Australian Government

Department of Education, Employment and Workplace Relations

LMFFDT6002A Design for mass production

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit specifies the outcomes required to design products for mass production, being mindful of equipment requirements and personnel capabilities while also considering cost effective opportunities and future planning considerations.

Application of the Unit

Application of the unit	This unit supports the attainment of skills and knowledge required for competent workplace performance in furnishing operations of all sizes. The design of products in mass production applies to an industry workplace or design studio environment and involves application of skills and knowledge at a managerial level. These skills and knowledge are to be used within the scope of the individual's job and authority. This unit covers employability skills in teamwork and communication in order to work with others in the design process. Planning and organising and problem solving skills are required to apply design processes and initiative and enterprise are required to develop design ideas. Self management and learning skills are applied to assess and reflect on own design skills and identify areas for improvement.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan for design	1.1. Applicable ***OHS***, ***legislative*** and ***organisational requirements*** relevant to designing for limited production are verified and complied with 1.2. ***Design brief*** is reviewed, confirmed and clarified with ***appropriate personnel*** 1.3. ***Client*** requirements and desires are reviewed, confirmed and clarified 1.4. ***Communication*** with others is established and maintained in accordance with OHS requirements 1.5. Problems or underlying factors to be addressed by the design brief are verified 1.6. ***Elements of design*** are diagnosed for the intended design brief 1.7. ***Principles of design*** are diagnosed for the intended design brief 1.8. Volumes of mass production runs are set, costed and relevance to the market evaluated
2. Design for mass production	2.1. ***Concepts*** for the proposed solution to the design brief are reviewed in accordance with mass production requirements 2.2. Different ***solutions*** to satisfy the requirements of the design brief are presented and reviewed 2.3. Sample ***maquette*** and ***prototype*** are reviewed in accordance with the concept sketches 2.4. Final ***working drawings*** and ***specifications*** are reviewed and compiled in readiness for mass production 2.5. Concept is designed for mass manufacture taking into account available equipment and resources 2.6. ***Equipment*** capabilities are reviewed and assessed and design brief modified in accordance with available or ***obtainable*** equipment 2.7. Personnel ***capabilities*** are reviewed and assessed and design brief modified in accordance with assessed and available skills 2.8. ***Material*** or resource ***supply chain*** to the company is assessed, stock sizes set and design brief modified or altered to cater for availability of resources 2.9. ***Outsourcing*** opportunities are assessed and reviewed in accordance with ***cost benefit analysis***

ELEMENT	PERFORMANCE CRITERIA
	2.10. ***Workflow methods*** are reviewed and the design brief or workflow methods amended to cater for limited production 2.11. Opportunities for innovation in mass production procedures are researched and implemented
3. Implement design	3.1. ***Manufacturing process*** is planned and organised taking into account available equipment and resources 3.2. Material is processed in accordance with the manufacturing plan and safe working procedures 3.3. ***Jigs*** are produced to assist with the manufacture of ***components*** 3.4. Components are produced and prepared for ***assembly*** 3.5. Components are assembled in accordance with the working drawings 3.6. ***Final product*** is ***finished*** according to specifications 3.7. Final product is evaluated for ***functionality*** and ***aesthetic*** appeal 3.8. Mass production methodology is reviewed 3.9. Production run is ***packaged and despatched*** to ***transport*** methods 3.10. Mass production anomalies are ***recorded and reported*** to the appropriate personnel

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- collect, organise and understand information related to the needs for a furnishing product
- communicate ideas, information and advice to client to enable confirmation of design requirements, plans and specifications
- prepare design proposals
- listen to client or customer needs
- work with others and in a team understand product needs and produce design proposals
- reviewing information provided and creatively generate proposals for a furnishing product
- apply research, analytical and mathematical skills to the identification and selection of materials and the selection of appropriate production and construction techniques for the product
- plan activities covering the choice of design method, the preparation and layout of the product proposals
- use mathematical ideas and techniques to correctly complete technical details of the proposed designs
- create innovative designs which satisfy the agreed parameters and consider but are not limited by other historical or contemporary influences
- recognise and respond to circumstances outside instructions or personal competence
- adopt a proactive relationship with the client
- identify new enterprise opportunities when developing product proposals
- clarify and confirm work instructions
- plan design work within given task parameters
- accept responsibility for given tasks
- set, monitor and satisfy personal design work goals
- satisfy the competency requirements for the job
- maintain current knowledge of batch and limited production methods
- maintain current knowledge of design methods
- seek learning opportunities
- use the workplace technology related to the production of technical information for production details
- use of workplace electronic media to communicate with client, suppliers and subcontractors.

