

Stage 5 Graphics Technology: Year 9	
Core module: Module 2	Module duration: 10 weeks
Module title: Engineered products	Outcomes: (targeted outcomes in bold) A student: 5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques 5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations 5.2.1 designs and produces a range of graphical presentations 5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes 5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications 5.3.2 manages the development of graphical presentations to meet project briefs and specifications 5.4.1 manipulates and produces images using computer-based drafting and presentation technologies 5.4.2 designs, produces and evaluates multimedia presentations 5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment 5.5.2 demonstrates responsible and safe work practices for self and others 5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings 5.6.2 evaluates the impact of graphics on society, industry and the environment
Module description: This 10 week module is placed in Year 9 in the first 100 hours of the 200 hour course. The theme for this unit is <i>Engineered products: a bicycle</i> . Throughout this unit students will be introduced to: <ul style="list-style-type: none">• visualise, measure and draw simple objects• produce freehand and mechanical pictorial representations — isometric and oblique• orthogonal drawings using instruments• apply AS1100 standards to represent features, dimensioning etc• create a simple orthogonal drawing using CAD.	
Resources: Computer lab and appropriate software and printing facilities, technical drawing and drafting equipment, OHP, coloured pencils, rendering markers, paper and card. Equipment will be provided as a class set. Students will be expected to purchase their own equipment to enable project and homework completion. A complete class set will enable all students to participate without disadvantage from day 1 and will promote ownership and pride in their work environment. Students will be trained to maintain and manage their physical environment, boards, t-squares, equipment, and storage of work and work samples.	
Programming requirements: Consideration has been given to the time lost through external and internal assessment procedures and variations in school routines. This module has been designed to be delivered over 8 weeks with final 2 weeks allocated for completion of the final assessment task.	
Class tasks: Throughout this unit students will complete a number of technical drawing tasks in class.	
Assessment: Assessment will be based on the class tasks and the final assessment task in each module.	

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
Graphical principles and techniques <i>Work practices</i> <ul style="list-style-type: none"> the importance of <ul style="list-style-type: none"> selection and maintenance of equipment clean and ordered work practices the importance of accurate and neat work practices 	<ul style="list-style-type: none"> apply planned and ordered approaches to producing drawings develop a planned and ordered work regime to produce neat and accurate drawings 	<ul style="list-style-type: none"> Teacher led discussion on: <ul style="list-style-type: none"> revision of equipment and materials selection and maintenance of equipment additional equipment including templates, guides, compass pens, technical illustration equipment scale rules and guides. 	<p>Students can recall and describe descriptions, definitions and concepts.</p> <p>Students can recall and describe descriptions, definitions and concepts.</p>	<p>Oral feedback and clarification.</p> <p>Observation and oral feedback.</p>
<ul style="list-style-type: none"> Occupational Health and Safety <ul style="list-style-type: none"> government legislation potential work environment hazards and risks 	<ul style="list-style-type: none"> identify OHS issues that impact on work environments 	<ul style="list-style-type: none"> Teacher led discussion on issues related to engineers and their workplaces and the scope of their work 	<p>Students can recall and describe descriptions, definitions and concepts.</p>	<p>Teacher observation and oral feedback during completion of tasks and discussions</p>

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
<p><i>Standards</i></p> <ul style="list-style-type: none"> • Australian and international drafting standards • Australian drafting standards • drafting scales and templates including radius, circle, nut/bolt and architectural 	<ul style="list-style-type: none"> • apply drafting conventions to create standard page layouts (e.g. paper size, borders, title blocks, projection symbols) • apply AS1100 drafting standards • use standard instruments in the production of drawings and presentations 	<ul style="list-style-type: none"> • Introduction to AS1100 standards and specifically Engineering drawing standards: <ul style="list-style-type: none"> – Exercise and discussion in using the standards document. – Class/group activity finding, identifying and discussing the feature or item and developing understanding in applying the information. – Issue information sheet/s for student reference to identify key features. – Completion sheet for students to identify features from engineering drawings. – Completion sheets in reading a drawing. 	<p>Students can recall and describe descriptions, definitions and concepts.</p> <p>Students can recognise and communicate using symbols and graphical language.</p>	<p>Observation and oral feedback during completion of class tasks and discussions</p> <p>Annotations on and marking of students work and support and discussions in class</p>

