

**SKILLS FRAMEWORK FOR PRECISION ENGINEERING
SKILLS STANDARDS FOR
CHIEF ENGINEER**

Occupation: Chief Engineer

Occupation Description:

The Plant Manager leads all manufacturing and engineering activities in the organisation to ensure that manufacturing objectives are achieved in a timely and cost-effective manner. He/She formulates and recommends manufacturing policies and programmes to guide the organisation in maintaining and improving its competitive position and profitability.

The Plant Manager works with cross-functional teams to identify, develop and implement technology, products and documentation. He/She builds high performance teams that work collaboratively through an organisation, and has the ability to develop and execute functional strategy as well as act as a change leader.

Important Points to Note about this Document

This document is intended purely to provide general information to enable individuals, employers and training providers to be informed about the skills for career, training and education purposes. SkillsFuture Singapore Agency provides no warranty whatsoever about the contents of this document, and does not warrant that the courses of action mentioned in this document will secure employment, promotion, or monetary benefits. WDA will not be liable for any loss, damage or expense that individuals may incur as a result of reliance on the contents of this document.

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The skills expected of the Chief Engineer are summarised as below:

Skill Category	Skill Sub-Category	Skills
Technical and Engineering Fundamentals		PRE-TEF-7043-1 Apply Advanced Precision Engineering Concepts and Principles to Solve Complex Precision Engineering Problems
Technical and Engineering Design		PRE-TED-7019-1 Develop a Strategy for the Engineering Design Process to Satisfy Market and Legislative Requirements PRE-TED-7020-1 Evaluate Engineering Designs of Machinery and Systems to Satisfy Manufacturing Requirements
Precision Manufacturing Processes		PRE-PMP-7075-1 Evaluate Precision Manufacturing Processes and Technologies to Satisfy Manufacturing Requirements
Quality		PRE-QUA-7017-1 Evaluate Quality Engineering Processes to Satisfy Business and Legislative Requirements PRE-QUA-7018-1 Integrate Quality Planning throughout Product Life Cycle to Incorporate Quality Management from Product Conception to Disposal
New Product Development		PRE-NPD-7003-1 Carry out Design of Experiments PRE-NPD-7004-1 Develop a Research Methodology for Engineering PRE-NPD-7005-1 Verify New Product Designs using a Physical Model
Workplace Safety and Health		PRE-WSH-6010-1 Evaluate Workplace Safety and Health Systems for Improvement
Additive Manufacturing		PRE-AMA-7011-1 Develop Additive Manufacturing Application Strategy and Evaluate Integration Plan for Additive Manufacturing Processes to Satisfy

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Skill Category	Skill Sub-Category	Skills
		Manufacturing Requirements
Laser and Optics		PRE-LOP-7007-1 Develop Advanced Optical Metrology Application Strategy and Evaluate Integration Plan for Advanced Optical Metrology Processes to Satisfy Manufacturing Requirements
Business Negotiation		BM-BN-601E-1 Direct Negotiation Policy and Develop Negotiation Limits
Change Management		BM-CM-601E-1 Lead Change Management
Communication		BM-COM-601E-1 Direct Relationships with Stakeholders BM-COM-504E-1 Establish Internal Communications Platforms and Channels
Human Resource Management		PRE-HRM-7008-1 Align Human Resources with Business Needs PRE-HRM-7009-1 Promote Harmonious Tripartite Relations
Leadership and People Management		LPM-PER-601C-0 Develop Self to Maintain Professional Competence to Lead an Organisation LPM-RLT-601C-0 Establish Organisational Relationships and Lead Organisational Diversity
Project Management		BM-PM-601E-1 Steer Programme
Strategy Planning and Implementation		BM-SPI-509E-1 Establish Business Strategies for the Business Function

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Skill Code	PRE-TEF-7043-1	Skill Category	Technical and Engineering Fundamentals
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Apply Advanced Precision Engineering Concepts and Principles to Solve Complex Precision Engineering Problems		
Skill Description	This skill describes the ability to apply advanced precision engineering concepts and principles to solve complex precision engineering problems. It also includes applying determinism as a precision engineering philosophy.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Principles of precision engineering • Determinism, as a manufacturing philosophy • Design trade-offs made through adopting different precision engineering principles • Computer-aided Engineering (CAE) and the role of computers in precision engineering • Concepts and applications of 'Smart Factory' and networked manufacturing process • Concepts and applications of ultra-precision machining and micro-electromechanical systems • Concepts of nanofabrication and molecular manipulation • Principles of innovative thinking and change management • Engineering ethics • Principles of mentorship 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate precision engineering issues in a deterministic and logical manner • Evaluate the design of components, precision machines and systems based on adherence to established principles • Review applications of ultra-precision machining to determine relevancy for application to manufacturing processes • Review applications of micro-electromechanical systems to determine relevancy for application to manufacturing processes 		
Innovation and Value Creation <i>It refers to the ability</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate the effects of incorporating CAE into manufacturing process 		

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<p><i>to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>chains to enhance overall value</p> <ul style="list-style-type: none"> • Evaluate the effects of incorporating ‘Smart Factory’ concepts into manufacturing process chains to enhance overall value
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead a culture of innovative thinking and receptiveness to apply changes and adopt advanced precision engineering applications • Deal with ethical issues associated with adopting advanced technology, in accordance with ethical codes or practices
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one’s self within and outside of one’s area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Reflect on the impact and effect of nanofabrication and molecular manipulation technologies on the precision engineering business • Lead organisation taskforces to drive learning or experiential journeys to embrace new technology • Reflect and collaboratively establish gaps within the engineering department relating to advanced technologies, and mentor senior team members to improve organisational capabilities
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Principles of precision engineering must include:</p> <ul style="list-style-type: none"> • All branches of mechanics • All branches of electricity and electronics

