



Australian Government

UEECD0048 Undertake computations in an energy sector environment

Release: 1

UEECD0048 Undertake computations in an energy sector environment

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to undertake computations in an energy sector environment.

It includes determining and applying computational mathematical methods to solve problems or to enhance given data in an energy sector environment.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Not applicable

Competency Field

Cross Discipline

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Determine computation methods

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Computational activities are planned and prepared to ensure work health and safety (WHS)/occupational health and safety (OHS) workplace policies and procedures are followed with the work appropriately sequenced in accordance with job requirements

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| | 1.2 | Data for computations is obtained and verified in accordance with workplace procedures to comply with job requirements |
| | 1.3 | Location in which activities are undertaken or data gathered is determined from job outcome requirements |
| | 1.4 | Applicable computation methods are determined and calculations applied relevant to data gathered and job outcome requirements |
| | 1.5 | Information technology needed to carry out the computations is obtained in accordance with workplace procedures |
| 2 Undertake computations | 2.1 | Computations are undertaken and appropriate calculations applied relevant to data gathered and in accordance with job outcome requirements |
| | 2.2 | Unplanned situations are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment |
| | 2.3 | Ongoing checking and validating of the quality/accuracy of the calculation work results are undertaken in accordance with workplace procedures |
| 3 Complete computation activities | 3.1 | Computation results are verified and checked against estimates |
| | 3.2 | Documentation/reports/computations are completed to ensure all job requirements are met |
| | 3.3 | Work is completed and relevant person/s notified in accordance with workplace procedures |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package

Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UEENEEE150A Undertake computations in an energy sector environment.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEECD0048 Undertake computations in an energy sector environment

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying appropriate calculation methods relevant to data gathered and job outcome requirements
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements
- dealing with unplanned events
- understanding transporting instructions
- checking transport details against job instruction
- obtaining relevant plant and equipment
- transporting plant and equipment in accordance with requirements
- notifying work completion
- undertaking computations in accordance with requirements.
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Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- energy sector applied mathematical concepts of engineering mathematics with calculus, including:
 - mathematical linear measurement in engineering situations encompassing:
 - precision and error in mathematical computations
 - displaying mathematical outcomes in the correct format using the appropriate significant figures and in scientific notation
 - perimeters of plane figures, polygons and the perimeter of shapes involving arcs
 - Pythagoras' theorem to engineering situations
 - mathematical spatial measurement in engineering situations encompassing:
 - areas of combined shapes
 - volume and surface areas of solids
 - right triangle trigonometry in engineering problem solving encompassing:

- problems using the six trigonometrical ratios
- problems involving compass bearings and angles of elevation/depression
- trigonometrical concepts in problems involving inclined planes, vectors and forces and electrical sinusoidal waveforms
- sine and cosine rules in practical applications encompassing:
 - sine rule to solve unknown dimensions/angles in triangles
 - cosine rule to solve unknown dimensions/angles in triangles
- mathematical concepts in basic surveying and computation of areas encompassing:
 - mathematical concepts for radial and triangulation surveys
 - Simpson's Rule in engineering applications
- basic algebra in engineering calculations encompassing:
 - basic operations involving substitutions, additions, removal of brackets, multiplication and divisions
 - solving linear equations
 - transportation in non-linear equations
- linear graphical techniques in engineering problem solving encompassing:
 - graphing linear functions
 - deriving equations from graphs and tables
 - solving simulations equations algebraically and graphically
 - the best line of fit graphically and determine equation
- mathematical computations involving polynomials encompassing:
 - adding, subtracting and multiplying polynomials
 - factorising trinomials
 - solving quadratic equation
- mathematical computations involving quadratic graphs encompassing:
 - graphs of quadratic functions
 - maxima and minima
 - graphical solutions of quadratic equations
 - properties of a parabola
 - applications of parabolas in engineering applications
- trigonometry and graphical techniques in engineering outcomes encompassing:
 - graphs of trigonometric functions e.g.: $V = V_m \sin V$, $I = I_m \cos$
 - addition of equations such as: $v \sin A + u \sin(+)$ graphically
 - Simpson's Rule to determine the average and root mean square values of a sinusoidal waveform
- statistical data presentation encompassing:
 - appropriate presentation of frequency tables, histograms, polygons, stem and leaf plots
 - advantages of different visual presentations
- appropriate sampling techniques for gathering data encompassing:
 - design of surveys and census

- sample data using correct technique
- use of the measures of central tendency encompassing:
 - estimation of percentiles and deciles from cumulative frequency polygons (ogives)
 - interpreting data from tables and graphs, including interpolation and extrapolation
 - analysing misleading graphs
- measures of dispersion in statistical presentations encompassing:
 - box-and-whisker graphs
 - measures of dispersion using variance and standard deviation
 - standardised scores, including Z-scores
- correlation and regression techniques encompassing:
 - interpreting scatter plots
 - correlation coefficients
 - calculate the regression equation and use for prediction purposes
- elementary probability theory encompassing:
 - probabilities in everyday situations
 - counting techniques: factorials; permutations and combinations
- Pascal's triangle and the normal curve encompassing:
 - Pascal's triangle
 - characteristics of the normal curve
 - standard deviation and applications to everyday occurrences
 - probabilities using the normal curve
- differential calculus encompassing:
 - basic concepts - definition of the derivative of a function as the slope of a tangent line (the gradient of a curve); limits; basic examples from 1st principles; notation and results of derivative of $k \cdot f(ax + b)$ where $f(x) = x$ to the power of n , $\sin x$, $\cos x$, $\tan x$, e to the power of x , $\ln x$
 - rules - derivative of sum and difference; product rule; quotient rule; chain rule (function of a function), limited to two rules for any given function
 - the 2nd derivative
 - application - equations of tangents and normals; stationary points; turning points; and curve sketching; rates of change and rectilinear motion
 - verbally formulated problems involving related rates and maxima: minima
- integral calculus encompassing:
 - integration as the inverse operation to differentiation - results of the integral of $k \cdot f(ax + b)$ where $f(x) = x$ to the power of n , $\sin x$, $\cos x$, $\sec^2 x$, e to the power of x
 - the method of substitution
 - the definite integral
 - applications - areas between curves; rectilinear motion, including displacement from acceleration and distance travelled; and voltage and current relationship in capacitors and inductors
- differential equations encompassing:

- first order and separable linear equations
- relevant workplace documentation
- relevant workplace policies and procedures.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices when undertaking computations in an energy sector environment
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

Links

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