Course outline: S01 Solar Basic K125A
UEENEEK125A - Solve basic problems in photovoltaic energy apparatus and systems

Qualification:	Statement of Attainment issued on successful completion
Applicable to:	Learners, industry/employers, governments, community and Global Energy Training Solutions as the provider
Unit of competency:	Accessible from: http://training.gov.au/Training/Details/UEENEEK125A
Related policies:	Policy & Procedure 1 – Enrolment Policy Policy & Procedure 2 – Credit Transfer & Recognition of Prior Learning Policy & Procedure 3 – Learner Support Policy & Procedure 4 – Assessment Policy & Procedure 5 – Academic Misconduct Policy & Procedure 6 – Alcohol & Other Drugs Policy & Procedure 7 – Access, Equity & Diversity Policy & Procedure 8 – Vulnerable People Policy & Procedure 9 – Work, Health & Safety Policy & Procedure 10 – Incident, Injury & Rehabilitation Policy & Procedure 11 – Competency, & Qualification Assessment Decisions Policy & Procedure 12 – Complaints & Appeals Policy & Procedure 13 – Privacy Policy & Procedure 14 – Fees Policy & Procedure 15 – Industry & Employer Engagement Policy & Procedure 16 – Trainers & Assessors Policy & Procedure 17 – Administration & Other Staff Policy & Procedure 18 – Quality Assurance Policy & Procedure 19 – Business & Financial Risk Management Policy & Procedure 20 – Changes to Qualifications or Business Policy & Procedure 21 – Conflict of Interest Policy & Procedure 22 – Records Management Policy & Procedure 23 – Marketing & Advertising
Monitor and review:	Policy and Procedure 18 – Quality Assurance
Responsibility:	Ben Murphy – as Proprietor
Questions/queries:	Feedback and suggestions welcomed: office@gets.com.au (+61) 02 6262 0077

Table of Contents

1. Material requirements

- Internet access (provided)
- Scientific calculator, ruler, pens and pencils
- Note book
- Hand tools
- Covered footwear

2. Course formats

(1.5 days total, 5 days for all 3 units of Competency)

Weekend course (over 4 weekends)				Weekday course – Block (over 1 week)			
Session	**Times**	**Time of day**	**Week day**	**Session**	**Times**	**Time of day**	**Week day**
Session 1	5 pm– 8:30 pm	Evening	Friday	Session 1	8 am – 12 pm	All day	Monday
Session 2	8 am – 12 pm	All day	Saturday	Session 2	1 pm – 4 pm		
Session 3	1 pm – 4 pm			Session 3	8 am – 12 pm	Morning	Tuesday
(Solar Install starts following Session 3)				(Solar Install starts following Session 3)			

Weekday course – 1 day per week (over 5 weeks)				Other pathways
Session	**Times**	**Time of day**	**Week day**	
Session 1	8 am – 12 pm	All day	TBA	RPL and Assessment only pathways available by application.
Session 2	1 pm – 4 pm			
Session 3	8 am – 12 pm	Morning	TBA	
(Solar Install starts following Session 3)				

3. Session activities/tasks

Session	Length	Description		
Session 1	3 - 4 hours	Slide set 1 of 2	Work sheet 1 of 2	
Session 2	3 - 4 hours	Slide set 2 of 2	Work sheet 2 of 2	
Session 3	3 - 4 hours	Theory assessment	Practical assessment	Simulated work place assessment

4. Slide sets

Item	Description	When
Slide set 1 of 2	Solar radiation and solar panels	Session 1
Slide set 2 of 2	Design considerations	Session 2

5. Work sheets

Item	Description	When
Work sheet 1 of 2	Solar radiation and solar panels	Session 1
Work sheet 2 of 2	Energy calculations	Session 2

6. Assessments

Assessment	Description	When	Pass mark
Theory assessment	Multiple choice	Session 3	70% overall, 50% in each Competency Point section
Practical assessment	Solar Machines	Session 3	100%
Simulated work place assessment	Risk assessment, installation/coordination and fault finding	Session 3	100%
Note: Once theory, practical and simulated work place assessments are complete, competency assessment decisions can be made in conjunction with the learner, registered training organisation and employer where applicable.			

7. Version control

Version	Date of release	Author	Authorised by	Position	Reason for change
V2	7/2/2017	Ben Murphy	Ben Murphy	Proprietor	Initial release. Version number consistent with full Course outline review version release.