Required knowledge

- State or Territory OHS legislation, regulations, standards and codes of practice relevant to designing for mass production
- organisational and site standards, requirements, policies and procedures for designing for mass production

REQUIRED SKILLS AND KNOWLEDGE

- environmental protection requirements
- established communication channels and protocols
- problem identification and resolution
- elements and principles of design
- ergonomics and aesthetic values
- supply chain management
- outsourcing arrangements
- cost benefit analysis methods
- company resource audit techniques
- design and manufacture for mass production
- types of tools and equipment and procedures for their safe use, operation and maintenance
- characteristics of materials, products and defects
- set up and operation of equipment
- computer programs
- product machining, assembly and finishing techniques
- sketching and drawing
- storage systems and labelling
- procedures for the recording, reporting and maintenance of workplace records and information
- appropriate mathematical procedures for estimation and measurement.

Evidence Guide

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 the relevant Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Effectively work through the design taking into account the requirements of mass production to fulfil the design brief and oversee a mass production run • Effectively apply design elements and principles to designing for mass production • Effectively design for mass production in accordance with a design brief • Comply with legislation, regulations, standards, codes of practice and established safe practices and procedures for designing for mass production • Communicate effectively and work safely with others in the work area

Context of, and specific resources for assessment	• The application of competency is to be assessed in the workplace or simulated workplace
	• Assessment is to occur under standard and authorised work practices, safety requirements and environmental constraints
	• Assessment of essential underpinning knowledge, other than confirmatory questions, will usually be conducted in an off-site context
	• Assessment is to comply with relevant regulatory or Australian Standards requirements
	• The following resources should be made available:
	  • workplace location or simulated workplace
	  • materials and equipment relevant to designing for mass production
	  • specifications and work instructions

Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Furnishing Industry Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions

EVIDENCE GUIDE	
	(real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency
Guidance information for assessment	

Range Statement

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.	
OHS requirements	• are to be in accordance with Commonwealth, State or Territory legislation and regulations, organisational safety policies and procedures • requirements may include but not be limited to the use of personal protective equipment and clothing, fire fighting equipment, first aid equipment, hazard and risk control and elimination of hazardous materials and substances, manual handling including lifting and carrying
Legislative requirements	• are to be in accordance with applicable legislation from all levels of government that affect organisational operation • requirements may include but not be limited to award and enterprise agreements, industrial relations, Australian Standards, confidentiality and privacy, OHS, the environment, equal opportunity, anti-discrimination, relevant industry codes of practice, duty of care and heritage
Organisational requirements	• may include but not be limited to legal, organisational and site guidelines, policies and procedures relating to own role and responsibility, quality assurance, procedural manuals, quality and continuous improvement processes and standards, OHS, emergency and evacuation, ethical standards, recording and reporting, access and equity principles and practices, equipment use, maintenance and storage, environmental management (waste disposal, recycling and re-use guidelines)
Design brief	• may include but not be limited to the aims, objectives, milestones for the design project, the point of reference for everyone, elements and principles of design and may include organisational or personal profiles, aims, target audience, budget, timeline, consultation requirements, colour requirements, image requirements and function

