Australian Government

CPPSIS4031A Perform surveying computations

Release 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

CPPSIS4031A Perform surveying computations

Modification History

Unit revised and not equivalent to CPPSIS4011A Perform surveying computations
Element structure, performance criteria, and critical aspects reviewed to reflect workplace requirements
Skills and knowledge requirements and the range statement updated

Unit Descriptor

This unit of competency specifies the outcomes required to solve surveying and engineering-related problems. It requires the ability to identify, analyse and evaluate data to perform surveying computations. Functions would be carried out under limited supervision and within organisational guidelines.

Application of the Unit

This unit of competency supports the application of sound communication, organisational, problem-solving and time management skills, and a sound understanding of technology. The skills and knowledge acquired upon completion of this unit would apply to the needs of employees in supporting positions for surveying and mapping.

Licensing/Regulatory Information

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

Pre-Requisites

Nil

Employability Skills Information

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

1	Prepare to perform traverse computations.	1.1	Task ***objectives*** are defined.
		1.2	***Pertinent standards*** are identified, considered and adhered to, in line with ***project specifications***.
2	Execute the task.	2.1	Computations are performed on angles and bearings.
		2.2	Conversions between polar and rectangular modes are performed.
		2.3	Computations are performed on the coordinates of a simple closed ***traverse***.
		2.4	Computations are performed on the missing elements of a traverse.
		2.5	Computations are performed on adjusted coordinates of a traverse.
		2.6	Traverse information from field notes is reduced.
		2.7	Traverse misclose computations are adjusted according to appropriate industry standards.
		2.8	***Organisational documented and undocumented practices*** are adhered to.
3	Solve surveying problems involving circular curves.	3.1	Computations are performed on all elements of circular curves.
		3.2	Problems involving circular curve missing elements are

			solved.
4	Finalise the task.	4.1	***Required documentation*** is completed promptly, accurately and according to ***organisational guidelines***.
		4.2	***Relevant personnel*** are informed of the results according to organisational guidelines.
		4.3	Spatial data is archived according to project specifications.

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
- communication skills to:
  - discuss vocational issues effectively with colleagues
  - impart knowledge and ideas through oral, written and visual means
- computer skills to complete required documentation
- literacy skills to:
  - assess and use workplace information
  - read and interpret datums and projections
  - read and record data and write technical reports
  - research and access routine sources of spatial data
- numeracy skills to:
  - analyse errors
  - perform mental calculations
  - record and interpret statistics with accuracy and precision
  - undertake computations
- organisational skills to:
  - prepare and administer documentation
  - prioritise activities to meet contractual requirements
- spatial skills to:
  - exercise precision and accuracy in surveying computations
  - solve basic problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation

Required knowledge

- basic principles of algebra, geometry and trigonometry
- computing basic traverse data from field information
- 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
- understanding and application of significance in calculations

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 CPPSIS4029A Collect and set out basic surveying data, and CPPSIS4030A Operate surveying equipment.

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
- performing calculations following a logical progression and presenting clearly visible results
- assessing and recording computations from varied sources
- demonstrating operational knowledge in a broad range of areas relating to traverse computations
- applying mathematical principles and skills to a range of surveying problems
- accuracy in surveying calculations
- defining terms used in calculations.

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 surveying and 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 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

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:	• agreed client requirements • written survey data specifications.
Pertinent standards are standards essential to the	• basic measurement • calculation of horizontal and vertical information • calculation of area and volume

accuracy of:	• recording.
Project specifications refer to:	• detailed technical descriptions of the survey data and its requirements.
Traverse refers to:	• a method of surveying in which lengths and directions of lines between points on the earth are obtained by or from field measurements and are used in determining positions of the points.
Organisational documented and undocumented practices may include:	• appropriate timelines • data processing requirements • final product formats • formal design parameters • protocols for teamwork.
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:	• code of ethics • company policy • legislation relevant to the work or service function • manuals • OHS policies and procedures • personnel practices and guidelines outlining work roles and responsibilities.
Relevant personnel may include:	• managers • site personnel such as field hands • supervisors • surveyors.

Unit Sector(s)

Surveying and spatial information services

Custom Content Section

Not applicable.