

# Skills Framework for Electronics

## Overview of Technical Skills & Competencies (TSC)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Automation Management	Automated Operation Monitoring	Ensure smooth automation operations by maintaining and monitoring the automated systems and manufacturing process flows						
	Automated System Design	Design and commission automated systems as well as evaluate the system design specification against functional requirements						
	Automation Process Control	Apply automation process control to monitor performance metrics and quality of manufacturing outputs to determine the optimal settings as well as productivity improvement strategies						
	Automation System Maintenance	Maintain automation systems to meet operation requirements as well as propose strategies for the automation systems performance improvement						
Big Data Analytics	Data Analytics System Design	Integrate the use of data analytics in the production environment for the identification of bottlenecks and system improvements						
	Data Synthesis	Analyse factory automation and manufacturing data to monitor the manufacturing processes for operations and product or process flow optimisation						
Business Continuity Management	Business Continuity Planning	Execute business impact analysis, risk analysis, testing and exercising to ensure the currency of the organisation's business continuity plans						
	Crisis Situations Management	Identify crisis response and recovery activities as well as implement the recovery and business continuity strategies to minimise the impact of disruptive events to the organisation						
Maintenance	Equipment Maintenance	Maintain tools and equipment to meet operation requirements as well as propose strategies for tools and equipment performance improvement						
	Facilities Maintenance	Manage facility systems maintenance as well as propose strategies for performance enhancement						
Manufacturing and Operations	Defect Density Monitoring	Monitor the manufacturing process defect density metrics and manage deviations as well as analyse defect density issues and recommend corrective actions						
	Electrostatic Discharge Control	Implement precautionary measures required to avoid damage to sensitive electronic components as well as adopt proper components handling techniques and the use of appropriate personal grounding device						
	Factory System Management	Manage different factory system applications to ensure optimum manufacturing operations performance as well as measure equipment effectiveness and track production lot material						
	Good Manufacturing Practices Implementation	Implement good manufacturing practices to ensure that works are carried out based on industry practices and protocols						
	Manufacturing Process Management	Perform process engineering and ensure the stability of the manufacturing process as well as troubleshoot process deviations and propose strategies for process performance improvement						
	Metrology Management	Manage metrology techniques for process performance measurement as well as develop metrology recipes for process optimisation						
	Operation Management	Manage the manufacturing operations' Standard Operating Procedures (SOPs) to ensure consistent results of each manufacturing process as well as define and standardise the exact steps to perform specific tasks						
	Production Shut-down and Re-start	Manage shutdown and restarting of production process to minimise loss and/or damage of assets as well as ensure the safety of personnel during shut down and restarting						
Networking Building	Business Networking	Establish mutually beneficial relationship with other business stakeholders and potential clients and/or customers						
Network Technology Management	Internet of Things (IoT) Management	Interrelate computing devices, equipment and machines' data in a networked environment to provide specific solutions						
Organisational Development	Change Management	Implement organisational change smoothly as well as manage reactions to ensure seamless transition during change						
	Conflict Management	Perform conflict management within the organisation to assist members in resolving grievances and disputes						
	Learning and Development	Plan employees' learning and development activities to maximise employee contribution as well as building a skilled workforce						
People Management	Effectiveness Management	Set goals with team and evaluate team's effectiveness in achieving the defined goals and objectives						
	Report Writing	Present specific information and evidence in a clear and structured format						
	Technical Presentations	Deliver effective and engaging presentations to a variety of audiences						
Production Management	Production Performance Management	Plan and manage resources to optimise production performance as well as manage production constraint and improve manufacturing efficiency						
	Production Planning	Establish and execute the production plan to meet production targets and cycle time indices						

