TSC Category	Technology Management					
TSC	Human-Robot Collaboration					
TSC Description	Implement Human-Robot Collaboration (HRC) applications to enhance the efficiency and effectiveness of work processes					
TSC Proficiency Description	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
		ATP-TEM-2001-1.1	**ATP-TEM-3001-1.1**	**ATP-TEM-4001-1.1**	**ATP-TEM-5001-1.1**	**ATP-TEM-6001-1.1**
		Operate robots to perform work tasks in line with Standard Operating Procedures (SOPs) and safety protocols	Administer implementation of collaborative robots to work alongside humans	Enhance work performance through the development and deployment of robots to increase productivity and quality of products and services	Develop overall Human-Robot Collaboration (HRC) strategies to automate and transform operations for the organisation	Transform business operations by developing robots which are capable of emulating human behaviours, emotions and intelligence
Knowledge		• Principles of Human-Robot Interaction (HRI) • Concept of telerobotics • Uses and advantages of robots • Types and usage of robots deployed for operations • SOPs and safety protocols for operating robots • Local and international guidelines such as International Civil Aviation Organisation (ICAO) Annex for Aerodromes	• Principles of Human-Robot Interaction (HRI) • Concept of telerobotics • Concept of Artificial Intelligence (AI) • Robot troubleshooting procedures • Standard Operating Procedures (SOPs) and safety protocols for operating robots • Local and international guidelines such as International Civil Aviation Organisation (ICAO) Annex for Aerodromes	• Principles of Human-Robot Interaction (HRI) • Theories of Artificial Intelligence (AI) • Theories of telerobotics • Theories and construction of robotic manipulators • Concept of mechatronics • Socio-ethical implications of the usage of robots • Local and international guidelines such as International Civil Aviation Organisation (ICAO) Annex for Aerodromes	• Technological changes impacting the aviation industry • Principles of Human-Robot Interaction (HRI) • Theories of Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL) • Challenges of Human-Robot Collaborations (HRC) • Design thinking techniques • Socio-ethical implications of the usage of robots • New developments in robotics across different disciplines and industries • Local and international guidelines such as International Civil Aviation Organisation (ICAO) Annex for Aerodromes	• Principles of Human-Robot Interaction (HRI) • Theories of Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL) • Theories of cognitive robotics • Interaction modalities in Human-Robot Collaboration (HRC) • Technological changes impacting the aviation industry • Design thinking techniques • Socio-ethical implications of the usage of robots • New developments in robotics across different disciplines and industries • Local and international guidelines such as International Civil Aviation Organisation (ICAO) Annex for Aerodromes

Abilities		• Execute scheduled activities and tasks by operating robots • Interact with robots to complete work processes • Identify problems or faults when interacting with robots to complete work processes	• Administer work plans to schedule human-robot activities • Develop work instructions for team members to utilise new Human-Robot Collaboration (HRC) applications • Implement communication protocols to coordinate communication between humans and robots • Troubleshoot and recover performance of robots in the event of robot malfunctions • Recommend approaches to enhance the precision and effectiveness of robots	• Propose approaches to streamline work processes by researching new developments in Human-Robot Collaboration (HRC) applications • Develop Standard Operating Procedures (SOPs) and safety protocols governing the use of robots in the organisation • Mitigate risks associated with the deployment of robots in the workplace	• Develop HRC strategies for the organisation • Articulate the business rationales of investing in HRC projects • Develop competitive advantages through the application of new HRC technologies in the organisation • Oversee the installation of prototype robotic manipulators • Pilot new HRC applications to determine feasibility of their roll-out • Calculate financial savings as a result of new HRC applications • Engage different departments and/or stakeholders to address socio-ethical concerns regarding the use of robots	• Integrate technologies to lead the development of robots • Form communication plans to allay socio-ethical concerns regarding the use of robots • Elucidate and put forth business strategies for investing in human-robot collaboration projects • Assimilate robotics into projects and processes for the organisation