22446VIC Diploma of Product Design

This course has been accredited under Parts 4.4 of the Education and Training Reform Act 2006.

Accreditation period: 1 January 2018 to 31 December 2022
22446VIC accreditation extended to: 30 June 2023

VICTORIA State Government | Education and Training

22446VIC Diploma of Product Design

Modification History

Version	Date	Details
1.0	November 2022	Course accreditation extended to 30 June 2023.
1.0	October 2017	Initial release approved to commence from 1 January 2018.

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Section A: Copyright and course classification information

1. Copyright owner of the course	Copyright of this course is held by the Department of Education and Training, Victoria © State of Victoria (Department of Education and Training) 2017.
2. Address	Executive Director Industry Engagement and VET Systems Higher Education and Skills Group Department of Education and Training (DET) GPO Box 4367 Melbourne Vic 3001 **Organisational Contact:** Manager Training Products Higher Education and Skills Group Telephone: (03) 9637 3092 Email: course.enquiry@edumail.vic.gov.au **Day-to-Day Contact** Human Services Curriculum Maintenance Manager Swinburne University PO Box 218 Hawthorn VIC 3122 Ph: 03 9214 8501 / 03 9214 5034 Email: cmmhs@swin.edu.au
3. Type of submission	Re-accreditation
4. Copyright acknowledgement	The following unit/s of competency: • BSBCRT401 Articulate, present and debate ideas • BSBDES302 Explore and apply the creative design process to 2D forms • BSBDES303 Explore and apply the creative design process to 3D forms • BSBDES502 Establish, negotiate and refine a design brief • BSBIPR401 - Use and respect copyright • BSBLIB504 Develop exhibition concepts • BSBMKG413 Promote products and services • BSBPMG522 Undertake project work • BSBSMB404 Undertake small business planning • BSBWOR501 Manage personal work priorities and professional development are from the *BSB Business Services Training Package* administered by the Commonwealth of Australia. The following unit/s of competency:

	• CUAACD301 Produce drawings to communicate ideas • CUAACD302 Produce computer-aided drawings • CUAACD303 Produce technical drawings • CUAACD304 Make scale models • CUAACD501 Refine drawing and other visual representation tools • CUAACD508 Refine model making skills • CUAANM303 Create 3D digital models • CUADES402 Research and apply techniques in product design • CUADES601 Design innovative products • CUADIG405 Produce innovative digital images • CUAGRD606 Develop graphic designs for packaging • CUARES503 Analyse cultural history and theory • CUAWHS302 Apply work health and safety practices are from the *CUA Creative Arts and Culture Training Package* administered by the Commonwealth of Australia. The following unit/s of competency: • MSFDN5001 Generate and transfer complex computer-aided drawings and specifications • MSFFDT4004 Assess environmental impact of a design • MSFFDT5008 Research and recommend alternative manufacturing processes are from the *MSF Furnishing Training Package* administered by the Commonwealth of Australia. The following unit/s of competency: • MSS015004 Design sustainable product or process • MSS405030 Optimise cost of a product or service are from the *MSS Sustainability Training Package* administered by the Commonwealth of Australia. © Commonwealth of Australia.
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	Request for other use should be addressed to: Executive Director Industry Engagement and VET Systems Higher Education and Skills Group Department of Education and Training (DET) Email: course.enquiry@edumail.vic.gov.au Copies of this publication can be downloaded free of charge from the DET website at: www.education.vic.gov.au/training/providers/rto/Pages/courses.aspx
6. Course accrediting body	Victorian Registration and Qualifications Authority
7. AVETMISS information	**ANZSCO code** 232312 Industrial designer ***ASCED Code – 4 digit*** 0301 Manufacturing Engineering and Technology **National course code** 22446VIC
8. Period of accreditation	1 January 2018 to 31 December 2022 Extended to: **30 June 2023**

Section B: Course information

1. Nomenclature	*Standard 1 AQTF Standards for Accredited Courses*
1.1 Name of the qualification	Diploma of Product Design
1.2 Nominal duration of the course	1569 – 1671 hours
2. Vocational or educational outcomes	***Standard 1 AQTF Standards for Accredited Courses***
2.1 Purpose of the course	The Diploma of Product Design describes the skills and knowledge required for individuals to undertake entry level product design roles as part of a small or large production team with existing companies or to set up an independent design practice. In these roles, they discuss designs with colleagues and clients, as well as working closely with engineers, suppliers and manufacturers, model makers, sales and marketing staff and other skilled people. They use drawings, 3-D models and computer designs to express their ideas. They have underpinning knowledge in technology, production methods and materials, and can meet deadlines and work within budgets.
3. Development of the course	***Standards 1 and 2 AQTF Standards for Accredited Courses***
3.1 Industry/enterprise/ community needs	The design sector continues to be of major importance to Victoria's economy. Victorian design consultancies earn revenue of $5.0 billion annually from Victorian clients, and increasingly, interstate and international clients[1]. In recognition of this, the Victorian Government, in 2016, launched the Creative State strategy with more than $115 million in funding, aimed to grow the creative and cultural economy as well as create new job employment opportunities[2]. Product design is a capability that transforms products to improve their function, efficiency and style. It enables industry sectors to differentiate their products and services and to enter new markets. Organisations can undertake design activities

[1] Victoria Design 2015: Victoria's Design Capacities, Performance and Business Use of Design, Creative Victoria.
[2] Creative State strategy, http://economicdevelopment.vic.gov.au/significant-projects/creative-industries-strategy, accessed May 2017.

	internally, or can utilise external design consultancies that offer design services to other businesses. Design plays a more significant role in new product development in the manufacturing sector. Given the challenges facing Victoria's manufacturing sector, with the closure of automobile manufacturing expected in the next few years, there is still a strong design industry in Australia. This includes, but not limited to, product design for: • shop-fittings, displays and signage (e.g. retail, museums, trade-shows) • consumer goods (e.g. furniture, baby products, kitchen equipment) • packaging (e.g. consumables, retail goods) • sport (e.g. Commonwealth games torch, trophies, medals) • medical (e.g. surgical instruments, drug delivery devices, home health and rehabilitation devices). Victoria's industrial and product designers are highly regarded and are responsible for innovative and cutting-edge products. Product design, with its overlaps with 'industrial design', has become a broad term inclusive of service, software, and physical product design. Product design is concerned with bringing artistic form and usability, usually associated with craft design and ergonomics, together in order to mass-produce goods. Other aspects of product design include engineering design, particularly when matters of functionality are at issue, though such boundaries are not always clear[3]. According to Job Outlook, in 2015, there was an estimated 11,600 individuals employed as industrial designers. Employment for this occupation rose strongly (13.6%) in the past five years and rose very strongly in the long-term (53.2% in ten years). Looking forward, employment industrial design related industrials to November 2020 is expected to grow strongly[4]. In addition, the National Innovation and Science Agenda (2015) states that "innovation and science are critical for Australia to deliver new sources of growth, maintain high-wage jobs and seize the next wave of economic prosperity.", and that "in the next decade an estimated 75 per cent of jobs in the

[3] Morris, R. (2009). *The fundamentals of product design*. AVA Publishing.
[4] Job Outlook http://joboutlook.gov.au/occupation.aspx?code=2323&search=alpha&Tab=prospects, accessed May 2017.

fastest-growing industries will need skills in science, technology, engineering and mathematics (STEM).[5]

Based on the monitoring and evaluation processes conducted by the Curriculum Maintenance Manager - Human Services, the Victorian Department of Education and Training, as copyright holder for this Victorian Crown Copyright accredited course, has determined that there is a continuing need for this course, now in its 4th accreditation cycle.

