



Australian Government

CPPSIS5054A Perform geodetic surveying computations

Release 1

CPPSIS5054A Perform geodetic surveying computations

Modification History

Unit revised and not equivalent to CPPSIS5024A Perform geodetic surveying computations
Element structure and performance criteria 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 perform basic relevant geodetic surveying calculations. It requires the ability to analyse data and plan approaches to technical problems. Functions would be carried out within organisational guidelines.

Application of the Unit

This unit of competency supports the application of communication, organisational, problem-solving and time management skills; interpreting technical documentation; and a very sound understanding of technology. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying.

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

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|---|--|-----|--|
| 1 | Prepare to perform geodetic surveying. | 1.1 | <i>Geodetic surveying</i> task <i>objectives</i> are defined. |
| | | 1.2 | <i>Pertinent standards</i> are identified, considered and adhered to according to <i>project specifications</i> . |
| | | 1.3 | Special <i>resource requirements</i> are identified. |
| 2 | Perform computations on the reference surface. | 2.1 | A relevant <i>reference surface</i> is selected for the required geodetic computations. |
| | | 2.2 | <i>Data</i> is reduced to the required reference surface. |
| | | 2.3 | <i>Geodetic components</i> for reference surface are identified and computed. |
| | | 2.4 | <i>Computations on the reference surface</i> and <i>computations on the projection plane</i> are identified and conducted. |
| | | 2.5 | Checks are completed according to requirements and problems are solved. |
| | | 2.6 | Organisational documented and undocumented practices are adhered to. |
| 3 | Perform computations on the projection plane. | 3.1 | Relevant projection plane is selected for required geodetic computations. |
| | | 3.2 | Data is reduced to the required projection plane. |
| | | 3.3 | Geodetic components for projection plane are identified |

- and computed.
- 3.4 Checks are completed according to established requirements.
- 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

- communication skills to:
 - consult effectively with clients and colleagues
 - impart knowledge and ideas through oral, written and visual means
- computer skills to:
 - complete business documentation
 - apply surveying software
- initiative and enterprise skills to create, extract and output information from engineering plans
- literacy skills to:
 - assess and use workplace information
 - read and write technical reports
 - research and evaluate
- numeracy skills to:
 - analyse errors
 - 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 geodetic computations
 - archive and retrieve spatial data
 - manage and manipulate spatial data
 - manage files

Required knowledge

- data formats
- data management
- data processing
- geodetic computations using appropriate computing aids, including appropriate software
- industry requirements and standards
- organisational policies and guidelines

- planning and control processes
- relationships between different surfaces
- spatial reference systems
- understanding and application of significance in calculations
- vocational issues involving relevant reference surface and relevant projection surface

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 CPPSIS5053A Perform advanced surveying computations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>A person who demonstrates competency in this unit must be able to provide evidence of:</p> <ul style="list-style-type: none">• applying checks wherever necessary• applying formulas appropriately and obtaining correct results• applying solutions to a range of problems• assessing and recording computations from varied sources• defining terms used in geodetic surveying calculations• demonstrating a sound understanding of the requirement for accuracy in calculations• understanding mathematical concepts and techniques• performing calculations in a logical progression to solve geodetic surveying problems.
Specific resources for assessment	<p>Resource implications for assessment include access to:</p> <ul style="list-style-type: none">• 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. <p>Access must be provided to appropriate learning and assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.</p>
Context of assessment	Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.
Method of assessment	<p>Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).</p> <p>Demonstrated competency in a range of situations, that</p>

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.

- Geodetic surveying*** refers to:
- surveying that takes into account the shape and size of the earth.
- Objectives*** may include:
- agreed client requirements
 - written survey data specifications.
- Pertinent standards*** are standards essential to the accuracy of:
- calculation of horizontal information
 - fixing lines for maintaining areas
 - measurement
 - recording.
- Project specifications*** refer to:
- detailed technical descriptions of the survey data and its requirements.
- Resource requirements*** may include:
- calculators
 - computers
 - software.
- Reference surface*** may include:
- relevant reference ellipsoid.
- Data*** may be:
- measured or otherwise
 - geodetic data derived from:
 - global navigation satellite system (GNSS)
 - total station.
- Geodetic components*** may include:
- geodetic control: a network of sites for which precise positions and heights are known and for which the shape and size of the earth are taken into account
 - geodetic parameters
 - other information required on the relevant surface or projection plane.
- Computations on the reference surface*** may include:
- meridian convergence
 - point to point calculations (Robbin's formula)
 - principle radii
 - spheroidal distance from observed distance.
- Computations on the***
- angle/bearing calculations on Map Grid of Australia (MGA)

projection plane may include:

- arc to chord corrections
- grid convergence
- grid bearings
- point and line scale factor
- point to point calculations
- transformation of coordinate axes
- use of MGA and GDA 94 software
- Australian Map Grid (AMG) and MGA
- latitude and longitude to grid coordinates

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
- personnel practices and guidelines outlining work roles and responsibilities.

Relevant personnel may include:

- managers
- supervisors
- surveyors.

Unit Sector(s)

Surveying and spatial information services

Custom Content Section

Not applicable.