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Skill Code	PRE-TED-7019-1	Skill Category	Technical and Engineering Design
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Develop a Strategy for the Engineering Design Process to Satisfy Market and Legislative Requirements		
Skill Description	This skill describes the ability to develop a strategy for the engineering design process, which ranges from the identification of design activities to the dissemination of design information. It also includes establishing contingency plans.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Organisational activities required for the design process • Procedures used in the design process • Prioritising and scheduling activities • Problems encountered during the design process • Factors to be considered when disseminating information • Components of contingency plans 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Identify the design activities that need to be undertaken • Establish the responsibilities for developing aspects of the design process • Identify and obtain the resources necessary to complete the design process • Ensure that the design process is in compliance with organisational procedures and regulatory requirements 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Identify potential problems and establish contingency plans 		
Social Intelligence and Ethics	The ability to:		

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<p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<ul style="list-style-type: none"> • Conduct briefing on procedures for disseminating information on designs
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Engage in self-reflection to review the effectiveness of engineering design evaluation processes in meeting component functional and legislative requirements
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Developing a design strategy must include:</p> <ul style="list-style-type: none"> • Confirming the requirements • Production and review of detailed designs • Review of reference materials • Development of models, e.g. software, physical • Production and review of high level designs • Obtaining approval

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Skill Code	PRE-TED-7020-1	Skill Category	Technical and Engineering Design
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Evaluate Engineering Designs of Machinery and Systems to Satisfy Manufacturing Requirements		
Skill Description	This skill describes the ability to apply engineering design principles and strategies in evaluating machinery and automation systems for effectiveness and reliability. It also includes evaluation of applications, integration of key mechanical components and modules, and practical design and analytical approaches for machine structures and automation systems.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Principles of precision engineering • Methods and tools for evaluating machinery and automation systems • Evaluation criteria for machinery and automation systems • Types and impact of recommendations on engineering processes • Organisational and legislative requirements 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate methods of analyses used to determine requirements of precision machine performance • Evaluate findings from performance specification analysis pertaining to selection of sensors and actuators • Evaluate findings from performance specification analysis pertaining to selection of automation control systems • Evaluate findings from performance specification analysis pertaining to selection of electrical systems • Evaluate findings from performance specification analysis pertaining to selection of human machine interface systems • Evaluate system designs for Integration of selected components, in accordance to precision machine requirements • Evaluate final reports on the selected components used to meet the machine system requirements • Evaluate machine design specification drawings 		

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<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Conduct costs-of-quality analyses related to products, and identify areas for improvement in accordance with organisational quality system requirements
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Analyse and propose opportunities for improved forming approaches in the workplace
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Explain evaluation criteria to team members • Communicate improved work processes to relevant stakeholders
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Principles of precision engineering include:</p> <ul style="list-style-type: none"> • Advanced concepts of mechanics and mechatronics • Advanced concepts of electricity and magnetism • Advanced concepts of thermodynamics • Advanced concepts of material science • Advanced concepts of engineering mathematics • Advanced concepts of design and drafting • Advanced concepts of control systems • Concepts of computing and programming • Advanced concepts of geometric error budgeting • Advanced concepts of calibration • Advanced concepts of measurements <p>Evaluating engineering processes must include evaluation of the following:</p> <ul style="list-style-type: none"> • Standard operating procedures and work instructions • Process and quality control/quality assurance documentation

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	<ul style="list-style-type: none">• Organisation documentation• IT systems <p>Organisational and legislative requirements include:</p> <ul style="list-style-type: none">• Economics, environment requirements• Workplace Safety and Health Act
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Skill Code	PRE-PMP-7075-1	Skill Category	Precision Manufacturing Processes
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Evaluate Precision Manufacturing Processes and Technologies to Satisfy Manufacturing Requirements		
Skill Description	This skill describes the ability to apply appropriate methods and techniques to monitor and evaluate process outputs and the utilisation of resources. It also includes highlighting deviations from agreed specifications and recommending corrective actions.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Methods and tools for evaluating engineering processes • Evaluation criteria for engineering processes • Types and impact of recommendations on engineering processes • Workplace safety and health regulations 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Determine impact to business when evaluating new manufacturing processes and implementing new technology • Establish criteria for evaluating engineering processes • Lead in the establishment of new manufacturing processes and technology 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Assess the potential impact of recommended changes • Recommend improvements to engineering processes to add value to company processes, or quality output of products and services 		

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<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Consult with the engineering team to seek feedback on engineering processes
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Reflect on the non-tangible impact of implementing new processes on the precision engineering business • Lead organisation taskforces to drive learning or experiential journeys to embrace adoption of latest technology • Reflect and collaboratively establish gaps within the manufacturing process, and mentor colleagues to improve organisational capabilities
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>N/A</p>

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Skill Code	PRE-QUA-7017-1	Skill Category	Quality
		Skill Sub-Category (where applicable)	N/A
Skill	Evaluate Quality Engineering Processes to Satisfy Business and Legislative Requirements		
Skill Description	This skill describes the ability to apply methods and techniques to evaluate quality of engineering processes. It also includes integration of quality management models into engineering processes to satisfy business requirements.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Quality models in business • Standards in quality assurance • Uses of integrated management systems within organisations • Types and impact of recommendations on engineering processes • Methods and tools for evaluating engineering processes • Evaluation criteria for engineering processes • Business case writing • Principles of change management • Workplace Safety and Health (WSH) regulations 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate the use and benefits of quality models and standards to business • Evaluate business cases for implementing quality models within an organisation • Recommend improvements to engineering processes based on quality models • Assess potential impacts of recommended improvements • Establish criteria for evaluating the engineering process • Prepare business cases for implementing integrated quality management systems • Develop quality strategies and prepare plans to integrate quality management systems to satisfy business and legislative requirements 		
Innovation and Value Creation <i>It refers to the ability to generate purposive</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Analyse different approaches for evaluating quality management systems to enhance their effectiveness and accuracy 		

