



Australian Government

Department of Education, Employment and Workplace Relations

CPPSIS5024A Perform geodetic surveying computations

Release: 1

CPPSIS5024A Perform geodetic surveying computations

Modification History

Not Applicable

Unit Descriptor

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

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, 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

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to perform geodetic surveying.	1.1 <i>Geodetic surveying</i> task objectives are defined. 1.2 Pertinent standards are identified, considered and adhered to according to project specifications . 1.3 Special resource requirements are identified. 1.4 OHS requirements are planned for and adhered to.
2 Perform computations on the reference surface.	2.1 A relevant reference surface is selected for the required geodetic computations. 2.2 Data is reduced to the required reference surface. 2.3 Geodetic components for reference surface are identified and computed. 2.4 Checks are completed according to requirements and problems are solved. 2.5 Organisational documented and undocumented practices are adhered to. 2.6 Skills and knowledge are updated to accommodate changes in operating environment and equipment.
3 Perform computations on the projection plane.	3.1 A 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 All 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

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills:

REQUIRED SKILLS AND KNOWLEDGE

- 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
- create, extract and output information from engineering plans
- 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 geodetic computations
 - 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.

Required knowledge and understanding:

- data formats
- data management
- data processing
- apply the basic principles of algebra, geometry and trigonometry

REQUIRED SKILLS AND KNOWLEDGE

- geodetic computations using appropriate computing aids, including appropriate software
- industry requirements and standards
- interaction of surveying software with surveying equipment
- organisational policies and guidelines
- planning and control processes
- relationships between different surfaces
- safe work practices
- spatial reference systems
- plan design and presentation conventions
- understanding and application of significance in calculations
- vocational issues involving relevant reference surface and relevant projection surface.

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 CPPSIS5023A Manage advanced surveying computations.

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 checks wherever necessary
- applying formulae 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
- taking responsibility for own outputs in work and

	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

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.

- Geodetic surveying*** refers to:
- surveying that takes into account the shape and size of the earth: points are marked on the ground to which topographic, land and engineering surveys can be related to provide additional coordinated points for mapping and other purposes.
- Objectives*** may include:
- agreed client requirements
 - written survey data specifications.
- Pertinent standards*** are standards essential to the accuracy of:
- calculation of horizontal and vertical information
 - fixing lines for maintaining areas
 - measurement
 - missing measurements
 - recording.
- Project specifications*** refer to:
- detailed technical descriptions of the survey data and its requirements.
- Resource requirements*** may include:
- calculators
 - computers
 - geodetic tables
 - software.
- 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.
- Reference surface*** may include:
- relevant reference ellipsoid
 - sphere.
- Data*** may be:
- measured or otherwise
 - geodetic data derived from:
 - global positioning system
 - 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 latitude: the smaller angle to the earth's ellipsoid at the point and the plane of the equator
 - geodetic parameters
 - other information required on the relevant surface or projection plane.
- Organisational documented and undocumented practices** may include:
- appropriate timelines
 - data processing requirements
 - final product formats
 - formal design parameters
 - teamwork.
- Projection plane** refers to:
- any plane surface mathematically derived by a projection from a reference surface.
- 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, including equal employment opportunity (EEO)
 - 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)

Unit sector Spatial information services