Over recent years, enrolments in the Diploma have been consistent:

Year	Number of enrolments
2013	82
2014	86
2015	120
2016	112

Although the *CUA Creative Arts and Cultural Training Package* includes flexible qualifications to meet the needs a full range of job outcomes for the creative arts and design industries, there is currently no qualification offering entry level fundamental design skills in conceptual and industrial product for product designers.

The review of the Diploma of Product Design for reaccreditation was overseen by a project steering committee (PSC). A Skills and Knowledge Profile was developed with guidance from, and validated by, the PSC.

This course is intended to provide participants with a range of knowledge and skills to perform the following functions associated with product design:

- establish and refine design briefs for a range of products
- research and analyse market segments
- develop innovative design solutions that incorporates considerations to sustainability, ergonomics, ethics, copyright/intellectual property and impacts of different methods of manufacture and materials

[5] National Innovation and Science Agenda (2015), Australian Government, http://www.innovation.gov.au/system/files/case-study/National%20Innovation%20and%20Science%20Agenda%20-%20Report.pdf, accessed May 2017.

- use free hand sketching, technical drawings and design software to communicate ideas
- make scale models of products and/or uses rapid prototyping techniques for concept models
- plans and manage projects that incorporate manufacturing process knowledge
- source and costs material, including the outsourcing of the manufacturing of product scale models
- promote products and services.

The PSC consisted of the following members:

Harry Zanios (Chair)	Independent Designer
Alan Kirszner	Buzz Products
Andrew Louey	Designbox
Jansen Lye	RMIT University
Karl Baxter	Karl Baxter Design
Mary Miceli	Swinburne University
Michael Chijoff	Chijoff+Co Design Institute of Australia
Paul Charlwood	Charlwood Design
Richard Fine	Biopak
Robin Blood	RMIT University
Roh Singh	Swinburne University
In attendance:	
Autumn Shea	Curriculum Maintenance Manager (CMM)
Wendy Dowe	CMM Administrator
Lina Robinson	Curriculum Writer

It is confirmed that this course:

- does not duplicate, by title or coverage, the outcomes of an endorsed training package qualification

	• is not a subset of a single training package qualification that could be recognised through one or more statements of attainment or a skill set • does not include units of competency additional to those in a training package qualification that could be recognised through statements of attainment in addition to the qualification • does not comprise units that duplicate units of competency of a training package qualification.

3.2 Review for re-accreditation	The review and redevelopment of the 22221VIC Diploma of Product Design was based on extensive monitoring and evaluation, research and consultation and validation processes to ensure the course remains relevant and reflects the current work practices and job outcomes for product designers.
	As well as other face-to-face and email consultations, the members of the steering committee met formally on three occasions to review and confirm the skills and knowledge profile of the course, course structure and final accreditation submission.
	Although it was considered that the skills and knowledge requirements of the course were still considered appropriate and relevant to meet the training needs of the learning cohort, significant changes for improvement to the revised course include:
	• changes to the course structure and rules to ensure better alignment and more flexibility required to meet the job outcomes for the Diploma of Product Design. This resulted in a decrease in the number of total number of units to be completed, including the number of core units and the number of units within the elective list.
	• the development of a new enterprise unit of competency, *Produce 2D product design drawing using software applications* to better reflect the skills needs for product designers
	• the revision and updating of existing enterprise units of competency for improvements, including the:
	  • removal of duplication of content where necessary
	  • shortening of unit titles without losing its intent
	  • simplifying language to ensure the unit outcomes are clear and concise
	  • tightening of Evidence Guides to ensure clearer assessment requirements.

	• revising the endorsed units of competency included in the course to ensure their relevance for product designers, including using the updated versions of those still relevant for the course • reducing the number of elective units listed in the course structure for their relevance, and adding flexibility to the course rules to allow for three elective units to be imported from other training packages or accredited courses. **Transition arrangements** The vocational outcome of revised 22446VIC *Diploma of Product Design* is deemed to be equivalent to the vocational outcome of *22221VIC Diploma of Product Design.* RTOs are advised there are additional resourcing requirements for delivery, training and assessment of *22446VIC Diploma of Product Design*. RTOs are required to review the changes that have occurred in the new *22446VIC Diploma of Product Design* and make the required resource adjustments prior to enrolling students. **Table 1** shows the transition arrangements from the 22221VIC Diploma of Product Design to the revised 22446VIC *Diploma of Product Design* For learners who are currently enrolled in 22221VIC and are transferring to 22446VIC and have completed units of competency as part of the 22221VIC which do not appear in the revised course, Registered Training Organisations should check to see whether these units align to imported unit ruling as part of the transfer process. For more details regarding the updates/changes to imported units from national training packages, refer to the National Register (training.gov.au) or the relevant Companion Volume Implementation Guides.

TABLE 1: Transition arrangements between 22221VIC and 22446VIC

22221VIC unit code and title	**22446VIC unit code and title**	**Equivalent (E)** **Not Equivalent (NE)**
BSBCMM401A Make a presentation		Unit removed Alternative unit included: BSBCRT401
BSBDES302A Explore and apply the creative design process to 2D forms	BSBDES302 Explore and apply the creative design process to 2D forms	E
BSBDES303A Explore and apply the creative design process to 3D forms	BSBDES303 Explore and apply the creative design process to 3D forms	E
BSBINN502A Build and sustain an innovative work environment	BSBINN502 Build and sustain an innovative work environment	E
BSBMKG402B Analyse consumer behaviour for specific markets		Unit removed
BSBMKG413A Promote products and services	BSBMKG413 Promote products and services	E
BSBPMG510A Manage projects	BSBPMG522 Undertake project work	NE
BSBSMB401A Establish legal and risk management requirements of small business		Unit removed
BSBSMB404A Undertake small business planning	BSBSMB404 Undertake small business planning	E
BSBWOR501B Manage personal work priorities and professional development	BSBWOR501 - Manage personal work priorities and professional development	E
CUEFIN01C Develop a budget		Unit removed
CULEVP504A Develop exhibition concepts	BSBLIB504 Develop exhibition concepts	E

22221VIC unit code and title	22446VIC unit code and title	Equivalent (E) Not Equivalent (NE)
CUSOHS301A Follow occupational health and safety procedures	CUAWHS302 Apply work health and safety practices	E
CUVACD301A Produce drawings to communicate ideas	CUAACD301 Produce drawings to communicate ideas	E
CUVACD302A Produce computer-aided drawings	CUAACD302 Produce computer-aided drawings	E
CUVACD303A Produce technical drawings	CUAACD303 Produce technical drawings	E
CUVACD304A Make scale models	CUAACD304 Make scale models	E
CUVACD508A Refine model making skills	CUAACD508 Refine model making skills	E
CUVDES404A Research and apply techniques in product design	CUADES402 Research and apply techniques in product design	E
CUVDIG401A Experiment with techniques to enhance digital images	CUADIG405 Produce innovative digital images	E
CUVGRD606A Develop graphic designs for packaging	CUAGRD606 Develop graphic designs for packaging	E
CUVPRP404A Develop self as artist		Unit removed
CUVRES502A Analyse cultural history and theory	CUARES503 Analyse cultural history and theory	E
LMFDN5001B Generate and transfer complex computer aided drawings and specifications	MSFDN5001 Generate and transfer complex computer-aided drawings and specifications	E
LMFFDT4007A Establish the design brief		Unit removed Alternative unit included: BSBDES502