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
<p><i>Computing principles</i></p> <ul style="list-style-type: none"> • CAD application set-up • the CAD environment including <ul style="list-style-type: none"> – tools – methods and modes – constraints and modifiers • output options including printers, file formats, magnetic/optical media and computer-based communication media 	<ul style="list-style-type: none"> • configure drafting applications • analyse and break down CAD drawing techniques into three general steps <ul style="list-style-type: none"> – what shape to draw (tools) – how to draw that shape (tool methods/modes) – where to start and end the shape (constraints/modifiers) • output information to a specified device or medium 	<p>Week 2</p> <ul style="list-style-type: none"> • Introduction to the CAD application environment. <ul style="list-style-type: none"> – Clarify and develop knowledge and understanding of terminologies and metalanguage – Familiarise and explore the libraries and templates provided with the application software. • Using templates provided output to another file and destination a representation of a common engineering feature • Students produce a template for an engineering drawing, including materials and items tables. 	<p>Students demonstrate competencies and understanding through completion of task as outlined in the brief</p>	<p>Observation and oral feedback during completion of class tasks and discussions</p>
<p>Design in graphics</p> <ul style="list-style-type: none"> • freehand pictorial and orthogonal drawings 	<ul style="list-style-type: none"> • visualise and sketch common objects • identify and apply freehand drawing techniques to a range of simple orthogonal and pictorial drawing types 	<ul style="list-style-type: none"> • Teacher led discussion and demonstration on the use of freehand sketching and representation to form the basis of orthogonal representation. • Students given quick exercises to develop skills in sketching representing features and developing skill in proportion and scale. • Samples of engineered components and products, assembled and disassembled provided to class for observation. Samples could include: <ul style="list-style-type: none"> – a pedal and crank – bell assembly – brake assembly – gear selector assembly. 	<p>Students demonstrate understanding and competence in the development and production of sketches and complete tasks as directed.</p>	<p>Teacher observation and oral feedback during completion of task.</p>

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
<ul style="list-style-type: none"> design principles and processes 	<ul style="list-style-type: none"> apply design principles and processes in the development, production and evaluation of graphical presentations select and apply graphical communication techniques for specific purposes 	<ul style="list-style-type: none"> Students assemble and sketch freehand orthogonal drawings of components. Sketches should include: <ul style="list-style-type: none"> – identification of features – basic information on shape, size – materials. Students evaluate the best type of drawing to communicate the information to the reader. 	<p>Students demonstrate understanding and competence in the development and production of sketches and complete tasks as directed.</p>	<p>Teacher observation and oral feedback during completion of task.</p>

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
Planning and construction <i>Applied geometry</i> <ul style="list-style-type: none"> • measurement and accuracy • application of scales in drawing • simple geometric constructions • tangency 	<ul style="list-style-type: none"> • use scales in the production of drawings • apply basic geometric construction and tangency to graphical communication 	<ul style="list-style-type: none"> • For a bicycle bell assembly, complete: <ul style="list-style-type: none"> – detail drawings of components using appropriate scale and tangency – dimensioned detail orthogonal drawings of components, – introducing sectioning – introducing threads, nuts and bolts engaged threads – introducing knurls, fillets, holes. • Alternative assemblies could include <ul style="list-style-type: none"> – valve assembly – brake block assembly. 	Students demonstrate understanding and competence in the development and production of drawings and complete tasks as directed.	Annotations on and marking of students work and support and discussions in class.