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<p><i>ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead a culture of quality and receptiveness to adopt new quality models • Consult in collaboration with business management to obtain bottom-up feedback on quality of engineering processes
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Reflect on the non-tangible impact of implementing quality models on the precision engineering business • Lead organisation taskforces to drive learning or experiential journeys to embrace new quality strategies • Reflect and collaboratively establish quality gaps within the engineering department and mentor senior team members to improve organisational capabilities
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Management system models and standards must include:</p> <ul style="list-style-type: none"> • Plan, Do, Check, Act (PDCA) cycle • ISO 9000/1/4 • Six Sigma • Lean manufacturing • Total Quality Management <p>Evaluation scope must include</p> <ul style="list-style-type: none"> • Standard operating procedures / work instructions • Process / quality control or assurance documentation • Organisation documentation • IT system

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Skill Code	PRE-QUA-7018-1	Skill Category	Quality
		Skill Sub-Category (where applicable)	N/A
Skill	Integrate Quality Planning throughout Product Life Cycle to Incorporate Quality Management from Product Conception to Disposal		
Skill Description	This skill describes the ability to lead and incorporate quality management to support products and services through the whole life cycle from conception to disposal. It also includes supporting the various business functions involved in each part of the process.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	The ability to understand: <ul style="list-style-type: none"> • New product development processes • Full product life cycle management • Quality and reliability prediction techniques, including Design Failure Mode and Effects Analysis (DFMEA) and Failure Mode and Effects Analysis (FMEA) • Reliability concepts of series and parallel systems • Risk management 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	The ability to: <ul style="list-style-type: none"> • Evaluate quality factors to be considered during initiation of the development of new products and services • Determine life cycle activities in new product development processes • Evaluate quality inputs and outputs for satisfactory completion of every key activity • Lead and incorporate quality concepts and tools to improve quality of each phase of development for new products and services 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i>	The ability to: <ul style="list-style-type: none"> • Perform risk assessment on the positive and negative effects of quality on each activity's deliverables, and optimise development processes to reduce or remove risks • Evaluate the business benefits of using cross-functional approaches in integrating quality to further enhance business performance 		

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<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead a culture of quality and receptiveness to adopt new quality models • Consult in collaboration with business management to obtain bottom-up feedback on quality of development for new products and services
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Reflect on the non-tangible impact of implementing quality planning on the precision engineering business • Lead organisation taskforces to drive learning or experiential journeys to embrace new quality strategy • Reflect and collaboratively establish gaps within the business in quality planning, and mentor colleagues to improve organisational capabilities
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Development processes must include:</p> <ul style="list-style-type: none"> • Market research • Business case development • Design, prototyping, design review • Testing • Service and product launch • Service and product enhancement and maintenance • Disposal <p>Industry standards and tools for new product development include:</p> <ul style="list-style-type: none"> • Rapid application development • Prince2 • ISO 10006 • BS6079 <p>Product life cycle quality management includes:</p> <ul style="list-style-type: none"> • 'Make or buy?' decision-making criteria • Potential costs due to poor design and development processes • Sequential and concurrent design • Selection and use of quality tools throughout the product life cycle

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Skill Code	PRE-NPD-7003-1	Skill Category	New Product Development
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Carry out Design of Experiments		
Skill Description	This skill describes the ability to carry out design of experiments by applying design of experiments principles and processes to selected plants or processes. It also includes determining the scope and parameters of the experiment and carrying out the experiment within these parameters, utilising the appropriate tools and techniques.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	The ability to understand: <ul style="list-style-type: none"> • Design of experiments and its benefits • Methods to determine scope of experiments • Methods for carrying out design of experiment project • Tools and techniques to carry out design of experiments • Data required to carry out design of experiments • Alpha and beta risks in carrying out design of experiments • Methods for calculating sample sizes in design of experiments • Workplace Safety and Health regulations 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	The ability to: <ul style="list-style-type: none"> • Select appropriate processes to carry out design of experiment • Determine scope and parameters of experiments • Utilise sample size selection to ensure statistical validity of experiments • Identify suitable sampling plans to reduce systematic errors • Carry out design of experiments utilising appropriate tools and techniques • Record results of design of experiments • Produce a design of experiments report to ensure improvements are implemented 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are</i>	The ability to: <ul style="list-style-type: none"> • Estimate the resources and expected benefits for the design of experiment undertaken • Analyse data gathered and identify areas where improvements to processes may be introduced 		

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<i>aligned to organisational goals.</i>	
Social Intelligence and Ethics <i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i>	The ability to: <ul style="list-style-type: none"> • Communicate with customers, colleagues and teams to direct timeframes and design requirements
Learning to Learn <i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i>	The ability to: <ul style="list-style-type: none"> • Analyse past design of experiment projects to avoid repeating past mistakes in current project
Range of Application <i>(where applicable)</i> <i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i>	Types of resources required for design of experiments project must include: <ul style="list-style-type: none"> • Financial • Time scales • Manpower • Plant and equipment • Materials