22221VIC unit code and title	22446VIC unit code and title	Equivalent (E) Not Equivalent (NE)
LMFFDT5010A Research and recommend alternative manufacturing process	MSFFDT5008 Research and recommend alternative manufacturing processes	E
MEM09002B Interpret technical drawing		Unit removed Alternative unit included: VU22260
MEM09009C Create 2D drawings using computer aided design system		Unit removed Alternative unit included: VU22260
MEM09010C Create 3D models using computer aided design system		Unit removed Alternative unit included: CUAANM303
MEM16008A Interact with computing technology		Unit removed Alternative unit included: VU22260
MEM19030A Research and design sustainable objects	MEM19030A Research and design sustainable objects	E
MEM234020A Coordinate small lot manufacture using rapid manufacture processes.		Unit removed
MSS015004A Design sustainable product or process	MSS015004 Design sustainable product or process	E
PMBTECH401B Predict polymer properties and characteristics		Unit removed
PMBTECH505B Choose polymer materials for an application		Unit removed

22221VIC unit code and title	22446VIC unit code and title	Equivalent (E) Not Equivalent (NE)
VU21024 Design and produce a commercial product from a brief	VU22261 Design and produce products from a brief	E Unit revised and updated Title change
VU21025 Design and produce a range of commercial products from a brief to meet market opportunities	VU22262 Develop a product range to meet market opportunities	E Unit revised and updated Title change
VU21026 Design and produce a product incorporating mechanical/electrical features	VU22263 Develop products incorporating mechanical/electrical features	E Unit revised and updated Title change
	BSBCRT401 Articulate, present and debate ideas	Unit added
	BSBDES502 Establish, negotiate and refine a design brief	Unit added
	BSBIPR401 Use and respect copyright	Unit added
	CUAACD501 Refine drawing and other visual representation tools	Unit added
	CUADES601 Design innovative products	Unit added
	MSFFDT4004 Assess environmental impact of a design	Unit added
	MSS405030 Optimise cost of a product or service	Unit added
	VU22260 Produce 2D product design drawings using software applications	New unit

4. Course outcomes	*Standards 1, 2, 3 and 4 AQTF Standards for Accredited Courses*
4.1 Qualification level	The course outcomes of the Diploma of Product Design are considered consistent with the Australian Qualifications Framework Level 5, that qualifies individuals who apply integrated technical and theoretical concepts in a broad range of contexts to undergo advanced skilled or paraprofessional work and as a pathway for further learning. Graduates of the Diploma of Product Design will have the technical and theoretical knowledge in the area of work and learning as follows: • cognitive and communication skills to identify, analyse, synthesise and act on information from a range of sources. For example, by interpreting a project brief. • cognitive, technical and communication skills to analyse, plan, design and evaluate approaches to unpredictable problems and/or management requirements. For example, by designing a range of possible approaches to design problems or by determining the production feasibility of designs. • specialist technical and creative skills to express ideas and perspectives. For example, by exploring and applying the creative design process to 3D forms. • communication skills to transfer knowledge and specialised skills to others and demonstrate understanding of knowledge. For example by producing drawings to communicate ideas or through discussing ideas with clients. Graduates of the Diploma of Product Design will demonstrate the application of knowledge and skills as follows: • with depth in some areas of specialisation in known or changing contexts. For example, by producing designs to meet changing market contexts. • to transfer and apply theoretical concepts and/or technical and/or creative skills in a range of situations. For example, by designing sustainable products in a changing environment. • with personal responsibility and autonomy in performing complex technical operations with responsibility for own outputs in relation to broad parameters for quantity and quality. For example, by researching and applying new techniques in design and production. • with initiative and judgment to organise the work of self and plan, coordinate and evaluate the work of others within broad but generally well-defined parameters. For

	example, working with fellow designers and technicians to realise a design. The Diploma of Product Design is delivered over 2 years, consistent with the volume of learning for an Australian Qualifications Framework Level 5.
4.2 Employability skills	**Table 2** (below) contains a summary of the employability skills for the Diploma of Product Design. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this course. The outcomes described here are broad industry requirements and will vary according to electives undertaken. This table is a summary of employability skills that are typical of the outcomes of this course and should not be interpreted as definitive.

TABLE 2: Employment Skills summary for the Diploma of Product Design

Employability Skill	**Industry/enterprise requirements for this qualification include the following facets. On successful completion of the course a graduate should be able to:**
Communication *that contributes to productive and harmonious relations across employees and customers*	• visually represent and communicate concepts • verbally communicate concepts and ideas • seek and receive feedback from others. • access, read, interpret and complete business documentation requirements. • communicate business and legal requirements including OHS responsibilities. • negotiate appropriate production processes, costs and commercial issues. • liaise with engineers and other departments, including marketing, to discuss and negotiate. • make presentations to senior design management or clients.
Teamwork *that contributes to productive working relationships and outcomes*	• work within arts industry and with other product designers including clients • meet with clients • participate in specialist or multidisciplinary team meetings • support, respect and understand views of others • provide feedback to others. • work collaboratively with others. • build and maintain networks and relationships.

Problem solving *that contributes to productive outcomes*	• analyse brief or commission requirements and consider options for action • develop and evaluate a creative concept • apply a wide range of strategies and techniques identify and solve creative, innovative and practical solutions • find solutions to sometimes complex problems • research materials, processes or market requirements
Initiative and enterprise *that contribute to innovative outcomes*	• create a continuous improvement environment for self and accept challenges. • research business and marketing opportunities. • encourage self and others to evaluate and review designs. Incorporate feedback from others into own work. • evaluate the feasibility of production
Planning and organising *that contribute to long and short-term strategic planning*	• manage time and prioritise work tasks • plan and organise resources. • adapt resource allocation to cope with contingencies and to fit budget • ensure business and legal requirements are understood, established and met including OHS and sustainability requirements. • establish process and gather information when researching to inform work.
Self-management *that contributes to employee satisfaction and growth*	• develop personal and artistic vision • show confidence in and articulate own ideas and vision • evaluate and monitor own artistic work performance. • act as a role model and display professionalism, proficiency, integrity, industry knowledge and commitment to industry. • network to increase industry knowledge and understanding • identify personal strengths and weaknesses as an illustrator.
Learning *that contributes to ongoing improvement and expansion in employee and company operations and outcomes*	• identify and access learning and development opportunities • maintain and manage own knowledge and skill and undertake professional development. • share and exchange new knowledge and ideas. • assist others with creative and technical learning. Show enthusiasm for ongoing learning. • be open to new ideas and techniques.
Technology *that contributes to the*	• use technology to complete workplace and business requirements.

effective carrying out of tasks	
4.3 Recognition given to the course **(if applicable)**	Not applicable
4.4 Licensing/ regulatory requirements **(if applicable)**	Not applicable
5. Course rules	***Standards 2, 6,7 and 9 AQTF Standards for Accredited Courses***

5.1 Course structure

To be awarded the 22446VIC Diploma of Product Design, 22 units of competency must be completed:

- 17 core units
- 5 elective units, consisting of:
  - A minimum of 3 units from the elective list below, plus
  - A maximum of 2 units may be selected from the elective list below or any currently endorsed units that appear within a training package qualification or accredited course.

The choice of elective units must be relevant to the vocational outcome and work environment and maintain the integrity of the AQF alignment.

There are no prerequisite units for any of the units of competency.

For those who do not complete the full qualification a Statement of Attainment will be issued listing any units of competency successfully completed.

