Australian Government

Department of Education, Employment and Workplace Relations

CPPSIS5020A Create engineering drawings

Release: 1

CPPSIS5020A Create engineering drawings

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency specifies the outcomes required to create and output two-dimensional (2-D) engineering drawings using suitable surveying software. It requires high-level technical application and the ability to apply theoretical concepts to a range of surveying data specifications. Functions would be carried out within organisational guidelines.

Application of the Unit

Application of the unit

This unit of competency supports the application of planning, organisational, communication and problem-solving skills; and high-level understanding of technology. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying.

Licensing, legislative, regulatory and certification requirements may impact on this unit. Incorporate these requirements according to state, territory and federal legislation.

Licensing/Regulatory Information

Refer to Application of the Unit

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Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged, will assist in identifying employability skills requirements.

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.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare computer-aided design (CAD) environment.	1.1 ***Objectives***, deliverables, constraints and principal work activities are defined and documented according to the written spatial data specifications and ***legislative requirements***.
	1.2 System variables are customised to suit standard operating procedures.
	1.3 Relevant manuals, instructions and operating procedures for software and hardware being used are obtained according to workplace procedures.
	1.4 Menus are customised to suit standard operating procedures.
	1.5 ***Drawing*** defaults are customised to suit the applicable drafting standards and procedures.
	1.6 Skills and knowledge are updated to accommodate changes in operating environment and equipment.
2 Create 2-D engineering drawings or three-dimensional (3-D) models.	2.1 Engineering drawings are created using available software systems.
	2.2 Drawing ***entities*** are linked to database ***attributes*** to suit job requirements.
	2.3 Detailed views are created using various scales to meet job requirements.
	2.4 Plots are produced at required scales to meet job requirements.
	2.5 If a 3-D model is created, ***products*** are determined and entities are created in ***3-D space*** to job requirements.
3 Produce output.	3.1 Files are saved in various ***formats*** according to standard operating procedures.
	3.2 Entities are produced from the drawing files or database and are listed in required format to meet job requirements.
	3.3 ***Supplementary data*** is extracted from engineering drawing to meet job requirements.
	3.4 ***OHS requirements*** are planned for and adhered to.
4 Finalise the task.	4.1 All ***required documentation*** is completed promptly, accurately and according to ***organisational guidelines***.
	4.2 ***Relevant personnel*** are informed of the results.
	4.3 Spatial data is archived according to ***project specifications***.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills:

- ability to create, extract and output information from engineering plans
- ability to relate to people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities
- analytical skills
- communication skills to:
  - consult effectively with clients and colleagues
  - impart knowledge and ideas through oral, written and visual means
- computer skills (high technical user level) to complete business documentation and apply surveying software
- literacy skills to:
  - assess and use workplace information
  - locate and interpret legislation and other written documentation
  - prepare and manage documentation
  - read and write technical reports
  - research and evaluate
- numeracy skills to:
  - analyse errors
  - conduct image analysis
  - interpret and analyse statistics
  - perform mental calculations
  - record with accuracy and precision
  - undertake high level computations
- organisational skills to:
  - coordinate technical and human resource inputs to research activities
  - prioritise activities to meet contractual requirements
- spatial skills to:
  - exercise precision and accuracy in relation to spatial and aspatial data design
  - perform spatial data archival and retrieval and train others in this task
  - perform spatial data management and manipulation and train others in this task
  - perform file management and train others in this task
  - solve problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation
  - understand implications of height, depth, breadth, dimension and position to actual operational activity and virtual representation.

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REQUIRED SKILLS AND KNOWLEDGE

Required knowledge and understanding:

- data formats
- data management
- industry requirements and standards
- interaction of surveying software with surveying equipment
- organisational policies and guidelines
- planning and control processes
- road design software
- safe work practices
- spatial reference systems
- standard plan design and presentation conventions.

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 this Training Package.

Overview of assessment	This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example unit CPPSIS5019A Conduct an engineering surveying project.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of: • applying known solutions to a range of problems • applying mathematical principles and skills to a range of surveying-related problems • assessing and recording information from varied engineering sources • performing a range of tasks where choice between a substantial range of options is required • understanding mathematical concepts and techniques • understanding operational knowledge in a broad range of CAD environments • understanding terms used in calculations • understanding the purpose of numerically solving surveying problems • taking responsibility for own outputs in work and

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learning.

Specific resources for assessment

Resource implications for assessment include access to:

- assessment instruments, including personal planner and assessment record book
- assignment instructions, work plans and schedules, policy documents and duty statements
- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

Context of assessment

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

Method of assessment

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).

Demonstrated competency in a range of situations, that may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Obtained by observing activities in the field and reviewing induction information. If this is not practicable, observation in realistic simulated environments may be substituted.

Guidance information for assessment

Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of spatial information services requirements to assess competency.

Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical).

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

All practical demonstration must adhere to the safety and

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environmental regulations relevant to each State or Territory.

Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

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.

Objectives may include:	• client requirements • written survey data specifications.

Legislative requirements may include:	• relevant state, territory and federal legislation affecting organisational operations, including:
	  • anti-discrimination and diversity
	  • equal employment opportunity (EEO)
	  • industrial relations.

Drawings may include:	• charts • diagrams • plans.
Entity refers to a single item created on the screen such as:	• arc • circle • hatch • line • text.
Attributes are properties	• colour

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associated with an entity and may include:	• layer • level • line type • line width • text.
Products may include:	• aspect maps • line of sight maps • slope maps • visualisation estimation • volume estimation.
3-D space may include:	• line of sight (intervisibility) map • fly through products.
Formats may include:	• DXF (data exchange format) • PTS (a format used in the triangulation process to define the position of points and triangles) • XLS (Excel spreadsheet format).
Supplementary data may include:	• area • volumes • lengths • angles • perimeters.
OHS may include:	• Australian standards • development of site safety plan • identification of potential hazards • inspection of work sites • training staff in OHS requirements • use of personal protective clothing • use of safety equipment and signage.
Required documentation may include:	• field records • final product reports • survey plots.
Organisational guidelines may include:	• appropriate timelines • final product formats • format design parameters • guidelines for working with teams • particular requirements for data processing.
Relevant personnel may include:	• supervisors and managers • site personnel such as field hands • surveyors.
Project specifications refer to:	• detailed technical descriptions of the survey data and its requirements.

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Unit Sector(s)

Unit sector Spatial information services

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