RANGE STATEMENT	
Appropriate personnel	• may include but not be limited to trainers, supervisors, suppliers, clients, colleagues and managers
Client	• may include but not be limited to suppliers, manufacturers, private clients, colleagues, retailers or the public
Communication	• may include verbal and non-verbal language, constructive feedback, active listening, questioning to clarify and confirm understanding, use of positive, confident and cooperative language, use of language and concepts appropriate to individual social and cultural differences, control of tone of voice and body language
Elements of design	• may include but not be limited to line, shape, form (geometric or organic), texture, colour, and function
Principles of design	• may include but not be limited to balance, proportion (symmetry, asymmetry), harmony, contrast, pattern, movement, rhythm, unity, style, focus, scale, dominant, sub dominant or subordinate relationship, emphasis, proximity, alignment, space, anthropometry, ergonomics, arrangement, workload, materials handling capacity, skills, control, equipment capabilities, aesthetic relations, tension and development methods
Concepts	• are to include ideas generated to respond to the design brief through both ideation drawings or sketching and written explanation
Solutions	• may include but not be limited to a range of concepts, sketches, drawings, maquettes, models and prototypes
Maquette	• is to include a miniature version of the intended final product to establish if the elements and principles of design have been achieved. These are usually produced from cardboard or scrap timber.
Prototype	• is usually a full size replica of the intended product outcome based on concept sketches and free hand development drawings, these are usually produced from stiff cardboard, scrap timber or possibly even moulding clay
Working drawings	• may include but not be limited to drafted technical drawings or drawings produced on computer using computer aided drafting software packages. These usually contain project specifications

RANGE STATEMENT	
Specifications	• are to include the measurements, procedures by which a product is constructed and materials to be utilised
Equipment	• may include but not be limited to static machinery, portable power tools and computer numerically controlled equipment • may also include procedures for lock out protecting operators and co-workers from accidental injury by isolating the machine from the power source
Obtainability	• is to include the assessment of additional equipment requirements in regard to availability based on limited production requirements
Capabilities	• are to include but not be limited to the available equipment and personnel skills available within an organisation and the flexibility of these
Material	• may include but not be limited to native timber (native and imported), man-made timber products, plastic, metal, alloys, stones, glass, textiles, fibreglass, foam, cardboard, paper products or any other manipulable substance
Supply chain	• may include but not be limited to the network and integration of suppliers, wholesalers and distributors who supply resources to the company in a timely and cost effective manner
Outsourcing	• is to include the transfer of the provision of services previously carried out by in-house personnel to an external organisation, usually under a contract with agreed standards, costs and conditions
Cost benefit analysis	• is to include the assignment of monetary value to the costs and benefits (social, environmental and monetary) associated with a project for the purpose of selecting and evaluating project investment opportunities
Workflow methods	• is to include the arrangement of workspace, equipment and personnel so that work is carried out in the most efficient way
Manufacturing process	• may include but not be limited to the methods by which the product will be produced, these steps usually entail working from working drawings and specifications, producing components utilising machine operations, assembly of the components and finishing techniques

RANGE STATEMENT	
Jigs	• may include but not be limited to templates, patterns or frames for the manufacturing ease of components in production runs, these may assist machining or assembly
Components	• may include but not be limited to the parts which make up the whole of a product. Each component is often requires some level of machining to result in the desire part
Assembly process	• may include but not be limited to nailing, gluing, screwing, welding, pressing, sewing, bonding, jointing or connecting various materials
Final product	• may include but not be limited to items which are functional, applied, commercial or artistic
Finishing	• may include but not be limited to paints, waxes, lacquers, stains, pigments, oils and plastic coatings
Functionality	• is to include the purpose intended for the product in relationship to the design brief
Aesthetics	• are to include the consideration of appeal to a large number of people; products are pleasing to the eye of many who view them
Packaging and despatch	• may include but not be limited to wrapping in fabric, plastic wrapping, shrink wrapping, boxing, foam shells and despatch by truck, trailer, train, plane or ship
Transport	• may include but not be limited to movement by truck, trailer, train, plane or ship
Records and reports	• may include but not be limited to the design and production method, product type, size, inspection and labelling outcomes, storage locations, quality outcomes, hazards, incidents or equipment malfunctions

Unit Sector(s)

Unit sector	Furniture design and technology.

Competency field

Competency field	

Co-requisite units

Co-requisite units		