TABLE 3: Course Structure for the Diploma of Product Design

Unit of competency code	Field of Education code (six-digit)	Unit of competency title	Nominal hours
Core units			
BSBCRT401		Articulate, present and debate ideas	40
BSBDES303		Explore and apply the creative design process to 3D forms	50
BSBDES502		Establish, negotiate and refine a design brief	65
BSBMKG413		Promote products and services	40
CUAACD301		Produce drawings to communicate ideas	80

Unit of competency code	Field of Education code (six-digit)	Unit of competency title	Nominal hours
CUAACD302		Produce computer-aided drawings	50
CUAACD304		Make scale models	50
CUAANM303		Create 3D digital models	75
CUADES402		Research and apply techniques in product design	50
CUARES503		Analyse cultural history and theory	70
CUAWHS302		Apply work health and safety practices	10
MSFDN5001		Generate and transfer complex computer-aided drawings and specifications	72
MSS015004		Design sustainable product or process	100
VU22260	100501	Produce 2D product design drawings using software applications	85
VU22261	100501	Design and produce products from a brief	195
VU22262	100501	Develop a product range to meet market opportunities	144
VU22263	100501	Develop products incorporating mechanical/electrical features	180
Elective units			
BSBDES302		Explore and apply the creative design process to 2D forms	50
BSBIPR401		Use and respect copyright	50
BSBLIB504		Develop exhibition concepts	50
BSBPMG522		Undertake project work	60
BSBSMB404		Undertake small business planning	50
BSBWOR501		Manage personal work priorities and professional development	60
CUAACD303		Produce technical drawings	50
CUAACD501		Refine drawing and other visual representation tools	70

Unit of competency code	Field of Education code (six-digit)	Unit of competency title	Nominal hours
CUAACD508		Refine model making skills	65
CUADES601		Design innovative products	50
CUADIG405		Produce innovative digital images	50
CUAGRD606		Develop graphic designs for packaging	55
MSFFDT4004		Assess environmental impact of a design	36
MSFFDT5008		Research and recommend alternative manufacturing processes	27
MSS405030		Optimise cost of a product or service	60
		Total minimum nominal hours	**1569**
		Total maximum nominal hours	**1671**

5.2 Entry requirements	Learners enrolling in the Diploma of Product Design are best equipped to successfully undertake the qualification if they have learning, literacy, numeracy and oral communication skills equivalent to Level 4 of the Australian Core Skills Framework (ACSF). Full ACSF details and descriptors can be found on the Department of Education and Training website *https://www.education.gov.au/australian-core-skills-framework*. Learners with language, literacy and numeracy skills at lower levels than those suggested will require additional support to successfully undertake the qualification. It is preferred that applicants can provide evidence that demonstrates an aptitude for visual design. Evidence may comprise, but is not limited to: • audio-visual presentations • computer aided designs • journals • photographs of completed work

	• references or third party reports of work completed in education or employment • sketches, drawings or designs. Learners are best equipped to undertake the qualification if they have digital literacy and technology skills to self-manage within generic software applications; such as the ability to: • navigate within the system • save, retrieve and open files Learners who do not enter with these skills will require additional support to undertake the qualification.
6. Assessment	***Standards 10 and 12 AQTF Standards for Accredited Courses***
6.1 Assessment strategy	All assessment, including Recognition of Prior Learning (RPL), must be compliant with the requirements of: • Standard 1 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guidelines 4.1 and 4.2 of the VRQA Guidelines for VET Providers, or • the Standards for Registered Training Organisations 2015 (SRTOs), or • the relevant standards and Guidelines for RTOs at the time of assessment. These standards ensure that the assessment strategies meet requirements of the course and therefore ensure that: • all assessments are valid, reliable and flexible and fair • learners are informed of the context and purpose of the assessment and the assessment process • feedback is provided to learners about the outcomes of the assessment process and guidance given for future options • time allowance to complete a task is reasonable and specified to reflect the industry context in which the task takes place. Assessment strategies should be designed to:

	• cover a range of skills and knowledge required to demonstrate achievement of the course aim • collect evidence on a number of occasions to suit a variety of contexts and situations • be appropriate to the knowledge, skills, methods of delivery and needs and characteristics of learners • assist assessors to interpret evidence consistently • recognise prior learning • be equitable to all groups of learners. Assessment strategies for the imported units from the *BSB Business Services, CUA Creative Arts and Culture MSF Furnishing* and *MSS Sustainability* training packages should be consistent with the Assessment Requirements for the relevant training packages. The Assessment Evidence for the accredited units of competency provide suggested assessment methods for each of the units, however where not defined within the Assessment Evidence of the accredited units or Assessment Requirements of endorsed units of competency, a range of appropriate assessment methods may be used to determine competency. The following examples are appropriate for units of competency in this accredited course: • analysis of responses to case studies and scenarios • observation of demonstrated skills over time and in a range of situations • observation of, or evidence of, interactions with product team members and professionals • portfolio of evidence such as documentation of design process of completed original product designs • presentations and discussions • professional development portfolio and/or self-reflection journal maintained over a period of time • projects • Recognition of Prior Learning • referenced assignments • third party reports that confirm that tasks have been completed to an acceptable level based on the organisation's expectations and that the evidence is based on real performance

	• where there are work placement arrangements, logbooks that show a record of the assessment activities indicated in the units • written and/or oral questions to assess required knowledge and understanding
6.2 Assessor competencies	Assessment must be undertaken by a person or persons in accordance with: • Standard 1.4 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guidelines 3 of the VRQA Guidelines for VET Providers, or • the Standards for Registered Training Organisations 2015 (SRTOs), or • the relevant standards and Guidelines for RTOs at the time of assessment. All assessment of units of competency imported from training packages must reflect the requirements for assessors specified in the relevant training packages.
7. Delivery	***Standards 11 and 12 AQTF Standards for Accredited Courses***
7.1 Delivery modes	There are no restrictions on the delivery for the Diploma of Product Design. The qualification may be delivered in a blended learning mode, including the work placement, as well as classroom and/or distance based learning. Delivery methods should allow for self-directed development and achievement, independent and peer to peer judgement and accountability for a high standard of outcomes. The use of workplace based design projects is encouraged as a form of learning benefiting both learner and host organisation. Some areas of content may be common to more than one element/performance criteria and therefore integration may be appropriate. Registered Training Organisations must use additional educational support mechanisms to maximise each learner's completion of the course. An initial assessment of learner's needs must be conducted during entry into the course to identify the need for language, literacy and numeracy support and reasonable adjustment.

7.2 Resources	Resources that are essential for the delivery of the Diploma of Product Design includes:
	• design studio with access to:
	  • 3D printing and cutting technologies
	  • colour and large format outputs
	  • computers and internet
	  • design and presentation software
	• presentation space with access to digital presentation
	• model making fabrication workshop to suit plastics, metal, clay, hard foam and finishing materials
	• access to companies with modern manufacturing technologies
	• other production team members/s with whom the learner can interact
	• relevant documentation and references:
	  • product design briefs
	  • national and state or territory legislation, including copyright
	  • texts and references relating to product design
	• safety equipment including first aid and workplace incident report forms.
	Trainers
	Training must be undertaken by a person or persons in accordance with:
	• Standard 1.4 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guideline 3 of the VRQA Guidelines for VET Providers,
	or
	• the Standards for Registered Training Organisations 2015 (SRTOs),
	or
	• the relevant standards and Guidelines for RTOs at the time of assessment.
	The delivery of units of competency that have been imported from training packages must reflect the requirements for trainers specified in that training package.