8. Detailed session breakdown

GETS Competency Point Number and Description		Covered in session No #	Training materials		Assessments materials 'Y' for 'N'		
			Slide set No #	Worksheet No #	Theory Questions	Practical Questions	Simulated Workplace
C1	Define declination angle, latitude anf geographic contour maps.	1	1	-	Y	Y	-
C2	Define radiation, extraterrestrial irradiation, direct and diffuse radiation.	1	1	-	Y	-	-
C3	Define reflectance and solar window.	1	1	-	Y	-	-
C4	Define azimuth, altitude angles, solstice, equinox and tilt angle.	1	1	-	Y	Y	-
C5	Define anf distinguish between irradiation and irradiance.	1	1	-	Y	Y	-
C6	Interpret solar radiation data tables, sunshine hours.	1	-	1	Y	-	-
C7	Measure solar irradiance with a solarimeter.	1	-	1	-	Y	-
C8	Describe the yearly variation in radiation on a fixed collector.	1	-	1	Y	-	-
C9	Determine, using sun path diagrams, when shading will occur.	1	-	1	-	Y	-
C10	Calculate daily average horizontal radiation for a given site.	1	-	1	Y	-	-
C11	Use tables, sun path diagrams and software to calculate a PV array’s monthly mean daily irradiation.	1	-	1	Y	-	-
C12	Describe how the monthly mean daily irradiation varies during a year.	1	-	1	Y	-	-
C13	Describe how shading effects monthly mean daily irradiation during a year.	1	1	-	-	Y	-
C14	Determine the best tilt angle for fixed or seasonally adjustable PV arrays.	1	1	-	Y	-	-
C15	Define the terms PV; cell, module and array.	1	1	-	Y	-	-
C16	Define the terms mono-crystalline, poly-crystalline and amorphous.	1	1	-	Y	-	-
C17	Define the terms semi-conductor and band gap energy.	1	1	-	Y	-	-

GETS Competency Point Number and Description		Covered in session No #	Training materials		Assessments materials 'Y' for 'N'		
			Slide set No #	Worksheet No #	Theory Questions	Practical Questions	Simulated Workplace
C18	Identify the 5 major parts of a typical PV cell.	1	1	-	Y	-	-
C19	Identify the 4 major steps in the production process of typical PV cell.	1	1	-	Y	-	-
C20	Identify the 4 major steps in the production process of a thin film PV cell.	1	1	-	Y	-	-
C21	Describe the basic differences between mono, poly-crystalline and amorphous PV cells.	1	1	-	Y	-	-
C22	Use maker's documents to find the efficiency, spectral response, cost and typical applications of typical commercial PV modules.	1	-	1	Y	-	-
C23	Describe the features of thin film, dye sensitive and hybrid PV cells.	1	1	-	Y	-	-
C24	Describe the mechanical and electrical constraints that allow for a long life PV array.	1	1	-	Y	-	-
C25	Define I-V curve, fill factor, and operating point.	2	2	-	Y	-	-
C26	Define maximum power point (MPP), cell temperature coefficient.	2	2	-	Y	-	-
C27	Define nominal operating cell, temperature, current, voltage and power output temperature coefficients.	2	2	-	Y	Y	-
C28	Label the 4 major parts of a PV cell's equivalent circuit.	2	2	-	Y	-	-
C29	Label the I-V curve for a PV cell.	2	2	-	Y	-	-
C30	List the 5 major PV characteristics.	2	2	-	Y	-	-
C31	Calculate, using the load line method, the operating point of a PV module.	2	-	2	Y	-	-
C32	Distinguish between the function, placement and ratings of blocking and bypass diodes.	2	2	-	Y	Y	-
C33	Describe the effect of partial shading on a PV module.	2	2	-	Y	Y	-

GETS Competency Point Number and Description		Covered in session No #	Training materials		Assessments materials 'Y' for 'N'		
			Slide set No #	Worksheet No #	Theory Questions	Practical Questions	Simulated Workplace
C34	Describe the role of bypass diodes on a module’s output under typical operating conditions.	2	2	-	Y	Y	-
C35	Calculate the power at MPP, given irradiance and ambient air temperature.	2	-	2	Y	-	-
C36	Calculate a module’s power under typical battery charging conditions, given irradiance and ambient air temperature.	2	-	2	Y	-	-
C37	Calculate the daily energy output of a PV array, using AS 4509.2, and by using "rule of thumb" de-rating factors.	2	-	2	Y	-	-
C38	Outline the Standards relating to the expected performance of PV modules.	2	-	2	Y	-	-
C39	Describe the electrical characteristics of a PV module, using a Standard outdoor test method.	2	-	2	Y	-	-
C40	Demonstrate effective use of Risk Assessment in a practical situation.	3	-	-	-	-	Y
C41	Demonstrate effective Co-ordination of materials, equipment and knowledge in a practical situation.	3	-	-	-	-	Y
C42	Demonstrate effective Installation methods and in a practical situation.	3	-	-	-	-	Y
C43	Demonstrate effective Fault finding techniques in a practical situation.	3	-	-	-	-	Y