

MANUFACTURING: KNOWLEDGE OF MANUFACTURING

Knowledge of manufacturing focuses on the underpinning concepts of manufacturing. This covers the systems and processes used in the production of goods. Initially students learn about different manufacturing systems and various categories of manufacturing techniques. Students progress to complex understandings that also include broader concepts such as the use and availability of resources and political, social, economic and environmental factors.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Demonstrate understanding of basic manufacturing concepts and techniques</i>	<i>Demonstrate understanding of advanced manufacturing concepts and techniques</i>	
TEACHER GUIDANCE	<p>To support students to develop understandings about basic manufacturing concepts and techniques at level 6, teachers could:</p> <ul style="list-style-type: none"> • Provide a range of case studies to demonstrate different types of manufacturing systems. • Support students with their application of techniques used in manufacturing. • Support students to produce flow diagrams to communicate manufacturing processes. • Ensure students understand the need for differing manufacturing systems to meet specific requirements (eg, one off, batch and continuous production). 	<p>To support students to develop understandings about advanced manufacturing concepts and techniques at level 7, teachers could:</p> <ul style="list-style-type: none"> • Support students with their understanding of how quality management techniques impact on manufacturing products. • Present advanced technologies to students such as CNC, PLC or SCADA systems. • Ensure students understand key drivers on manufacturing such as customer, social, environmental and safety imperatives. Level 3 Technology: Draft achievement standards and assessment resources 	<p>LEARNING OBJECTIVE PROGRESSES TO: <i>Develop understanding of, and implement, a 'green' manufacturing process</i> See next page</p>
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • explain how safety issues were addressed in a manufacturing process • identify the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control • discuss how and why quality management techniques have been important in changing manufacturing practices. 	<p>Students can:</p> <ul style="list-style-type: none"> • communicate manufacturing processes by using process flow and system diagrams • explain why particular types of manufacturing systems are used in specified contexts • discuss the application of a range of techniques to meet production requirements • discuss how yield prediction and its determination, and quality control mechanisms, may be affected by social and environmental change. 	
AS	<p>AS91055 Generic Technology 1.12 <i>Demonstrate understanding of basic concepts used in manufacturing</i></p>	<p>AS91365 Generic Technology 2.12 <i>Demonstrate understanding of advanced concepts used in manufacturing</i></p>	
	Level 1 Generic Technology standards & assessment resources	Level 2 Generic Technology standards & assessment resources	Level 3 Technology achievement standards & assessment resources DRAFT

MANUFACTURING: IMPLEMENT A MULTI-UNIT MANUFACTURING PROCESS

Implement a multi-unit manufacturing process focuses on the application of underpinning concepts and techniques in the multi-unit manufacturing of goods.

Initially students will use a defined technological outcome suitable for manufacture that has established manufacturing specifications. They will determine and implement the manufacturing system by considering the type of outcome, the resources and the techniques to be used. Students progress towards the incorporation of quality management and quality control procedures in the development and implementation of a 'green' manufacturing process.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Implement a multi-unit manufacturing process</i>	<i>Develop and implement an effective manufacturing process</i>	<i>Develop understanding of, and implement, a 'green' manufacturing process</i>
TEACHER GUIDANCE	<p>To support students to implement a multi-unit manufacturing process at level 6, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to consider a range of manufacturing processes to explore relationships between the type of outcome and the resources and techniques selected. • Provide students with a defined technological outcome suitable for manufacture that has established manufacturing specifications. • Support students with their application of techniques used in their selected multi-unit manufacturing processes. 	<p>To support students to develop and implement an effective manufacturing process at level 7, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to analyse a range of technological outcome to determine suitability for manufacture and discuss design changes as required. • Support students in establishing specifications, including tolerances, required of the outcome that is to be manufactured. • Support students to select a manufacturing process and quality control procedures that enable units to meet the established specifications and tolerances • Support students to organise and use resources and carry out techniques in keeping with relevant codes of practice. 	<p>To support students to develop and implement a 'green' manufacturing process at level 8, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for discussion of how 'green' considerations are having an increasing influence on technological outcomes and their manufacture. • Support students to develop their understanding of 'green' manufacturing processes. • Discuss contemporary judgement criteria, based on the principles of good design, and how these may impact on the development and implementation of 'green' manufacturing processes. • Provide examples of optimisation in terms of energy and resources that exemplify 'green' manufacturing processes. • Support students to analyse a technological outcome to determine its suitability for 'green' manufacture and to make design changes as required. • Support students to modify the techniques and use of resources and the quality control procedures established to tailor the 'green' manufacturing process to the constraints and/or opportunities of the manufacturing location. • Support students to evaluate the success of their manufacturing process in meeting 'green' considerations.
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • Identify a manufacturing process suitable for multi-unit manufacture of the technological outcome • implement the manufacturing process by using selected resources and carrying out techniques in keeping with accepted practices, including safety and legal requirements • use feedback from quality control to review and modify the manufacturing process, leading to an improvement in the proportion of units meeting the specifications. 	<p>Students can:</p> <ul style="list-style-type: none"> • analyse a range of technological outcomes to determine suitability for manufacture • establish specifications, including tolerances, required of the outcome that is to be manufactured • select a manufacturing process and quality control procedures that enable units to meet the established specifications and tolerances • organise and use selected resources and carry out techniques independently and accurately in keeping with relevant codes of practice • implement the manufacturing process using feedback from quality control to ensure the majority of the units meet the established specifications and tolerances. 	<p>Students can:</p> <ul style="list-style-type: none"> • analyse a technological outcome to determine its suitability for 'green' manufacture • make design changes as required for the technological outcome guided by contemporary judgement criteria • establish specifications, including tolerances, required of the outcome that is to be manufactured • discuss how and why quality management procedures have been important in changing manufacturing practices to better support 'green' considerations • monitor quality control procedures that allow for ongoing monitoring to enhance the review and refinement of the manufacturing process to better suit the nature of the outcome and enhance its success in meeting 'green' considerations • justify the level of success the manufacturing process has attained in meeting 'green' considerations.
AS	<p>AS91056 Generic Technology 1.13 <i>Implement a multi-unit manufacturing process</i></p>	<p>AS91366 Generic Technology 2.13 <i>Undertake development and implementation of an effective manufacturing process</i></p>	<p>AS91618 Generic Technology 3.13 <i>Undertake development and implementation of a 'green' manufacturing process</i></p>
	Level 1 Generic Technology standards & assessment resources	Level 2 Generic Technology standards & assessment resources	Level 3 Technology achievement standards & assessment resources DRAFT