8. Pathways and articulation	***Standard 8 AQTF Standards for Accredited Courses***

	There are potential pathways into and from the Diploma of Product Design. Pathways into the Diploma may exist for those leaving secondary school or other vocational programs or those with vocational experience within design industries, but hold no formal qualifications. The Diploma includes a number of units of competency from the *BSB Business Services, CUA Creative Arts and Culture, MSF Furnishing and MSS Sustainability* training packages. Individuals who already hold these units or equivalent may be eligible to gain credit transfer for any qualifications that may undertake in the future that contain those units, in particular, at the Diploma or Advanced Diploma level in the *CUA Creative Arts and Culture Training Package*. No formal articulation and credit transfer arrangements have been negotiated with other Registered Training Organisations or higher education institutes, however graduates of the Diploma of Product Design can seek credit (by individual negotiation between the graduate and the University) into RMIT, Swinburne and Monash universities' programs: • Associate Degree in Design (Furniture) • Bachelor of Industrial Design (Hons) • Bachelor of Design (Industrial Design) (Hons) • Bachelor of Design (Interior Architecture) (Hons) • Bachelor of Innovation and Design.
9. Ongoing monitoring and evaluation	***Standard 13 AQTF Standards for Accredited Courses***
	The Diploma of Product Design will be maintained and monitored by the Curriculum Maintenance Manager - Arts/Entertainment and Recreation. The Curriculum Maintenance Manager will conduct a review of the course at the mid-point of its accreditation period. Feedback will be sought from the broader industry and other providers offering the course as part of the review process and may refer to data gathered using student satisfaction surveys, teacher critique and industry consultation. If changes are to be considered, the Curriculum Maintenance Manager will organise and convene an appropriate course advisory group, the membership of which may comprise:

	• industry representatives • past or present students • relevant industry or advisory bodies • provider representatives. The group will: • review the implementation of the course • provide advice on changing industry training requirements • monitor and evaluate course standards and recommend minor changes to the program. Recommendations for significant changes to the course resulting from course monitoring and evaluation procedures will be reported to the Victorian Registrations and Qualifications Authority. All Registered Training Organisations delivering the course will be notified of any changes by the Curriculum Maintenance Manager.

Section C—Units of competency

A list of the units of competency imported from training packages or accredited courses. These units can be accessed from: *http://training.gov.au/Home/Tga*

- BSBCRT401 Articulate, present and debate ideas
- BSBDES302 Explore and apply the creative design process to 2D forms
- BSBDES303 Explore and apply the creative design process to 3D forms
- BSBDES502 Establish, negotiate and refine a design brief
- BSBIPR401 Use and respect copyright
- BSBLIB504 Develop exhibition concepts
- BSBMKG413 Promote products and services
- BSBPMG522 Undertake project work
- BSBSMB404 Undertake small business planning
- BSBWOR501 Manage personal work priorities and professional development
- CUAACD301 Produce drawings to communicate ideas
- CUAACD302 Produce computer-aided drawings
- CUAACD303 Produce technical drawings
- CUAACD304 Make scale models
- CUAACD501 Refine drawing and other visual representation tools
- CUAACD508 Refine model making skills
- CUAANM303 Create 3D digital models
- CUADES402 Research and apply techniques in product design
- CUADES601 Design innovative products
- CUADIG405 Produce innovative digital images
- CUAGRD606 Develop graphic designs for packaging
- CUARES503 Analyse cultural history and theory
- CUAWHS302 Apply work health and safety practices
- MSFDN5001 Generate and transfer complex computer-aided drawings and specifications
- MSFFDT4004 Assess environmental impact of a design
- MSFFDT5008 Research and recommend alternative manufacturing processes
- MSS015004 Design sustainable product or process
- MSS405030 Optimise cost of a product or service.

Units of competency developed for the course, which comply with the current requirements from the Training Package Development Handbook.

- VU22260 Produce 2D product design drawings using software applications
- VU22261 Design and produce products from a brief
- VU22262 Develop a product range to meet market opportunities
- VU22263 Develop products incorporating mechanical/electrical features.

Unit code	VU22260
Unit title	Produce 2D product design drawings using software applications
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge to produce two-dimensional (2-D) product design drawings using software applications. It requires the ability to set up the drawing template file to create and edit drawings, output drawing and use saving, backing up and importing file functions. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.
Employability Skills	This unit contains Employability Skills.
Application of the Unit	This unit applies to product designers who use software applications to prepare technical and non-technical 2D drawings from project briefs, sketches, drawings, plans and from 3D models. The drawings produced and notations included are required to conform to industry standards and drawing protocols.

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*
1 Produce a drawing template file	1.1 Determine ***drawing requirements*** based on job requirements
	1.2 Set up the drawing environment
	1.3 Create a suitable ***drawing management strategy***
	1.4 Build a product design library
	1.5 Create appropriate text and dimension styles
	1.6 Set up title blocks
2 Create product design drawings	2.1 Import data from other software applications to commence drawings, as required
	2.2 Add ***text***, as required, according to standard operating procedures, Australian Standards and ***drawing protocols***

		2.3 Apply appropriate scale according to Australian Standards and drawing protocols
		2.4 Import symbols to represent product ***features***
		2.5 Apply essential status toggles
		2.6 Check and validate drawing against job requirements, standard operating procedures, Australian Standards and drawing protocols
		2.7 Use editing commands to modify drawing elements and existing text
		2.8 Follow relevant occupational health and safety procedures for drawing activities
3	Output drawings	3.1 Set page layout for the drawing file to suit output requirements
		3.2 Set parameters for the output
		3.3 Output drawings to the appropriate required format
4	Manage files	4.1 Create suitable file directories for the drawing project
		4.2 Save and back up drawing files to the specified drives or directories
		4.3 Retrieve, rename and edit saved files as required

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- reading skills to interpret technical drawings and documentation from a range of sources
- writing skills to:
  - present required information visually and in writing
  - use appropriate technical vocabulary
  - effectively convey meaning without ambiguity
- oral communication to clarify drawing requirements
- numeracy skills to make calculations and add dimensions using an appropriate scale in drawings

- problem solving skills to:
  - create an appropriate drawing management strategy
  - identify and create an appropriate template file
- planning and organising skills to:
  - save, retrieve and back up files
  - ensure coordinated development of drawings
- technology skills to use information technology and software applications.

Required knowledge:

- types and uses of drawings commonly required for product design, including the relationship between the views contained in drawings
- functions and operation of software applications used for product design
- protocols applicable to the production of 2D product design drawings
- drawing commands and their application
- technical vocabulary relating to technical product drawings and documentation
- product features used in product design, and their representation in drawings
- work health and safety requirements as they relate to working for periods of time on screen and computers
- Australian drawing standards and other industry standards, codes of practice and legislation relating to the production of 2-D drawings using software applications
- checking and validating processes used for drawings
- hard copy and digital file management procedures.

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Drawing requirements may include:	• technical drawing pack, including:
	  • assembly view
	  • exploded view
	  • parts view
	  • isometric projection
	  • orthographic projection
	• product visualisation drawing.

Drawing management strategy may include:	• autostyles • conventions • imported files

- layers
- linked files
- presets
- version control
- dimension rationalisation

Text may include:

- notations and references
- view labels
- legends
- dimensions
- bill of materials
- references to other data files.

Drawing protocols may include:

- abbreviations
- commonly used symbols
- dimensions
- hierarchy
- legends
- lettering standards
- numbering
- paper size
- scale
- standard units of measurement.

Features may include:

- size
- shape
- materials
- functions

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The learner must show evidence of the ability to complete tasks outlined in the elements and performance criteria of this unit, consistently and accurately over time and in a range of relevant contexts, manage tasks and manage contingencies in the context of the job role. There must be evidence that the learner can:

- produce and edit at least four (4) 2D technical drawing packs that includes:
  - assembly/subassembly view
  - exploded view
  - parts view
  - isometric projection
  - orthographic projection
- produce and edit at least one (1) product visualisation drawing.

In demonstrating the above, the learner should have also:

- set up the drawing template file
- produced drawings using the appropriate software applications
- identified and applied drawing protocols
- checked and validated drawing
- applied output requirements
- saved and backed up files
- applied work health and safety practices to working on screen and computers.

Context of and specific resources for assessment

Assessment must be conducted in a safe product design workplace/studio or simulated environment that accurately reflects performance in a real workplace setting.

The assessment environment must include access to:

- a suitable work space
- a computer
- software applications for producing 2D drawings.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of work in progress, including the output of computer aided drawings and saving, backing up and retrieving files
- portfolio of 2D drawings produced using software applications.
- third-party reports that confirm performance has been completed to the level required based on the organisation's expectations and the evidence is based on real performance
- written and/or oral questioning and discussion to assess knowledge of application.