	<b>Production Resource Management</b>	Plan and control capacity and quality issues to meet organisational needs as well as schedule resources to synchronise production processes					
<b>Product Development and Testing</b>	<b>Manufacturing Process Design</b>	Analyse the design of the product to identify potential manufacturing risks and problems for the reduction of manufacturing costs					
	<b>New Product Introduction</b>	Support new production by validating build plan to achieve cost-effective production and assembly as well as meeting design specifications					
	<b>Product Testing</b>	Formulate test programme structure based on product specifications as well as develop a systematic approach in resolving test issues					
	<b>Research and Development</b>	Optimising manufacturing processes, material developments and development of new product line					
<b>Productivity and Innovation</b>	<b>Continuous Process Improvement</b>	Apply continuous improvement processes to improve products, services or processes seeking incremental improvement over time or breakthrough improvement all at once					
	<b>Innovation Management</b>	Respond to external or internal opportunities and apply creativity to introduce new ideas, processes or products					
	<b>Solutioning</b>	Generate solutions by systematic analysis of the problem, proposing preventive and/or corrective measures and evaluating the effectiveness of the measures from different perspectives					
<b>Quality Management</b>	<b>Audit Management</b>	Assess organisational objectives, policies, procedures, structure, control and system for the verification of efficient management of the organisation's activities					
	<b>Failure Analysis</b>	Examine the electrical and physical defects evidence to verify the causes of failure as well as identify the failure modes					
	<b>Material Qualification</b>	Manage quality of materials to ensure material specifications conform to product requirements					
	<b>Parametric Testing</b>	Implement parametric tests and parametric data analysis to drive process and yield improvements					
	<b>Quality Control and Assurance</b>	Implement checks and testing processes for the measurement and assurance of product quality and services to meet consumer expectations					
	<b>Quality Process Control</b>	Implement quality process controls to improve and stabilise production in order to avoid or minimise issues leading to defects					
	<b>Quality System Management</b>	Coordinate and direct the organization's activities to meet customer and regulatory requirements as well as identify opportunities for improvement					
	<b>Yield Analysis</b>	Apply yield analysis techniques to drive process and yield performance improvements					
<b>Risk Management</b>	<b>Enterprise Risk Management</b>	Develop and implement risk management strategies to support business operations					
	<b>Risk Appetite and Goals Setting</b>	Manage productive practices to allow for effective and efficient management of work by making changes for continuous improvements in the organisation					
<b>Strategy Planning and Implementation</b>	<b>Business Planning</b>	Develop business plans by reviewing existing resources to identify growth opportunities to achieve sustainable competitive advantage leading to a high exit valuation					
	<b>Organisational Analysis</b>	Evaluate factors that can affect the organization's performance as well as strategically assessing the organization's own resources and potential for improvement					
	<b>Organisational Strategising</b>	Provide an overall strategic direction to the organization to support achievement of strategic needs of the organisation					
<b>System Integration</b>	<b>Embedded System Integration</b>	Implement control systems to perform pre-defined tasks and also real-time monitoring for the real world					
	<b>Process Integration</b>	Integrate process loops and/or architecture to optimise process interactions between and within process modules as well as formulate strategies for yield performance improvements					
<b>Technology Road Mapping</b>	<b>Technology Road Mapping</b>	Plan short-term and long-term goals with specific technology solutions to help meet those goals in order to make capital out of future market needs					
<b>Workplace Safety and Health (WSH) Management</b>	<b>Emergency Management</b>	Implement emergency management to ensure the readiness of the stakeholders in addressing emergencies that may arise in the workplace					
	<b>Hazards and Risk Control, and Policy Management</b>	Ensure a systematic and objective approach for hazards identification and risk assessment to effectively manage the hazards that may occur within the workplace					
	<b>Workplace Safety and Health (WSH) Practices Implementation</b>	Implement Workplace Safety and Health (WSH) practices in accordance with legislative requirements to ensure safe work practices					
	<b>Workplace Safety and Health (WSH) System Management</b>	Ensure systematic process in the managing of Workplace Safety and Health-related activities in the workplace					

## General Descriptors for TSC – For Reference Purposes

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
<b>Responsibility</b> (Degree of supervision and accountability)					
Work under direct supervision  Accountable for tasks assigned	Work with some supervision  Accountable for a broader set of tasks assigned	Work under broad direction  May hold some accountability for performance of others, in addition to self	Work under broad direction  Hold accountability for performance of self and others	Accountable for achieving assigned objectives, decisions made by self and others	Accountable for significant area of work, strategy or overall direction
<b>Autonomy</b> (Degree of decision-making)					
Minimal discretion required. Expected to seek guidance	Use limited discretion in resolving issues or enquiries. Work without frequently looking to others for guidance	Use discretion in identifying and responding to issues, work with others and contribute to work performance	Exercise judgment; Adapt and influence to achieve work performance	Provide leadership to achieve desired work results; Manage resources, set milestones and drive work	Empower to chart direction and practices within and outside of work (including professional field/ community), to achieve/ exceed work results
<b>Complexity</b> (Degree of difficulty of situations and tasks)					
Routine	Routine	Less routine	Less routine	Complex	Complex
<b>Knowledge and Abilities</b> (Required to support work as described under Responsibility, Autonomy and Complexity)					
<ul style="list-style-type: none"> <li>• Recall factual and procedural knowledge</li> <li>• Apply basic skills to carry out defined tasks</li> <li>• Identify opportunities for minor adjustments to work tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and apply factual and procedural knowledge in a field of work</li> <li>• Apply basic cognitive and technical skills to carry out defined tasks and to solve routine problems using simple procedures and tools</li> <li>• Present ideas and improve work</li> </ul>	<ul style="list-style-type: none"> <li>• Apply relevant procedural and conceptual knowledge, and skills to perform differentiated work activities and manage changes</li> <li>• Able to collaborate with others to identify value-adding opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate and develop factual and conceptual knowledge within a field of work</li> <li>• Select and apply a range of cognitive and technical skills to solve non-routine/abstract problems</li> <li>• Manage work activities which may be unpredictable</li> <li>• Facilitate the implementation of innovation</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate factual and advanced conceptual knowledge within a field of work, involving critical understanding of theories and principles</li> <li>• Select and apply an advanced range of cognitive and technical skills, demonstrating mastery and innovation, to devise solutions to solve complex and unpredictable problems in a specialised field of work</li> <li>• Manage and drive complex work activities</li> </ul>	<ul style="list-style-type: none"> <li>• Synthesise knowledge issues in a field of work and the interface between different fields, and create new forms of knowledge</li> <li>• Employ advanced skills, to solve critical problems and formulate new structures, and/or to redefine existing knowledge or professional practice</li> <li>• Demonstrate exemplary ability to innovate, and formulate ideas and structures</li> </ul>