

**SKILLS FRAMEWORK FOR PRECISION ENGINEERING
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Product Development					
TSC	Research and Development					
TSC Description	Optimising manufacturing processes, material developments and development of new product lines					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
				PRE-PMN-4010-1.1-1	PRE-PMN-5010-1.1	PRE-PMN-6010-1.1
				Manage product design, development and introduction as an integrated, holistic value chain	Formulate research methodology for engineering team to achieve the research aims by overcoming potential constraints or critical requirements	Synergise research and development (R&D) to drive business strategy and manage product innovation
Knowledge				<ul style="list-style-type: none"> Product development processes Relationship between tangible products and brands Processes of concurrent engineering Types of organisation styles for effective product design and development Design protection and intellectual property rights Types of tools, techniques and technologies supporting concept generation and selection Design for assembly and/or manufacture lifecycle costing Principles of design-to-cost validation Applicable workplace safety and health (WSH) regulations 	<ul style="list-style-type: none"> Areas in which research can be undertaken by the organisation Factors that may have a critical effect on the methodology Types of constraints that may affect the research Regulations, directives and guidelines that may affect research Contingency plans Various research methods that may be used and where to obtain specialist knowledge or expertise Statistical analysis techniques used in processes or data Factors in determining the most effective research methods Time scales required for research Resources required for research 	<ul style="list-style-type: none"> Organisational innovativeness and idea creation Innovation strategy and how it is executed by the new product portfolio Methods for managing capacity and prioritising the new product portfolio in the R&D pipeline Measurement of project performance and overall innovation performance Methods for managing a portfolio of processes for different types of innovations (from incremental to radical) Co-ordination and effective organisational structures for product innovation Architectures, platforms and cost management in R&D R&D partnerships and alliances: strategies and processes

**SKILLS FRAMEWORK FOR PRECISION ENGINEERING
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

						<ul style="list-style-type: none"> • Transferring knowledge pertaining to R&D • Innovation culture and managing professionals
Abilities				<ul style="list-style-type: none"> • Define the roles of product design and development processes • Define the components of product design and development processes, and their relationships, from concept to customer • Establish design management processes and effective customer satisfaction through innovation • Evaluate methodical approaches to the management of product development • Review approaches, technologies, trends, tools and techniques of product design and development for effective utilisation 	<ul style="list-style-type: none"> • Confirm the aims and objectives of the research • Identify factors that may have an impact on the research methodology • Assess potential constraints on research and develop contingency plans to overcome them • Select research methods which best achieve the aims and objectives • Prioritise and schedule research activities that are necessary • Calculate the resources and time scales required to implement the methodology • Produce detailed plans of research and record them in organisation information systems • Establish benefits and opportunities of collaborating with others in conducting research 	<ul style="list-style-type: none"> • Build tools to translate business strategy into a portfolio of innovation initiatives • Measure the performance of uncertain and long-term initiatives • Build processes and structures to enhance the capability of the organisation to generate creative ideas for different purposes and with different degrees of value proposition