Unit code	**VU22261**
Unit title	**Design and produce products from a brief**
Unit Descriptor	This unit describes the skills and knowledge required to design and produce a product from a brief. It requires the ability to interpret the product design brief, undertake research, develop design options, plan the design process and provide visual concepts to the client before making the product model. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.
Employability Skills	This unit contains Employability Skills.
Application of the Unit	This unit applies to product designers who design and produce products from a brief that specifies the product's purpose, target market, and functionality. Product design work may include fields such as shop fittings and displays, consumer goods such as furniture, appliances and electronic items, packaging and special effects and props for film work. As part of the conceptualisation and design process, product designers undertake research and explore design solutions to meet marketing, manufacturing and financial requirements to achieve the ideal design of a product. They consider both functional and aesthetic aspects and pay attention to ergonomics. They select components and materials and decide on assembly and manufacturing details. They prepare visual concepts to assist in the decision-making process and models and prototypes to demonstrate and test products and support marketing efforts. This work could be carried out independently or as part of a product development team.

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*
1 Analyse the brief	1.1 Interpret the ***specifications*** of the product design brief
	1.2 Establish the market or client for the proposed product
	1.3 Clarify specifications and ***parameters*** of the brief with relevant individuals

2	Undertake research to inform the design	2.1	Source and evaluate ***information*** relevant to the brief
		2.2	Discuss research with relevant colleagues to determine relevance to the brief
		2.3	Use research information to establish criteria for selecting appropriate design solutions for the design problem
3	Develop innovative options	3.1	Create a range of design options to meet design brief requirements
		3.2	Apply relevant principles of functionality, ergonomics, aesthetics and sustainability to development of the design solutions
		3.3	Evaluate environmental and ethical factors on the selection and use of resources
		3.4	Finalise the preferred design option based upon criteria developed to meet the parameters of the brief
4	Develop design proposal	4.1	Plan the design proposal representing the design vision
		4.2	Select approach to work which meets established criteria
		4.3	Produce visual interpretations of design
		4.4	Prepare written and visual support materials to contribute to final presentation
5	Plan the design process	5.1	Identify all components required to produce the design option
		5.2	Assess technical, resource and workspace and/or manufacturing requirements associated with production
		5.3	Consult with any technical experts required to produce the design solution
		5.4	Develop the project plan that incorporates compliance with relevant regulatory and legislative requirements
6	Deliver visual concepts to client	6.1	Present the product design and proposed timelines for production to client, including rationale for any changes

		6.2 Respond to feedback and make changes to the design as required
		6.3 Confirm production plan and timelines with client
7	Realise product design	7.1 Develop the product model using devices, tools, techniques and materials to meet conceptual vision
		7.2 ***Refine*** product model, as required, to address constraints identified during its development
		7.3 Use safe working practices throughout the process of making the product model
		7.4 Prepare documentation and specifications to accompany final design
		7.5 Confirm that intellectual property and other legislative requirements have been met

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- reading skills to:
  - interpret and analyse a brief
  - interpret detailed information from a range of sources to determine how the content may be applied to the product design outcomes
- writing skills to:
  - documents research outcomes
  - prepared structured project plans
  - develop detailed and complex documentation and specifications of the design features of the completed work
  - produce sketches and drawings for visual presentation
- oral communication skills to:
  - negotiate brief requirements
  - establish and maintain effective communication with relevant individuals during conceptual development, planning and development stages
  - listen and use analytical questioning to gather and confirm ideas, information and feedback
  - present design option rationales in discussions
  - deliver highly developed presentations to client
- numeracy skills to:

  - interpret technical information to determine component and material, or outsourcing requirements and costs
  - calculate quantities and costings for components
  - establish timelines for design and production
- problem solving skills to:
  - source, analyse, synthesise and integrate information from a wide variety of sources
  - develop and refine solutions to meet requirements of brief
- initiative and enterprise skills to complete research and analysis to determine the balance of aesthetics, function and sustainability in ideas, and develop criteria to assist the evaluation of design solutions
- teamwork skills to:
  - work collaboratively with others to develop the product design concept and gather information and ideas for design options
  - obtain feedback on visual concepts and to confirm production requirements
  - use consultative processes to refine and finalise the design options
- planning and organising skills to develop and monitor plans to manage design resources, processes and production, refining and finalising the design options as required
- self-management skills to maintain compliance with intellectual property and relevant legislative requirements
- technology skills to:
  - use the relevant industry standardised software for design, concept presentation and project planning
  - select and safely use industry tools and equipment to develop models and samples.

Required knowledge:

- purpose and characteristics of a product design brief
- principles of functionality, ergonomics, aesthetics relevant to product design
- principles of sustainability, including social, environmental and economic impacts relevant product design and production
- copyright, moral rights and intellectual property issues and legislation and their relevance to the design industry
- industry and design standards
- regulatory and legislation requirements relevant to product design and production
- production processes as they apply to product design
- quality assurance processes relating to the production process
- plans, drawings and specifications used in product design, including current industry software and hardware to produce those
- workplace safety requirements and legislation in relation product design and production processes
- facilities, tools, techniques and materials required to produce models and samples.

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Specifications may include:

- cost
- location
- market
- media
- quantity
- scope of work
- spatial (e.g. site, size, etc.)
- target group
- timeframes.

Parameters may include:

- budgeting and financing arrangements
- cost of production
- number of units
- outlets
- packaging and display of product
- timeframes.

Information may include:

- current trends in the application of materials, techniques, tools and equipment
- design standards
- health and safety
- industry standards
- legal, contractual, ethical and copyright considerations
- manufacturing and production considerations
- material characteristics and capabilities
- new technology and innovation
- stylistic considerations.

Refine may involve:

- adapting machinery
- changing materials
- changing production parameters
- costing

- modelling
- incorporating new elements
- meeting industry and government standards and legislation
- reducing or changing weight, mass, size, shape, appearance or colour
- referral to outside specialists.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The learner must show evidence of the ability to complete tasks outlined in the elements and performance criteria of this unit, consistently and accurately over time and in a range of relevant contexts, manage tasks and manage contingencies in the context of the job role. There must be evidence that the learner can:

- design and produce at least one product model from a brief

In demonstrating the above, the learner must have also:

- interpreted the specifications of the project brief
- researched and presented information relevant to the product design
- generated and documented options and ideas and finalised a design option, in collaboration with others
- developed visual concepts and used effective communication and presentation skills to deliver the product design option
- developed the project plan for the design process
- selected and safely used the appropriate facilities, tools, and materials to develop the product design model
- selected, applied and refined the range of approaches and techniques consistent with the design
- developed documentation and specifications to supplement the final product design model.

Context of and specific resources for assessment

Assessment must be conducted in a safe product design workplace/studio or simulated environment that accurately reflects performance in a real workplace setting.

The assessment environment must include access to:

- a suitable work space
- product brief
- references and resources relevant to product design
- equipment, tools and materials used to design and produce a product
- appropriate presentation environment and resources

- individuals and team members with whom the learner can interact to support design development and realisation.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of work in progress, including exploration of and experimentation with design development
- portfolio of evidence that includes personal reflection and feedback from relevant others.
- third-party reports that confirm performance has been completed to the level required based on the organisation's expectations and the evidence is based on real performance
- written and/or oral questioning and discussion to assess knowledge and understanding and the learner's intentions and work outcome
- written reports or presentations.