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Skill Code	PRE-NPD-7004-1	Skill Category	New Product Development
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Develop a Research Methodology for Engineering		
Skill Description	This skill describes the ability to develop a research methodology for engineering in accordance with approved procedures. It also includes selecting and producing methodologies to achieve the research aims and objectives effectively, and evaluating research methodologies for any potential constraints or critical requirements.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Different types research areas the organisation may undertake • Factors that may have critical effects on research methodologies • Types of constraints that may affect the research • Regulations, directives and guidelines that may affect research • Contingency plans • Advantages and disadvantages of collaborating with other organisations and people • Research methods • Sources to obtain specialist knowledge and expertise • Statistical analysis techniques used on processes and data • Factors in determining effective research methods • Time scales required for research • Resources required for research • Methods to present research plans • Organisation information systems for recording information 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Confirm the aims and objectives of the research • Identify factors that may impact research methodologies • 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 research methodologies • Produce detailed plans of research and record them in organisation information systems 		

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<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Establish benefits and opportunities of collaborating with others in conducting research
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Present research results to key stakeholders for endorsement and information • Adhere to code of conduct and ethics when conducting research
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Keep abreast of past research conducted in similar areas through research journals to incorporate the findings into current research
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Critical factors and constraints that may affect the research must include:</p> <ul style="list-style-type: none"> • Cultural acceptability of the activities • Organisational capability • Prestige • Personnel capabilities • Commercial implications • External contracts • Time scales • Technology requirements • Environment • Costs • Availability of resources and facilities • Safety

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	<p>Research methods must include:</p> <ul style="list-style-type: none">• Tests, such as destruction, emission, audio and sound frequency, life expectancy, durability, vibration, analysis, simulations• Observation• Quantitative data analysis• Environmental study• Qualitative data analysis• Statistical analysis and sampling• Interview• Design of experiments• Case study• Survey <p>Resources required for research must include:</p> <ul style="list-style-type: none">• Personnel• Hardware and/or software• Equipment• Location and/or site facilities• Monitoring equipment and systems• Contracts• Finances
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Skill Code	PRE-NPD-7005-1	Skill Category	New Product Development
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Verify New Product Designs using a Physical Model		
Skill Description	This skill describes the ability to plan the creation of a physical model and verify its performance against defined design data. It also includes establishing the design data against which the model is to be evaluated, determining the most suitable modelling process and arranging for the model to be created.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Suitable methods for producing physical models • Technologies used in the creation of physical models • Benefits, constraints and physical limitations of various modelling processes • Organisational procedures and information systems for verifying designs using physical models • Equipment and methods used to evaluate physical modes • Engineering principles in modelling and evaluation processes • Types of problems encountered during the modelling process • Methods and techniques used to evaluate design models • Resources necessary for modelling exercises • Hazards associated with various technologies • Workplace Safety and Health regulations 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Establish most appropriate methods for producing physical models • Identify potential design limits and constraints from physical modelling exercises • Arrange construction of physical models • Collect design data from physical models using appropriate equipment and materials • Monitor modelling processes to ensure they meet the design characteristics • Evaluate data from physical models against design data requirements to determine variances 		
Innovation and Value Creation <i>It refers to the ability</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Analyse data from physical models to determine measures that may 		

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<p><i>to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>enhance the performance of the new product designs</p>
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Present results of physical models to key stakeholders for endorsement
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Keep abreast of latest trends and technologies in modelling through industry networks and research journals to source for new technologies that may be used in building physical models
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Resources required to produce the physical model must include:</p> <ul style="list-style-type: none"> • Modelling methods • Materials required • Manpower with required skills • Access to specialised equipment <p>Methods of creation of the physical model must include:</p> <ul style="list-style-type: none"> • Rapid prototyping • Soft tools • Other processes <p>Data from the physical models must include:</p> <ul style="list-style-type: none"> • Geometry • Interfacing • Aesthetics • Performance • Materials • Assembly and manufacturability

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	<ul style="list-style-type: none">• Weight• Aerodynamics• Durability
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Skill Code	PRE-WSH-6010-1	Skill Category	Workplace Safety and Health
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Evaluate Workplace Safety and Health Systems for Improvement		
Skill Description	This skill describes the ability to evaluate an organisation's Workplace Safety and Health (WSH) management system, identify areas for improvement, make the relevant recommendations and monitor the progress of improvement.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Areas of improvement to Workplace Safety and Health (WSH) Management System • Organisational needs for improvement • Consultation with stakeholders • Prioritisation of areas for improvement • Improvement recommendations • Levels of control • Legal and other requirements of WSH • Good practices in WSH • Resources needed for implementation of improvement recommendations • Benefits of recommended improvements • Setting of measurements for successful implementation • Implementation plan • Monitor and review of implementation progress • Resolving issues during implementation • Contextual or organisational changes • Verification of improvements' effectiveness • Reporting to stakeholders on improvement made • Workplace Safety and Health regulations 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Develop a proposal on areas of improvement in accordance with organisational needs • Monitor and review progress of implementation in accordance with implementation plan and organisational needs 		

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<i>manage the changes at work.</i>	
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational</i>	The ability to: <ul style="list-style-type: none"> Identify areas of improvement to the WSH Management System based on organisational needs for improvement
Social Intelligence and Ethics <i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i>	The ability to: <ul style="list-style-type: none"> Present improvement recommendations proposal to stakeholders in accordance with organisational procedures Advise stakeholders on setting of measurements for successful implementation in accordance with the implementation plan
Learning to Learn <i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i>	N/A
Range of Application (where applicable) <i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i>	N/A

