID	Name	Type	Description	Level	ESCO
C23 6	Condition monitoring tools	Knowledge	Understand and operate condition monitoring tools to assess equipment health in real time. ▪ Set up and calibrate vibration analysers, thermographic cameras, and acoustic sensors ▪ Interpret condition monitoring data to detect anomalies and early failure indicators ▪ Integrate monitoring results with predictive maintenance platforms ▪ Perform routine calibration and servicing of monitoring equipment ▪ Ensure accuracy and reliability of collected data	3	
C23 7	Apply reliability engineering	Skill	Apply reliability engineering methods to enhance system performance and reduce downtime. ▪ Conduct root cause analysis to identify and eliminate failure modes ▪ Use reliability models and failure data to predict equipment behaviour ▪ Recommend actions to improve asset reliability ▪ Develop maintenance strategies that balance cost, risk, and performance ▪ Collaborate with multidisciplinary teams to embed reliability into operations	3	
C23 8	Optimise maintenance	Skill	Analyse data and apply optimisation techniques to improve maintenance schedules and resource use.	2	

ID	Name	Type	Description	Level	ESCO
			▪ Identify opportunities to improve maintenance intervals based on predictive data ▪ Apply predictive analytics to prioritise interventions ▪ Refine maintenance plans for cost, risk, and uptime balance ▪ Evaluate results of optimisation strategies to extend asset lifespan ▪ Coordinate with production teams to align plans with operational goals		
C23 9	Maintenance execution and inspection	Knowledge	Apply technical documentation, procedures, and inspection practices to execute predictive maintenance activities. ▪ Follow work orders and predictive maintenance instructions accurately ▪ Record and validate completed interventions in CMMS systems ▪ Inspect equipment to detect degradation or deviations from expected behaviour ▪ Ensure compliance with company-specific and regulatory standards ▪ Support audits and reporting for predictive maintenance	2	
C24 0	Safety, health and environmental protection	Knowledge	Apply occupational safety and environmental regulations in predictive maintenance contexts. ▪ Use personal protective equipment in accordance with legal requirements ▪ Apply safety and environmental procedures during maintenance tasks ▪ Follow emergency protocols and risk prevention measures ▪ Comply with quality and safety management systems ▪ Ensure predictive maintenance practices minimise environmental impact	2	
C24 1	Tools and materials management	Knowledge	Manage tools, instruments, and materials to ensure readiness and traceability in predictive maintenance. ▪ Identify and specify technical characteristics of required tools and materials	2	

ID	Name	Type	Description	Level	ESCO
			▪ Apply stock management and procurement procedures ▪ Ensure calibration and preparation of diagnostic instruments ▪ Maintain inventory accuracy and traceability ▪ Handle and store tools in compliance with safety requirements		