Unit code	**VU22262**
Unit title	**Develop a product range to meet market opportunities**
Unit Descriptor	This unit describes the skills and knowledge required to design and produce a product range with a set of variations on a specific product made to appeal to different market segments. It requires the ability to research and analyse market segments, establish design requirements, develop design options, plan the design process and provide visual concepts to the client before making the models for the product range. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication
Employability Skills	This unit contains Employability Skills.
Application of the Unit	This unit applies to product designers who design and produce products to meet new market opportunities by discovering unmet customer needs or by making improvements to products for competitive advantages. This includes the development of related products that can be marketed together to similar market segments. As part of the conceptualisation and design process, product designers undertake market research and analysis and explore design solutions to meet marketing, manufacturing and financial requirements to achieve the ideal design of a product. They consider both functional and aesthetic aspects and pay attention to ergonomics. They select components and materials and decide on assembly and manufacturing details. They prepare visual concepts to assist in the decision-making process and models and prototypes to demonstrate and test products and support marketing efforts. This work could be carried out independently or as part of a product development team.

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*
1 Research product market	1.1 Gather information on market or ***market segment*** for a ***product range*** in accordance to the brief

		1.2 Develop research parameters to establish basic elements of the product range
		1.3 Analyse the market performance of existing and potential competitors and their products to identify potential opportunities or threats
		1.4 Liaise with relevant colleagues to assess feasibility for product range or additional related products
		1.5 Establish opportunities for product range based on the analysis of information collected
2	Establish design requirements	2.1 Determine financial, physical and human resources and timeframes required for developing design concept to production stage
		2.2 Consider sustainability, intellectual property and copyright, and legislative requirement impacts for the product range
		2.3 Collaborate with others to refine parameters of the product design
3	Develop product range options	3.1 Create a range of design options to meet design brief requirements and cater for varying market segments
		3.2 Apply relevant principles of functionality, ergonomics, aesthetics and sustainability to development of the design options
		3.3 Establish ***criteria*** for selecting devices, techniques, tools and materials in consideration to environmental and ethical impacts
		3.4 Finalise the preferred design option based on developed criteria and ongoing experimentation and discussion with colleagues and client
4	Develop design proposal	4.1 Plan the design proposal representing the design vision
		4.2 Select approach to work which meets established criteria
		4.3 Produce visual interpretations of design
		4.4 Prepare written and visual support materials to contribute to final presentation
5	Plan the design process	5.1 Identify all components required to produce the design option

		5.2 Assess technical, resource and workspace and/or manufacturing requirements associated with production
		5.3 Consult with any technical experts required to produce the design option
		5.4 Develop the project plan that incorporates compliance with relevant regulatory and legislative requirements
6	Deliver visual concepts to client	6.1 Present the product design and proposed timelines for production to client, including rationale for any changes
		6.2 Respond to feedback and make changes to the design as required
		6.3 Confirm production plan and timelines with client
7	Realise product range design	7.1 Develop the product design range model using devices, tools, techniques and materials to meet conceptual vision
		7.2 ***Refine*** product range model, as required, to address constraints identified during its development
		7.3 Use safe working practices throughout the process of making the models for the product range
		7.4 Prepare documentation and specifications to accompany final design
		7.5 Confirm that intellectual property and other legislative requirements have been met

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- reading skills to:
  - interpret the brief
  - interpret detailed information from a range of sources to determine how the content may be applied to the product design range and production requirements
- writing skills to:
  - prepare comprehensive design concepts and structured project plans
  - develop detailed and complex documentation and specifications of the design features of the completed work

  - produce sketches and drawings for visual presentation
- oral communication skills to:
  - negotiate brief requirements
  - establish and maintain effective communication with relevant individuals during conceptual development, planning and development stages
  - listen and use analytical questioning to gather and confirm ideas, information and feedback
  - present design options rationales in discussions
  - deliver highly developed presentations to client
- numeracy skills to:
  - interpret data from market analysis
  - interpret technical information to determine component and material, or outsourcing requirements and costs
  - calculate and establish budget and design and production timelines
- problem solving skills to:
  - source, analyse, synthesise and integrate information from a wide variety of sources
  - develop and refine design options to meet requirements of brief
- initiative and enterprise skills to:
  - evaluate opportunities to generate innovative ideas for a product range for a targeted market
  - complete research and analysis to determine the balance of aesthetics, function and sustainability in ideas, and develop criteria to assist the evaluation of design options
- teamwork skills to:
  - work collaboratively with others to develop the product range design concept and gather information and ideas for design options
  - obtain feedback on visual concepts and to confirm production requirements
  - use consultative processes to refine and finalise the design options
  - planning and organising skills to develop and monitor plans to manage design resources, processes and production, refining and finalising the design options as required
  - self-management skills to maintain compliance with relevant regulatory and legislative requirements.
- technology skills to:
  - use the relevant industry standardised software for design, concept presentation and project planning
  - select and safely use industry tools and equipment to develop models, prototypes and samples.

Required knowledge:

- research methodologies used to analyse market and segments for product design

- purpose, types and characteristics of product ranges
- financial, physical and human resources required for product design
- principles of sustainability, including social, environmental and economic impacts relevant to product design and production
- copyright, moral rights and intellectual property issues and legislation and their relevance to the design industry
- regulatory and legislation requirements relevant to product design and production
- production processes as they apply to product design
- quality assurance processes relating to the production process
- plans, drawings and specifications used in product design, including current industry software and hardware to produce those
- workplace safety requirements and legislation in relation product design and production processes
- facilities, tools, techniques and materials required to produce models, prototypes and samples.

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Market segment may include to:	• product use • age • consumer spending profile • education • ethnicity • gender • hobbies • interests.
Product range may be:	• based on common theme or identity • linked technically • linked visually.
Criteria may include:	• adaptability • availability • cost • durability • efficiency • environmental concerns

- manufacturing capabilities
- multi-functional capacity
- skills of production team.

Refine may involve:

- adapting machinery
- changing materials
- changing production parameters
- costing
- modelling
- incorporating new elements
- meeting industry and government standards and legislation
- reducing or changing weight, mass, size, shape, appearance or colour
- referral to outside specialists.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The learner must show evidence of the ability to complete tasks outlined in the elements and performance criteria of this unit, consistently and accurately over time and in a range of relevant contexts, manage tasks and manage contingencies in the context of the job role. There must be evidence that the learner can:

- design and produce a product range (comprised of three (3) or more product models) that reflects one (1) or more of the following aspects:
  - based on common theme or identity
  - linked technically
  - linked visually.

In demonstrating the above, the learner must have also:

- developed the product concept based on the research conducted for the identified market segment from the brief, and which outlines purpose, feasibility, cost, timeframes and legislative requirements and environmental, ethical factors and intellectual property and copyright impacts for the product range
- generated and documented options and ideas and finalised a design option for the product range in collaboration with others
- developed visual concepts and used effective communication and presentation skills to deliver the product range design
- developed the project plan for the design process
- selected and safely used the appropriate facilities, tools, and materials to develop the product range model
- selected, applied and refined the range of approaches and techniques consistent with the design
- developed documentation and specifications to supplement the final product design range model.

Context of and specific resources for assessment

Assessment must be conducted in a safe product design workplace/studio or simulated environment that accurately reflects performance in a real workplace setting.

The assessment environment must include access to:

- a suitable work space

- product brief
- references and resources relevant to product design
- equipment, tools and materials used to design and produce a product range
- appropriate presentation environment and resources
- individuals and team members with whom the learner can interact to support design development and realisation.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of work in progress, including exploration of and experimentation with design development
- portfolio of evidence that includes personal reflection and feedback from relevant others.
- third-party reports that confirm performance has been completed to the level required based on the organisation's expectations and the evidence is based on real performance
- written and/or oral questioning and discussion to assess knowledge and understanding and the learner's intentions and work outcome
- written reports or presentations.