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
<p><i>Orthogonal drawing</i></p> <ul style="list-style-type: none"> • first and third angle projection • relating principal planes to the projection of views in the first and third angle • multi-view drawings • measuring and drawing objects • drawing from pictorial images • dimensioning to appropriate Australian drawing standards • variations in international drawing standards and units of measurement • assembled orthogonal drawings <ul style="list-style-type: none"> • sectioned orthogonal views <ul style="list-style-type: none"> • standard representation of common engineering and architectural features 	<ul style="list-style-type: none"> • create orthogonal drawings in third angle projection <ul style="list-style-type: none"> • identify and produce drawings used in design and manufacture <ul style="list-style-type: none"> • recognise and apply appropriate AS1100 drawing standards <ul style="list-style-type: none"> • produce assembly drawings from exploded pictorial drawings and detail drawings • produce orthogonal drawings containing full sections • select appropriate views and drawing types for a particular context • apply orthogonal drawing techniques to architectural, engineering or cabinet drawing • relate common drawing conventions to AS1100 standards • employ manual techniques and drawing templates to draft common engineering and architectural elements 	<p>Bicycle Bell assembly activity continued</p>		

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
<ul style="list-style-type: none"> the use of CAD software in the development of more complex orthogonal drawings 	<ul style="list-style-type: none"> use the hatching and fill features of CAD in the creation of sectioned views use CAD symbol libraries to draw common engineering elements apply layers to the production of orthogonal drawings 	<ul style="list-style-type: none"> Student to produce a detail drawing of a component from previous exercise, this should include a complete, part or half section. 	<p>Students demonstrate understanding and competence in the development and production of sketches and completion of accurate drawings.</p>	<p>Annotations on and marking of students work and support and discussions in class.</p>

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
Pictorial drawing <ul style="list-style-type: none"> a variety of pictorial representation techniques including <ul style="list-style-type: none"> isometric and oblique planometric/axonometric 1 and 2-point perspective 	<ul style="list-style-type: none"> visualise and draft common objects construct pictorial circles and geometric shapes utilise a range of pictorial representations 	<ul style="list-style-type: none"> Introduction to circles in isometric, oblique and perspective. Teacher demonstration and completion sheets in each. Introduction to use of templates. 	Students demonstrate understanding and competence in the development and production of sketches and complete tasks as directed.	Teacher observation and oral feedback during completion of tasks and discussions.
Additional content <ul style="list-style-type: none"> advanced pictorial projection 	<ul style="list-style-type: none"> represent complex curved surfaces in isometric and oblique drawings 	<ul style="list-style-type: none"> Students complete pictorial representation of bicycle bell. 	Students demonstrate understanding and competence in the development and production of sketches and complete tasks as directed.	Teacher observation and oral feedback during completion of tasks and discussions.
Presentation <p><i>Product drawing</i></p> <ul style="list-style-type: none"> drawing to convey technical information or product concept <ul style="list-style-type: none"> shape description size description technical information use of CAD to generate final drawings <p><i>Pictorial rendering</i></p> <ul style="list-style-type: none"> rendering pictorial drawings to assist others in the visualisation of a product or concept 	<ul style="list-style-type: none"> consolidate and apply pictorial, orthogonal and presentation techniques to a range of products identify and produce types of drawings used in marketing apply manual rendering and/or modelling techniques to a range of products 	<ul style="list-style-type: none"> Teacher demonstration using templates to produce isometric representation of bicycle bell assembly. Students complete pictorial representation of bicycle bell. Introduction to technical illustration. 	Students demonstrate understanding and competence in the development and production of sketches and completion of accurate drawings.	Annotations on and marking of students work and support and discussions in class.

Students learn about:	Students learn to:	Integrated learning experiences, instructions and assessment	Evidence of learning	Feedback
<i>Techniques</i> <ul style="list-style-type: none"> manual presentation methods 	<ul style="list-style-type: none"> present product information in a clear and innovative manner 	<ul style="list-style-type: none"> Students present a folio display of sequenced sheets from class activities. Identify and as a class evaluate purpose of each type of representation or drawing. 	Students demonstrate understanding and competence in the development and inclusion of worksheets and completion of task	Annotations on and marking of students work and support and discussions in class.
		Weeks 9 and 10 <i>Final task</i> <ul style="list-style-type: none"> Students to research and identify an assembly to be drawn for final task. This activity can be undertaken in groups or as a class task. In groups students measure components and identify features, materials and joining methods. Students produce: <ul style="list-style-type: none"> freehand sketches of the components detail drawings of the component assembly drawings including sectioning rendered pictorial representation. 		