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Skill Code	PRE-AMA-7011-1	Skill Category	Additive Manufacturing
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Develop Additive Manufacturing Application Strategy and Evaluate Integration Plan for Additive Manufacturing Processes to Satisfy Manufacturing Requirements		
Skill Description	This skill describes the ability to develop an organisational additive manufacturing application strategy. It also includes evaluation of the additive manufacturing integration plan to satisfy manufacturing requirements.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Advanced principles of precision engineering • Benefits and trade-offs of AM • Risk management • Impact of AM to manufacturing operations • Impact of AM to manufacturing organisational structure • Impact of AM to supply chain operations • Applications of AM technologies • Impact of external conditions to AM implementation • Components of business case • Business case writing • AM legislative requirements • Principles of change management 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate the benefits and trade-offs of implementing additive manufacturing to the business • Assess the impact and risks of additive manufacturing to manufacturing operations • Assess the impact of additive manufacturing to manufacturing organisational structures • Assess the impact and risks of additive manufacturing to supply chain operations • Assess the availability and risks of additive manufacturing technology • Assess the impact and risks of external conditions to the implementation of additive manufacturing • Develop organisational additive manufacturing application strategies • Prepare a business case for implementing additive manufacturing to 		

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	<p>satisfy business and legislative requirements</p> <ul style="list-style-type: none"> • Evaluate additive manufacturing integration plans to satisfy manufacturing requirements
<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Analyse different approaches to impact assessment, to enhance effectiveness and accuracy of evaluations
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead a culture of receptiveness to adopt change and new manufacturing processes • Engage and collaborate with industry subject matter experts to share insights on additive manufacturing implementation
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Reflect on the risks and impact to business competitiveness of not implementing additive manufacturing • Lead organisation taskforces to drive learning or experiential journeys to embrace new additive manufacturing application strategies • Reflect and collaboratively establish gaps within the engineering department in advanced manufacturing technologies, and mentor senior team members to improve organisational capabilities
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Benefits of additive manufacturing must include:</p> <ul style="list-style-type: none"> • Reduced lead time • Faster product modifications • Reduced costs • Quality products • High variety at same or reduced cost <p>Additive manufacturing trade-offs include:</p>

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	<ul style="list-style-type: none">• High capital investment• High material and maintenance costs• Material property characterisation challenges• Post-processing requirements• High process costs <p>Impact of external conditions to implementation of additive manufacturing include:</p> <ul style="list-style-type: none">• Competitive pressures• Environmental concerns• Legislative requirements <p>Additive manufacturing strategies include alignment between:</p> <ul style="list-style-type: none">• Business• Research• Product• Manufacturing
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Skill Code	PRE-LOP-7007-1	Skill Category	Laser and Optics
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Develop Advanced Optical Metrology Application Strategy and Evaluate Integration Plan for Advanced Optical Metrology Processes to Satisfy Manufacturing Requirements		
Skill Description	This skill describes the ability to develop an organisational advanced optical metrology application strategy. It also includes evaluation of advanced optical metrology integration plans to satisfy manufacturing requirements.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Advanced principles of precision engineering • Benefits and trade-offs of advanced optical metrology • Risk management • Impact of advanced optical metrology to manufacturing operations • Impact of advanced optical metrology to manufacturing organisational structures • Impact of advanced optical metrology to supply chain operations • Applications of advanced optical metrology technologies • Impact of external conditions to advanced optical metrology implementation • Components of business cases • Business case writing • Advanced optical metrology legislative requirements • Principles of change management 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate the benefits and trade-offs of implementing advanced optical metrology to the business • Assess the impact and risks of advanced optical metrology to manufacturing operations • Assess the impact of advanced optical metrology to manufacturing organisational structures • Assess the impact and risks of advanced optical metrology to supply chain operations • Assess the availability and risks of advanced optical metrology technology • Assess the impact and risks of external conditions to implementation of advanced optical metrology 		

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	<ul style="list-style-type: none"> • Develop organisational advanced optical metrology application strategies in consideration of assessments • Prepare business cases for implementing advanced optical metrology to satisfy business and legislative requirements • Evaluate advanced optical metrology integration plans to satisfy manufacturing requirements.
<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Analyse different approaches to impact assessment, to enhance effectiveness and accuracy of evaluations
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead a culture of receptiveness to adopt change and new manufacturing processes • Engage and collaborate with industry subject matter experts to share insights on advanced optical metrology implementation
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Reflect on the risks and impact of not implementing advanced optical metrology to business competitiveness • Lead organisation taskforces to drive learning or experiential journeys to embrace new advanced optical metrology application strategies • Reflect and collaboratively establish gaps within the engineering department in advanced manufacturing technologies, and mentor senior team members to improve organisational capabilities
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill</i></p>	<p>Advanced optical metrology benefits must include:</p> <ul style="list-style-type: none"> • Reduced lead time • Measurement accuracy • Reduced costs • Quality products

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<i>may be demonstrated.</i>	<ul style="list-style-type: none">• High variety at same or reduced cost <p>Advanced optical metrology trade-offs must include:</p> <ul style="list-style-type: none">• High capital investment• High maintenance costs <p>Impact of external conditions to advanced optical metrology implementation must include:</p> <ul style="list-style-type: none">• Competitive pressures• Environmental concerns• Legislative requirements <p>Advanced optical metrology strategies must include alignment between:</p> <ul style="list-style-type: none">• Business• Research• Product• Manufacturing
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Skill Code	BM-BN-601E-1	Skill Category	Business Negotiation
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Direct Negotiation Policy and Develop Negotiation Limits		
Skill Description	This skill describes the ability to develop, evaluate and refine negotiation policy and limits. It also includes setting negotiation guidelines to guide the negotiation process.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Situations that negotiation may be used in organisation • Means of applying negotiation limits and guidelines 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Develop negotiation policy and limits to guide organisation negotiation • Set negotiation guidelines to guide negotiation process 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate and refine negotiation policy and limits based on negotiation outcomes to enhance organisational effectiveness in managing negotiations 		