Unit code	**VU22263**
Unit title	**Develop products incorporating mechanical/electrical features**
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to design and produce a product incorporating mechanical/electrical features from a brief, applying a range of advanced techniques and materials. It includes the ability to contribute to the product design through the research and development of design options, planning the design process and providing visual concepts to the clients before realising the prototype. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication
Employability Skills	This unit contains Employability Skills.
Application of the Unit	This unit applies to product designers who design and produce products that incorporate mechanical/electrical features. As part of the conceptualisation and design process, product designers undertake research and explore design solutions to meet marketing, manufacturing and financial requirements to achieve the ideal design of a product. They consider both functional and aesthetic aspects and pay attention to ergonomics. They select components and materials and decide on assembly and manufacturing details. They prepare visual concepts to assist in the decision-making process and models and prototypes to demonstrate and test products and support marketing efforts. This work could be carried out independently or as part of a product development team.

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*
1 Develop the design concept	1.1 Evaluate the potential for a functional innovative product design that incorporates mechanical/electrical features for a targeted market

		1.2 Determine financial, physical and human resources and timeframes required for developing design concept to production stage
		1.3 Consider sustainability, intellectual property and copyright, and legislative requirement impacts for the product
		1.4 Collaborate with others to refine parameters of the product design concept
2	Undertake research to inform the design	2.1 Source and access relevant technical ***information*** relating to the product design concept
		2.2 Assess information for relevance and applicability
		2.3 Liaise with relevant specialists in relation to technological options
		2.4 Access information on available electrical or mechanical devices to requirements of brief
3	Develop innovative options	3.1 Determine a range of technologically innovative options to meet the parameters of the brief
		3.2 Apply relevant principles of functionality, ergonomics, aesthetics and sustainability to development of the design options
		3.3 Evaluate environmental and ethical factors on the selection and use of resources
		3.4 Establish ***criteria*** for selecting mechanical or electrical features required to develop the design options
		3.5 ***Refine*** and finalise the preferred design option based on ongoing experimentation and analysis of technological options
4	Plan the design process	4.1 Identify all components required to produce the design option
		4.2 Assess technical, resource and workspace requirements associated with production
		4.3 Consult with any ***specialist services*** required to produce the design options

		4.4 Develop the project plan that incorporates compliance with relevant regulatory and legislative requirements
5	Deliver visual concepts to client	5.1 Present the product design and proposed timelines for production to client, including rationale for any changes
		5.2 Respond to feedback and make changes to the design as required
		5.3 Confirm production plan and timelines with client
6	Realise working prototype	6.1 Develop the prototype using appropriate facilities, tools, techniques and materials
		6.2 Refine prototype based on ongoing experiences with the production of work
		6.3 Use safe working practices throughout the production of the prototype
		6.4 Prepare documentation and specifications to accompany final design model
		6.5 Confirm that intellectual property and other legislative requirements have been met

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- reading skills to interpret detailed and complex information from a range of sources to determine how the content may be applied to the product design outcomes
- writing skills to:
  - prepare comprehensive design concepts and structured project plans
  - develop detailed documentation and specifications of the design features of the completed work
- oral communication skills to:
  - establish and maintain effective communication with relevant individuals during conceptual development, planning and development stages
  - listen and use analytical questioning to gather and confirm ideas, information and feedback
  - deliver highly developed presentations to client
- numeracy skills to:

  - interpret technical information to determine component and material, or outsourcing requirements and costs
  - calculate and establish budget and design and production timelines
- problem solving skills to:
  - develop and refine design concepts and options from research and consultation
  - integrate information from a wide variety of sources to develop and document design concept, considerations and timelines
- initiative and enterprise skills to:
  - evaluate opportunities to generate innovative ideas for mechanical/electrical products for a targeted market
  - complete research and analysis to determine the balance of aesthetics, function and sustainability in ideas, and develop criteria to assist the evaluation of design options
- teamwork skills to:
  - work collaboratively with others to develop the product design concept and gather information and ideas for design options
  - obtain feedback on visual concepts and to confirm production requirements
  - use consultative processes to refine and finalise the design option
- planning and organising skills to develop and monitor plans to manage design resources, processes and production, refining and finalising the design option as required
- self-management skills to maintain compliance with intellectual and relevant legislative requirements
- technology skills to:
  - use the relevant industry standardised software for design, concept presentation and project planning
  - select and safely use industry tools and equipment to develop prototypes.

Required knowledge:

- methodologies used to explore potential markets for product design
- financial, physical and human resources required for product design
- principles of sustainability, including social, environmental and economic impacts relevant to product design and production
- copyright, moral rights and intellectual property issues and legislation and their relevance to the design industry
- range, uses and function of commercial electrical and mechanical devices in relation to product design
- operation and structure of mechanical devices e.g. levers, gears, cranks, pulleys, pistons, cams
- operation and structure of electrical devices e.g. motors, magnets, solenoids, lights, switches
- industry and design standards

- regulatory and legislation requirements relevant to product design and production
- production processes as they apply to product design
- quality assurance processes relating to the production process
- plans, drawings and specifications used in product design, including current industry software and hardware to produce those
- workplace safety requirements and legislation in relation product design and production processes
- facilities, tools, techniques and materials required to produce prototypes.

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Information may include:

- current trends in the application of materials, techniques, tools and equipment
- design standards
- health and safety
- industry standards
- legal, contractual, ethical and copyright considerations
- material characteristics and capabilities
- new technology and innovation
- stylistic considerations.

Criteria may include:

- availability
- capacity
- complexity
- cost
- ease of adjustment
- ease of installation necessity for maintenance
- power source
- size
- weight.

Refine may involve:

- adapting machinery
- changing materials
- changing production parameters
- costing
- modelling
- incorporating new elements
- meeting industry and government standards and legislation
- reducing or changing weight, mass, size, shape, appearance or colour
- referral to outside specialists.

Specialist services may include:

- cabinet makers
- electrical inspectors

- electricians
- engineers
- machinists' casting foundries
- pattern makers
- plastics engineers
- toolmakers
- welders/metal fabricators.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The learner must show evidence of the ability to complete tasks outlined in the elements and performance criteria of this unit, consistently and accurately over time and in a range of relevant contexts, manage tasks and manage contingencies in the context of the job role. There must be evidence that the learner can:

- design and produce an innovative product that incorporates one of the following features:
  - mechanical or moving components
  - electrical
  - combination of mechanical and electrical.

In demonstrating the above, the learner must have also:

- developed the product concept that outlines target market, purpose, feasibility, cost, timeframes and legislative requirements and environmental, ethical factors and intellectual property and copyright impacts
- researched and presented technical information relevant to the product design including electrical or mechanical devices
- generated and documented options and ideas and selected a design options, in collaboration with others
- developed visual concepts and used effective communication and presentation skills to deliver the idea and product.
- planned, managed, monitored the design and production of the product supported with the development of a project plan
- selected and safely used the appropriate facilities, tools, and materials to develop the prototype
- selected, applied and refined the range of approaches and techniques consistent with the design
- developed documentation and specifications to supplement the final product design.

Context of and specific resources for assessment

Assessment must be conducted in a safe product design workplace/studio or simulated environment that accurately reflects performance in a real workplace setting.

The assessment environment must include access to:

- a suitable work space
- references and resources relevant to product design
- equipment, tools and materials used to design and produce a product
- appropriate presentation environment and resources
- individuals and team members with whom the learner can interact to support design development and realisation.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of work in progress, including exploration of and experimentation with design development
- portfolio of evidence that includes personal reflection and feedback from relevant others.
- third-party reports that confirm performance has been completed to the level required based on the organisation's expectations and the evidence is based on real performance
- written and/or oral questioning and discussion to assess knowledge and understanding and the learner's intentions and work outcome
- written reports or presentations.