

**40007****Apply knowledge of Industry 4.0 and digital technologies to identify improvements in a manufacturing environment**

<b>Kaupae   Level</b>	3
<b>Whiwhinga   Credit</b>	10
<b>Whāinga   Purpose</b>	<p>This skill standard is intended for people who are already working in the manufacturing sector and have some operational experience. It will provide an introduction to Industry 4.0 principles and digital technologies used to establish networked manufacturing systems.</p> <p>This skill standard may be used in programmes leading to qualifications and micro-credentials at Level 3 and above in a manufacturing discipline.</p>

**Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria**

<b>Hua o te ako   Learning outcomes</b>	<b>Paearu aromatawai   Assessment criteria</b>
1. Describe how the principles of Industry 4.0 can improve productivity in a manufacturing environment.	a. Describe the principles of Industry 4.0.
	b. Describe common terminology associated with networked manufacturing and Industry 4.0.
	c. Describe how physical and digital systems are interconnected in a manufacturing environment.
	d. Explain how digital systems can improve productivity in a manufacturing environment.
	e. Describe real-time data and how data quality is maintained in a manufacturing environment.
2. Explain the purpose and benefits of using digital systems and tools in a manufacturing environment.	a. Identify digital systems and tools currently used in a manufacturing environment and explain their purpose.
	b. Explain the benefits of using digital systems and tools to improve operations and explain barriers to their use in a manufacturing environment.
	c. Describe future trends in digital technology and explain how these could improve systems in a manufacturing environment.

3. Map information flows in manufacturing operations.	a. Map information flows in a manufacturing system.
	b. Describe manufacturing key performance indicators (KPIs) relevant to your own team and/or operations.
	c. Map interdependencies between processes and use information to explain how digital tools can improve productivity and production transparency.
	d. Identify process information and data relevant to improving operations in your own role.
	e. Describe the effects of blockages in information flow and your own role in ensuring data flow and data accuracy.
4. Maintain data integrity and digital security in a manufacturing environment.	a. Explain the importance of data integrity and data security in a manufacturing environment.
	b. Explain the importance of capturing data accurately and in real time.
	c. Explain digital security risks, their ramifications and how to report suspicious activities.
	d. Follow digital security protocols and maintain data integrity in your own role.
5. Identify how digital systems and tools could improve productivity in a manufacturing environment.	a. Identify an issue or area in your workplace that could benefit from improvement in productivity.
	b. Research at least two potential solutions to the identified issue that use digital systems or tools.
	c. Evaluate digital solutions to determine the best option for improving productivity in your workplace.

## **Pārongo aromatawai me te taumata paearu | Assessment information and grade criteria**

### *Assessment specifications:*

Skills must be demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this standard:

- use of suitable facilities, equipment and resources
- modelling of industry operating conditions.

Evidence presented for assessment against this skill standard may include oral, visual, video, written and/or practical activities demonstrated in the workplace.

It is recommended that people hold credits for unit standard 32317, *Demonstrate and apply knowledge of digital processes, tasks, security, and data in a manufacturing environment* before being assessed against this skill standard or demonstrate equivalent knowledge and skills.

### *Definitions*

*Digital systems* refer to the integrated use of advanced technologies, including software, hardware, sensors, data analytics and artificial intelligence to optimise operations in a manufacturing environment.

*Industry 4.0*, also known as the fourth industrial revolution, refers to the ongoing transformation of traditional manufacturing and industrial processes through the integration of digital technologies to enhance efficiency, productivity and flexibility in manufacturing and supply chain processes. A key element of Industry 4.0 is the use of cyber-physical systems where physical processes are digitally monitored and controlled, enabling real time data exchange, predictive analytics and data driven decision making.

*Manufacturing environment* refers to an organisation that utilises manufacturing processes. Manufacturing may be the sole focus or a component of the organisation's activities.

### **Ngā momo whiwhinga | Grades available**

Achieved.

### **Ihirangi waitohu | Indicative content**

#### **Industry 4.0**

- Concept of the smart industry readiness index (SIRI) and how it can initiate a manufacturer's journey to Industry 4.0 transformation.
- Different groups of manufacturing processes and the benefits and different technologies available in each of these. Groups include work order creation, planning, ordering, scheduling, manufacturing, quality management, dispatch, invoicing.
- Advantages and disadvantages of applying artificial intelligence (AI) in a manufacturing environment.
- Interpretation of information and data relevant to a manufacturing process to inform and improve operational decisions.

#### **Digital systems and tools**

- Digital manufacturing support systems at different operational levels.
- Impacts of Overall Equipment Effectiveness (OEE) and downtime.
- The role and impact of digital manufacturing skills on a business, and the importance of correct processes and interpersonal skills in a manufacturing environment.
- Collaborative problem solving using digital tools (if appropriate).
- How to communicate ideas and suggestions for potential digital solutions to manager.

**Data integrity and digital security**

- Awareness of the critical importance of data integrity and digital security.
- Awareness of digital security measures such as password control, electronic records and signatures (ERES), privileges, sharing of information, managing rogue emails and requests, and risks such as phishing, AI, and malware.

**Rauemi | Resources**

None.

**Pārongo Whakaū Kounga | Quality assurance information**

<b>Ngā rōpū whakatau-paerewa  </b> Standard Setting Body	Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council
<b>Whakaritenga Rārangi Paetae Aromatawai  </b> DASS classification	Manufacturing > Manufacturing Skills > Manufacturing Processes
<b>Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga  </b> CMR	CMR 0013

<b>Hātepe   Process</b>	<b>Putanga   Version</b>	<b>Rā whakaputa   Review Date</b>	<b>Rā whakamutunga mō te aromatawai   Last date for assessment</b>
<b>Rēhitatanga   Registration</b>	1	28 March 2024	N/A
<b>Kōrero whakakapinga   Replacement information</b>	N/A		
<b>Rā arotake   Planned review date</b>	31 December 2028		

Please contact Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council at [qualifications@hangaarorau.nz](mailto:qualifications@hangaarorau.nz) if you wish to suggest changes to the content of this skill standard.