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<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Adhere to organisational code of conduct, values and ethics when developing negotiation policy to ensure objectivity in the process
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Consult with stakeholders to identify areas for improvement in relation to organisational negotiation policy to enhance organisational effectiveness
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>N/A</p>

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Skill Code	BM-CM-601E-1	Skill Category	Change Management
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Lead Change Management		
Skill Description	This skill describes the ability to drive and lead change management in an organisation. It includes guiding the development of change management strategy, leading, evaluating and refining change management strategy as well as building an environment conducive for change management.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	The ability to understand: <ul style="list-style-type: none"> • Leadership role in change management process • Types of change management programmes • Different leadership styles and approaches and their impact on change management • Drivers of implementing and sustaining change in the organisation • Factors that support change management • Typical barriers to change within organisations • Techniques to overcome resistance to change 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	The ability to: <ul style="list-style-type: none"> • Define and drive change in the organisation to achieve desired strategic business outcomes • Guide development of change management strategy in accordance with organisational culture and interests of relevant stakeholders to facilitate buy-in and support for proposed change • Lead change in line with strategic plan to achieve change objectives 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to</i>	The ability to: <ul style="list-style-type: none"> • Evaluate and refine change management strategy in accordance with organisational culture and interests of relevant stakeholders to facilitate buy-in and support for proposed change 		

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<i>organisational</i>	
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Exercise organisational awareness to build an environment ready for change management programmes
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Advocate organisational sharing on change management to encourage individuals to learn from the experiences of others and develop the skills needed to manage and adapt to change
<p>Range of Application</p> <p>(where applicable)</p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	N/A

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Skill Code	BM-COM-601E-1	Skill Category	Communication
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Direct Relationships with Stakeholders		
Skill Description	This skill describes the ability to direct relationships with stakeholders. It includes evaluating the interests and needs of stakeholder groups and factors impacting organisation's stakeholder relationships, guiding programmes to enhance stakeholder relationships, as well as establishing and maintaining networks and relationships.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Business environment • Types of networks • Opportunities to build networks • Legal, regulatory, ethical and socio-cultural constraints that may apply to stakeholder relationships 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Guide interactions and programmes with stakeholder groups to support organisational strategies and objectives 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate factors impacting organisation's relationships with stakeholder groups to determine how to enhance relationships 		

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<i>aligned to organisational</i>	
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate interests and needs of stakeholder groups to understand the existing and potential relationships with the organisation • Demonstrate organisational awareness to act with stakeholder groups' interest to establish and maintain networks and long term relationships to support organisational strategies and objectives
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Engage in self-reflection to identify new platforms which offer opportunities to establish strategic business relationships with potential partners to support organisational objectives
<p>Range of Application</p> <p>(where applicable)</p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	N/A

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Skill Code	BM-COM-504E-1	Skill Category	Communications
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Establish Internal Communications Platforms and Channels		
Skill Description	This skill describes the ability to establish internal communications platforms and channels. It also includes evaluating existing platforms and channels as well as developing, selecting and refining such platforms and channels to ensure effectiveness.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Communications objectives • Organisational structure to identify approach to disseminate information • Internal partners needed to successfully disseminate messages • Outcomes of communication • Critical success factors of internal communications platforms and channels • Considerations in addressing employees' needs and motivations 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate existing communications platforms and channels to assess their effectiveness • Develop communications platforms and channels to effectively disseminate messages internally to achieve communications objectives • Select appropriate communications platforms and channels in consultation with relevant stakeholders to execute communications strategies 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Review outcomes of communication to determine need to make necessary changes to communications platforms and channels 		

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<i>organisational goals.</i>	
Social Intelligence and Ethics <i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i>	The ability to: <ul style="list-style-type: none"> • Demonstrate openness to ideas and suggestions when consulting stakeholders on communication platforms and channels to ensure individual views are acknowledged and addressed
Learning to Learn <i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i>	The ability to: <ul style="list-style-type: none"> • Keep abreast of new communication platforms and channels to assess suitability for the organisation by subscribing to diverse information channels and participating in discussion platforms
Range of Application <i>(where applicable)</i> <i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i>	N/A

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Skill Code	PRE-HRM-7008-1	Skill Category	Human Resource Management
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Align Human Resources with Business Needs		
Skill Description	This skill describes the ability to align human resource (HR) services with business needs. It also includes the link between human resource initiatives and how these align to business strategies.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Legal and ethical considerations relating to the broader development and provision of human resource (HR) information and services • Links between HR and organisational strategies • Market trends and developments in relation to HRactivities, services and programmes • Communication techniques and channels relevant for disseminating information on HRactivities, services and programmes • Facilitation and communication skills for working with stakeholders to develop HRactivities, services and programmes • Statistical analysis for reviewing HR related performance data • Models and methods for evaluating the effectiveness of HRactivities, services and programmes • Legal and ethical considerations relating to consultation and communication with organisational stakeholders • Relationship between strategies developed at senior levels and the operational, or functional, requirements of other areas within the organisation 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Identify HR trends that may impact organisational performance • Document review activity outcomes to clarify future directions of HR services and validate priorities with stakeholders • Implement or initiate identified changes to HR activities, services and programmes to support the organisation's strategic and business goals • Establish performance indicators and measures for the effectiveness of HR activities, services and programmes designed to support the organisation's strategic and business goals 		

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<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Review organisation’s strategic and business plans to identify areas impacting HR activities, services and programmes • Review data and reports to document past performance of HR activities, services and programmes
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Facilitate involvement of stakeholders to review HR service effectiveness and clarify future expectations and requirements • Communicate with stakeholders to clarify their needs relating to HR activities, services and programmes • Agree on required changes to HR activities, services and programmes, and explain to key stakeholders how changes will assist in achieving strategic and business goals
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one’s self within and outside of one’s area of work.</i></p>	<p>N/A</p>
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>N/A</p>

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Skill Code	PRE-HRM-7009-1	Skill Category	Human Resource Management
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Promote Harmonious Tripartite Relationships		
Skill Description	This skill describes the ability to lead collective bargaining processes with a view to promoting harmonious tripartite relationships in the organisation. This includes This skill describes the ability to understand the processes used in dispute and grievance management as well as demonstrating advanced communication skills in representing the organisation to a diverse group of stakeholders.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Legislative procedures, organisational policies and procedures, standards and codes of practice relating to industrial relations and collective bargaining • Models and methods for engaging, negotiating and communicating with key stakeholders • Role of tripartite parties in Singapore industrial relations system • Market trends and developments in relation to human resource and industrial relations • Sources of conflict • Collective bargaining process • Systems and processes to implement agreed outcomes 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Champion organisational policies and procedures to strengthen labour and management relations • Direct the development of systems and processes to ensure agreed outcomes are implemented 		
Innovation and Value Creation	<p>The ability to:</p> <ul style="list-style-type: none"> • Examine possible causes and sources of conflict that may erode the 		

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<p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational</i></p>	<p>organisation's business value</p>
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Establish effective working relationships with union representatives to ensure synergy between tripartite parties • Lead collective bargaining process to achieve mutually beneficial and acceptable outcomes
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Review legislative procedures, organisational policies and industrial practice and compliance requirements relevant to the organisation • Keep abreast of market trends and developments in relation to human resource and industrial relations • Engage in self-reflection on one's own performance and experience in the collective bargaining process to ensure
<p>Range of Application</p> <p>(where applicable)</p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>Legislative procedures relevant to labour and management relations includes:</p> <ul style="list-style-type: none"> • Employment Act • Industrial Relations Act • Trade Unions Act • Trade Disputes Act • Workplace Safety and Health Act • Retirement Age Act • Workmen's Compensation Act <p>Sources of conflict includes:</p> <ul style="list-style-type: none"> • Issues, concerns and tensions between individuals and groups • Problems related to work roles and responsibilities

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	<ul style="list-style-type: none">• Matters related to workplace relationships and productivity• Introduction of initiatives which may impact a worker's entitlements and work environment <p>Systems and processes to implement agreed outcomes include:</p> <ul style="list-style-type: none">• Mediation processes• Collective bargaining• Employee engagement• Employee recognition programmes• Leadership programmes• Learning and development• Organisation culture
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Skill Code	LPM-PER-601C-0	Skill Category	Personal Management and Development
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Develop Self to Maintain Professional Competence to Lead an Organisation		
Skill Description	This skill describes the ability to lead organisational communications and decision-making as one of the most senior members of an organisation. It also includes influencing stakeholders and maintaining integrity in one's role as a key decision maker.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Legal and ethical considerations relating to organisational communications • Relevant professional or industry codes of practice and standards guiding the definition of values and behaviours • The relationship between high level organisational strategy and the development and implementation of business plans and processes at lower levels within the organisation • Implications and impact of organisational communication processes on stakeholders • Implications and impact of decision-making processes on employees and the organisation • Market trends and developments in relation to communication techniques and channels • Underlying issues and trends that may affect stakeholders' decision-making 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead stakeholders to develop strategic priorities for organisational communications • Promote the organisation using appropriate communication channels • Communicate decisions and ensure they are implemented accordingly to meet intended business outcomes 		

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<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Review effectiveness of organisational communications to identify areas for improvement • Seek and encourage inputs from senior management and technical experts to develop innovative approaches and responses to emerging issues
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Lead the communication of organisational strategic priorities, directions and plans to stakeholders to influence and garner their support and buy-in • Maintain integrity of self and organisation throughout decision-making and problem-solving processes in accordance to organisational code of conduct
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Maintain awareness of market trends and organisational environment to lead appropriate strategic responses
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>N/A</p>

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Skill Code	LPM-RLT-601C-0	Skill Category	People and Relationship Management
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Establish Organisational Relationships and Lead Organisational Diversity		
Skill Description	This skill describes the ability to create and foster strong organisational relationships to provide strategic value to the organisation. It also includes developing strategic leadership networks, creating a diverse and cooperative work environment and supporting team building initiatives.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Legal and ethical considerations relating to organisational participation in networking and opportunities for collaboration, and workplace diversity • Organisational policies and procedures relating to business networking, organisational diversity and team building • Relevant professional or industry codes of practice and standards relating to business networking and team building • The implication and impact of strategies to encourage diversity on employees and the organisation • Relevant local, regional and international networks • Common barriers to developing a diverse and cooperative workplace • Team dynamics and group behaviours 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Identify and prioritise networks which may provide strategic value to the organisation or the individual to facilitate networking decisions • Identify and review the constraints that may affect participation in networks to develop appropriate responses • Pursue collaborative opportunities to support mutually beneficial outcomes • Lead the development of strategies to support diversity and cooperation at all levels of the organisation • Communicate expectations of cross cultural awareness throughout organisation to promote organisational diversity • Encourage and support senior management to build stronger teams across the organisation 		

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<p>Innovation and Value Creation</p> <p><i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to organisational goals.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Identify innovative approaches to support team building
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Manage relationships to achieve cross-cultural cooperation and positive outcomes for individuals, teams and the organisation • Adjust interpersonal style and respond appropriately to emotional cues when interacting with others to meet the requirements of the social and cultural business context • Participate in team building activities with senior management team to develop instrumental relationships required to lead the organisation
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Keep abreast of organisational diversity management practices by subscribing to diverse learning channels and participating in peer discussion platforms to enhance own knowledge for workplace application
<p>Range of Application</p> <p><i>(where applicable)</i></p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	<p>N/A</p>

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Skill Code	BM-PM-601E-1	Skill Category	Project Management
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Steer Programme		
Skill Description	This skill describes the ability to steer a programme in accordance with the programme and organisation requirements. It includes ensuring alignment between the programme and organisational strategic direction, reviewing and measuring programme outcomes as well as mitigating the impact of large-scale risks on the project.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Principles of risk and risk analysis • Objectives of risk and risk analysis 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Set overall direction of organisation's programme of projects in accordance with to align to organisational strategic direction • Determine programme performance measures in accordance with programme requirements to facilitate programme outcomes measure • Review and measure programme outcomes to ensure adherence to set targets • Guide mitigation of large-scale risks to resolve issues 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Improve risk management systems and processes to ensure responsive and effective risk management within the organisation 		

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<i>values that are aligned to organisational</i>	
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Build business relationships with customers to garner their support for future programmes
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Keep abreast of changes in internal and external factors to identify and minimise impact of threats to the achievement of programme objectives by subscribing to diverse information channels
<p>Range of Application</p> <p>(where applicable)</p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	N/A

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Skill Code	BM-SPI-509E-1	Skill Category	Strategy Planning and Implementation
		Skill Sub-Category <i>(where applicable)</i>	N/A
Skill	Establish Business Strategies for the Business Function		
Skill Description	This skill describes the ability to develop business strategies for a business function. It also includes evaluating impact of critical business functions and internal and external factors, conducting situational analysis, as well as formulating and presenting business function strategies for management's approval and reviewing and refining them on a regular basis.		
Knowledge and Analysis <i>It refers to gathering, cognitive processing, integration and inspection of facts and information required to perform the work tasks and activities.</i>	<p>The ability to understand:</p> <ul style="list-style-type: none"> • Objectives of functional strategies • Own role in conduct of situational analysis • Critical business functions 		
Application and Adaptation <i>It refers to the ability to perform the work tasks and activities required of the occupation, and the ability to react to and manage the changes at work.</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Evaluate impact of critical business functions on organisational performance to identify implications for strategy formulation • Conduct situational analysis to identify factors affecting the organisation • Analyse impact of internal and external influencing factors on business function strategies to facilitate strategy formulation • Formulate business function strategies to align to organisational strategies, goals and objectives • Present business function strategies to management to seek endorsement 		
Innovation and Value Creation <i>It refers to the ability to generate purposive ideas to improve work performance and/or enhance business</i>	<p>The ability to:</p> <ul style="list-style-type: none"> • Review and refine business function strategies on a regular basis to align with organisational strategies, goals and objectives 		

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<i>values that are aligned to organisational</i>	
<p>Social Intelligence and Ethics</p> <p><i>It refers to the ability to use affective factors in leadership, relationship and diversity management guided by professional codes of ethics.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Demonstrate openness to ideas and suggestions when seeking management endorsement on business function strategies to ensure individual views are acknowledged and addressed
<p>Learning to Learn</p> <p><i>It refers to the ability to develop and improve one's self within and outside of one's area of work.</i></p>	<p>The ability to:</p> <ul style="list-style-type: none"> • Improve own capability in developing business unit strategies by subscribing to diverse learning channels to enhance workplace performance
<p>Range of Application</p> <p>(where applicable)</p> <p><i>It refers to the critical circumstances and contexts that the skill may be demonstrated.</i></p>	N/A

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Version Control

Version	Date	Changes Made	Edited by
1.0	12 October 2016	Initial Version	SSG and EDB

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Definitions of the Five (5) Domains

Domain	Definition
Knowledge and Analysis	Knowledge includes the gathering of facts and information through traditional and digital forms. Analysis involves the cognitive processing, integration and inspection of single or multiple sources of facts and information required to perform work tasks and activities and takes into consideration, the work contexts in which the tasks and activities are carried out. The result of knowledge and analysis produce judgements on work tasks/activities/issues/areas, and the conceptualisation of solutions to solve problems at work.
Application and Adaptation	Application involves the ability to perform work tasks and activities defined by the requirements of the occupation. Adaptation involves the ability to react to and manage the changes in the work contexts. The result of application and adaptation leads to the production of psycho-motor actions and behavioural reactions to the work tasks/activities/issues/areas, and the execution of the planned solutions to solve problems at work.
Innovation and Value Creation	Innovation includes the ability to generate purposive ideas to improve work performance and/or enhance business values that are aligned to the organisational goals. As a result of innovation, the organisation is able to reap the values from individual or team contributors to achieve organisational growth.
Social Intelligence and Ethics	Social intelligence includes the ability to appreciate and use affective factors in leadership, relationship and diversity management guided by professional codes of ethics as effective individuals or team contributors.
Learning to Learn	Learning-to-learn includes the ability to improve on self-development within and outside of one's area of work. It involves the continual inspection of one's knowledge, analytical, application, adaptive, innovative and social skills that are needed to perform the work optimally and/or solve problems effectively.